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AN INTRODUCTION TO APPLIED PSYCHOLOGY



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AN INTRODUCTION TO APPLIED PSYCHOLOGY

BY

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PREFACE

There is one fact about the study of human nature that causes every teacher no end of amazement. This fact is that the student, even of a book on applied psychology, will suppose that the events he reads about and the conclusions that are drawn must concern some other person than himself. This very day, for example, the reader of these lines will have been attracted by an advertisement, signed for some insurance that he did not want, remarked the strange differences between himself and his friends, followed a custom, either in clothing, in political opinion, or in social attitude, used an awkward method of learning an oration, given unreliable testimony about an accident, forgotten the name of a familiar person, suffered from some one of the many forms of maladjustment, or found himself ill-adapted to his curriculum, but when he reads about the psychological side of these various episodes, he will still not believe that he is discovering any information that pertains to his own conduct.

Nothing can be so plain as the fact that the persons who study this book are the persons of whom the experimental psychologist speaks and writes. That most of us do not know this to be true is due, in part, to our own lack of imagination and, in part, to the way in which the facts and principles of psychology are presented to us. So far as the student is concerned, every attempt has been made in the following pages constantly to remind him that he is looking at a fairly accurate photograph of himself and of his doings. The only way to know what the science of human nature is about and how it can be applied to various situations is to remember the situations in which the reader himself has been placed or to imagine those in which he may be placed. He must remember, also, what he and others did and thought about them.

A part of the usefulness of this study of applied psychology, then, depends upon the reader himself. The other part, viz., the task of presenting the facts of applied psychology so that they will have an immediate personal value, will be much more difficult. The author has done his best, however, to make the reader realize that his own actions, and the actions of persons like him, are under examination. In so far as the author has failed to do this, he will justify himself by

offering several excuses. He will remember, in the first place, that the psychologist has always been over-zealous in drawing a sharp distinction between the pure and the applied sciences. He has been forced into this distinction because no one of the sciences has had to begin its work in the face of so much prejudice, faulty opinion, and tradition. In the second place, the author will excuse himself because all of the sciences tend to become more and more abstract, that is, further and further removed from practical matters, as they grow older. They leave common-sense opinion behind. Physics is a first-rate example of this fact. He who would write about the applications of psychology, then, must try to translate abstract knowledge into concrete and usable information. The task of a translator is never an easy one; but the attempt must be made or else society, to say nothing of its members, cannot hope to profit from a science of which it stands greatly in need at the present time. Finally, psychology has more often served as an attendant on religion and theology than as a companion in the factory, in the schoolroom, in the law court, in the hospital, or in the social arena. It now has these additional duties, and the very statement of these duties has meant a change in methods of defining the subject matter of the science which is not easily grasped by the beginner.

It will not be altogether easy, then, to write this description of psychology in actual operation. The student will not think of himself and of his own daily life as we do so, and neither will the author escape the dangers that surround the translator of a science into sound practice. Nevertheless, the task is undertaken in the hope that at least a partial success may be achieved. Where there are facts, we shall use them, for they are now to be had in great abundance, but elsewhere we must trust to the best judgment of the experimenters who have ventured to express an opinion. We shall take the reader to some of the affairs that concern him most in his daily life, to the domain of political and social affairs, to the hospital, to the schoolroom, and to the criminal court, to industry and to commerce, and to buying and selling. In fact, we shall go wherever experimental psychology is inclined to take us, for it is the laboratory that has led most directly to the arts of practical control.

The book is formally divided into eight parts; but, as a matter of fact, there are only three major sections. The first section (Part One) looks at the student himself in his daily living. We cannot, of course, cover this whole field, but we have sought to pick out some of the

activities which stand close to the reader in his daily commerce with his fellows and with his work. The second section (Parts Two to Seven) considers the several more formal branches of applied psychology. The third section (Part Eight) will serve both as a summary of the whole book and as a repository for certain types of information which are the common property of all of the branches of applied psychology. We shall describe, for example, the general problems of experimental psychology, the problems of original nature and training, the principles of learning, and some of the larger aspects of human fellowship.

If the student of this book finds, at the end of his course, that he knows something about the domain of applied psychology and if, at the same time, he has caught a glimpse of what it means to take a scientific point of view toward the study of human nature, he will be indebted, in part, to the five years which the writer spent in the study of thought and action on the athletic field. In more senses than one, the athletic field is a little bit, and a very practical bit, of the whole of living. The reader will be most heavily indebted, however, to all of the men who have laid open to inspection the facts and principles which make up the body of the book. The author has served as not much more than a reporter to the student for these men.

It is a pleasure to recognize the faithful work of Miss Virginia Wucher who has prepared the manuscript for the press.

COLEMAN R. GRIFFITH

URBANA, ILLINOIS
September, 1934

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PART ONE

PSYCHOLOGY IN STUDENT LIFE

CHAPTER ONE

SOME HAZARDS OF THE OPEN ROAD

1. *Introduction.*—The best place to begin a study of the problems of applied psychology is with the conduct and experience of the reader himself. In order to show that this is really the case, we shall recite for him a few of his own daily actions. We shall begin with the very act of reading these first few words, for such an act raises questions about the uses of psychology which are far more important than the student may realize. The chances are that many of the persons who look at these pages will be able to cover not more than fifteen or twenty of them in an hour. There are some students, however, who will be able to read them at the rate of one hundred pages an hour. Moreover, in spite of their speed, they will be able to understand what they have read and recall their information at some later date just as efficiently in proportion to rate of reading as the slower readers do. We mean to say, then, that the art of reading is a type of psychological operation which is subject to practice and hence to improvement. This fact alone ought to convince the student that anyone who in interested in making the best possible instrument out of himself can hardly afford to remain without that kind of knowledge which it is the function of applied psychology to make known.[1]

Even were the student to abandon this book at this point, he would still find that the facts just mentioned about speed of reading may make a great difference in the way in which he drives an automobile. This is to say that escape from a dangerous situation may often depend, in part, on the quickness with which the driver sees a dangerous situation develop. Moreover, escape from collision may rest upon the quickness with which the driver can apply his foot to the brake pedal or upon his skill in coordinating his arm movements with the movements of his feet. This factor of quickness in reaction often marks the difference not only between a good driver and a poor driver, but between a good athlete and a poor athlete, a good factory hand and a poor factory hand, a successful and an unsuccessful surgeon, or an alert salesman and a sluggard.

[1] The student may expect to find a further discussion of these problems in Chapter Six.

As a second illustration of the place of psychology in daily affairs, let us suppose that the morning has been started with a second cup of coffee. We all know that coffee and tea contain a drug which has the effect of increasing both pulse rate and blood pressure and which presumably has certain beneficial effects upon different types of psychological function These facts have been noted by those persons who feel that the day is not really begun until they have had their morning cup They are recognized, too, by persons who are used to an afternoon tea and by students who often think that they can prepare themselves for an examination during the late hours of the night with the aid of the stimulus furnished by caffeine. Just what are the effects of this drug upon learning, reaction time, motor coordination, problem-solving, and other types of psychological operation? That is, does the experimental laboratory say anything about the way in which the use of this and of other drugs will affect the human organism when it is at work? [2]

These two illustrations may appear to be trivial indeed, but we have used them because we wish to show that applied psychology can touch the student in the plain things of life as well as in some of his more complex and even in some of his more troublesome difficulties. Let us think, for example, of a person who can do well in his studies because he learns readily, sees deeply into the meaning of facts and propositions and recalls, after long periods of time, much of the material that has been presented to him It often happens, however, that such persons are wholly out of contact with other persons simply because they do not know how to adjust themselves to their friends or make themselves comfortable in the presence of their teachers. That is, being qualified in some respects to do their work well, they turn in poor records simply because they have not learned how to adjust themselves to the persons around them.

The chances are that students who suffer from maladjustments of this type easily become vexed over their poor showing in the classroom or on an examination. Their vexation displays itself in periods of worry, anxiety, depression, and sleeplessness, and in feelings of inferiority or even of repression. They may try to make up for their handicap by taking advantage of the work of other people or by compensating for their weakness in one of the many forms of psychoneurotic behavior. Most of us have been taught to believe that behavior of this type is more or less inevitable because it is hereditary, but the experimental psychologist has been able to show that

[2] Many of the factors that lead to variations in efficiency will be found in Chapter Thirty.

most, if not all, forms of maladjustment have been acquired during early childhood training This means that the applied psychologist ought never to say, in answer to queries from troubled people, "I am sorry for you but that is the way you were born." On the contrary, he is now able to say that the worried or depressed, the anxious, the introvertive, or the maladjusted person can find real relief from his troubles. Moreover, he can say that, with a little practice, relief can sometimes be made permanent.[3]

We might, if we wished to write out this entire book in the first few paragraphs, run through the twenty-four hours of the day, pointing out uncounted places where differences in the way in which a person's psychological apparatus is used, separate the successful, comfortable, and productive man from the unsuccessful, the unhappy, and the maladjusted man During the average day, for example, we ask all sorts of questions about the influence which the opinions of others have upon us, about the extent to which our own actions are governed by those vague and indefinable forces called social agents or institutions, about the circumstances which enable some persons to achieve a prominent place among their fellows, about the differences between men and women and between members of the various races, about those curious persons in any social group who appear queer, ill at ease, or even deranged, about the miscarriage of justice in a law court and the apparent prejudices of a witness, about the strange discrepancy in the effects of training or education on different persons, about the wistful yearning that may be created by a sunset, a painting, or a piece of music, about the weak-willed way in which we follow the command of an advertisement or the invitation of a salesman, about the pressing problem of choosing a career, and so on.

We have asked the reader to remind himself of all of these common matters because we wish to raise and to try to answer a very important question regarding them. We have long since become accustomed to the idea that the things around us are not worth having unless they are of the very best quality. An old typewriter, a noisy radio, or a squeaky automobile are quickly laid aside because we have been taught to believe that efficiency is the first mark of a modern man. It is not very often, however, that we think of our own psychological operations in these terms. Before we were old enough to reflect about such things, we learned how to read and to write,

[3] Two useful books in this field are Sherman, M., *Mental Hygiene and Education*, N Y., Longmans Green, 1934 Morgan, J J B, *Keeping A Sound Mind*, N Y, Macmillan, 1934.

how to walk, to run, and to throw, how to speak, how to feel about certain kinds of situations and to think with respect to others, and how to express ourselves in those curious patterns of behavior called "personality traits." It has been fairly easy, therefore, for most of us to approach early maturity under the conviction that we have always been much as we are at the present moment. If we do not think this about ourselves, we almost certainly think that, in the future, we will be just what we are now. We hold this to be true, in particular, of our character traits, of our prevailing moods, emotionalized actions, and dispositions, of our attitudes and prejudices, and of our principal interests To be sure, we all hope to become a little wiser or a little more seasoned with experience, but we do not suppose that our "original" nature will change much. All of this means that we have not been taught to think of ourselves as we might think of the mechanical instruments around us. In other words, we have not been taught to believe that human nature can be engineered in somewhat the same way that we engineer a bridge or a highway.

It is the purpose of the pages which follow to show how facts drawn from the psychological laboratory can be applied to the daily conduct and experience of persons like those who happen to study this book It is true, of course, that the science of psychology is much less developed than the sciences of physics, of chemistry, and even of biology. At first sight, therefore, it might seem reasonable to try to apply these "more real" sciences to human living through medical practice, and through industry as in the erection of bridges, the construction of automobiles, or the stringing of telephone lines; but not very many people think it worth while to try to make themselves more intelligent about their own nature and about the ways in which this nature can be fashioned. Human beings differ from the lower animals, in part, because of the great speed with which they may secure profit from past experience. This is not to say, however, that the average person learns as readily as he could if he paid more attention to the principles of effective learning. Likewise, human beings differ from the lower animals in the variety and complexity of the problems which they can solve. No one could ever argue, however, that human beings solve problems as quickly as they might were they to find out more about the nature of problem-solving and about the ways in which it may be developed. If we may take one more illustration, human beings differ from animals in the richness and variety of their personality traits. It is a curious

fact, however, that the aesthetic impulses, while frequently expressed in stone, with paint, or through sound, have not often been expressed in personal character. In other words, we commonly suppose that personal quality is a blind gift from heredity or a chance consequence of an educative process that is, for the most part, informal and undirected. Even though the church and the secular and social school bring strong forces to bear upon the development of moral, ethical, and social traits, it still remains true, as recent experiments show, that this phase of personal development is more often an expression of chance factors which are operating during the pre-school years than it is of serious intent on the part of a mature person to seek as much perfection in himself as he demands in his automobile.

We do not mean to say, of course, that perfection in human nature is to be of the witless mechanical form that we expect of a machine. On the contrary, we mean only to argue that every person is a psychological agent who has acquired more or less aptness in getting along in the world. As a rule, emphasis is to be laid upon "less" rather than upon "more" because we have not supposed that we could really improve our quality as personal agents or make ourselves more effective even in the most common of our daily affairs. To go back to the illustration with which this chapter began, we may say that many students are less apt in rate of reading and in degree of comprehension than they might be. If they are to become more apt, they will not on that account become more mechanical even though, from a good many points of view, they will have become more efficient.

2. *Driving a Car.*—If it should happen that approximately 3,700 people were to read this book, we can be fairly sure that one of this number will be killed in an automobile accident within a year. On the average, also, we can be pretty sure that one out of every hundred readers will be injured in an automobile accident within a year.[4] From one point of view, many of these accidents are to be attributed to a mechanical fault such as defective steering gear, worn brake linings, a failure on the part of a danger signal, or to a weak tire; but from another point of view they are all due to a psychological factor. It is the purpose of this chapter to find out how the psychological factor operates in automobile accidents and to name some of the things that can be done to prevent them.[5]

[4] Report of the National Safety Council, Chicago, 1931, p. 19.
[5] Martin, R. E., "Are you fit to drive your car?" *Pop Sci. Mo*, 1930, *116*, 55–56.

We may begin with a study of some of the circumstances which surround the operation of an automobile. We shall assume that the person we are describing already knows how to steer, how to change the gears, and otherwise how to handle the machine in which he is riding. Were we to begin at an earlier point, that is, were we to begin with a person who had not as yet driven a car, it would be necessary to name some of the principles which have to do with the acquisition of suitable habits or skills. Since it will be much more convenient to treat this topic in another place, we shall assume that we are dealing with a person who has already passed this stage.

If an automobile is to be driven safely, it is essential that the driver shall know something about three aspects of muscular movement. There is (i) the matter of quickness of reaction, (ii) the matter of muscular coordination, and (iii) muscular judgments of movement. We may illustrate the first factor in this way. Let us suppose that our car is proceeding south along a highway toward an intersection. A first glance to the right and to the left may have betrayed no signs of another car, but just as we reach a point some fifty feet from the intersection, we see that another car is actually at hand. Moreover, we note that this car has the right of way. How quickly can any given driver apply his feet to the brakes? That is, in the face of an emergency of this sort, how will the personal equation of the driver affect the situation?

Fortunately, there are experiments which answer this question. In the first place, it is known that persons differ widely from one another in what is called their reaction time. If, for example, each member of a group of subjects is asked to react as quickly as he can, by tapping a telegraph key, to a bright light which is flashed suddenly in front of him, the results will show that the quickest man may react in just a little less than a tenth of a second. Slower men, on the contrary, will react only after one and a half or two-tenths of a second have passed.[6]

It is sometimes said that such short times as these cannot have

[6] Cf. Garrett, H. E., *Great Experiments in Psychology*, N. Y., Century, 1930, Chap. IX. Other studies on the various aspects of reaction time are: Jacobson, E., "Response to a sudden unexpected stimulus," *J. Exper. Psychol.*, 1920, *3*, 19–25. Miller, M., "Changes in response to electric shock produced by muscular conditions," *J. Exper. Psychol.*, 1926, *9*, 26–44. Cassell, E. E., and Dallenbach, K. M., "Effect of auditory distractions upon sensory reactions," *Amer. J. Psychol.*, 1918, *29*, 129–135. Woodrow, H., "The measurement of attention," *Psychol. Monog.*, 1914, *17* (No. 5). Burtt, H. E., "Effect of uniform and non-uniform illumination upon attention and reaction times with special reference to street illumination," *J. Exper. Psychol.*, 1916, *1*, 155–182.

much bearing upon skill in driving a car It is easy to see, however, that they may and often do make the difference between a safe journey and an accident. If an automobile is traveling thirty miles an hour, that is, forty-four feet per second, it will travel a little over four feet in a tenth of a second. Of two drivers, then, who differed from one another by a tenth of a second in reaction time, the one could easily avoid an accident while the other might not be able to escape. If this situation does not seem real, we may take a parallel case on the athletic field. Let us suppose that two track men differ from one another by much less than a tenth of a second In the hundred-yard dash, the runners are traveling at the rate of thirty feet per second or three feet every tenth of a second. Anyone who has seen a hundred-yard dash knows that such races are often won or lost by less than three feet. In a close race, inches may count.

Inches may also count on the football field where two lines are charging against each other. In this case, it can easily be shown that a line of forwards which consistently outcharges another may do so for no other reason, apparently, than a difference in average reaction time. But with respect to quickness in applying the brakes, there is even more direct evidence. The reaction times described above are exceedingly simple as compared with the actual use of a brake. It turns out that the foot reactions of a group of drivers to an auditory stimulus range from 0.31 of a second to 1.02 seconds. The average reaction time of the group of subjects was 0.54 second. If we compare the fastest subject with the slowest, we shall see that they differ from one another by seven-tenths of a second. At a speed of thirty miles an hour this would mean a difference of approximately twenty-eight feet between the two drivers.[7]

It is hardly necessary to argue that distances of this magnitude, due as they may be to differences in reaction time, are enormous. It is no wonder, then, that students of these problems often point to reaction time as one of the important items in accident cause and cure. The situation is not quite so simple, however, as we have seemed to put it. It has been shown that persons who have suffered accidents repeatedly display, on the average, a slower reaction time than others: but the same data show that men with the quickest reaction times may suffer more accidents than men with interme-

[7] Moss, F A, and Allen, H H, "The personal equation in automobile driving," *J Soc. Automot Eng*, 1925, *16*, 415–420. See also Forster, W A., "Test for drivers," *Person J*, 1928, *7*, 161–171.

diate reaction times. The inference is that men who know they are quick to react will take more chances than slower men would take. In any case, the conclusion that might be drawn from such studies is clear. The man who elects to be wise before the event will know something about his reaction time and regulate his driving accordingly.

The second feature of the muscular movements used in driving is named by the word "coordination." This word refers to the readiness with which movements in different members of the body may be fused together in a simple, effective, and even graceful pattern. In the game of golf, for example, it has been said that par play depends as much upon a smooth or coordinated swing as it does upon any other single factor.[8]

The problem of coordination would not concern the automobile driver were there not a great many occasions when his life depended upon it. We may think, for example, of the art of keeping to the road while lighting a cigarette, while fanning a bee out of the window, while grasping at a blown hat, and so on. These types of coördination involving, as they do, the simultaneous use of different members of the body for different purposes, mean that the driver must learn how to become, so to speak, a multiple personality. It turns out, however, that some men cannot even look far to the right or to the left without having movements of their heads interfere with arm movements.[9] There is, of course, no relation between speed of reaction and accuracy in coordination.[10]

The third feature of the motor skills used in driving is sometimes called kinaesthetic judgment. Judgments of this type become more or less skillful in the case of gear shifting where the driver seldom moves the lever too far Obviously, such judgments are a result of training [11] This kinaesthetic factor, in conjunction with vision, is often used by the driver in his decisions as to where the wheels on the far side of the car are running. Such estimates of position are especially valuable in parking near other cars, in running along

[8] Cf Pear, T H, "Integration of well-adjusted performance," *Person J*, 1927, *5*, 478–489.

[9] Perrin, F, "An experimental study of motor ability," *J Exper Psychol*, 1921, *4*, 24–57 Muscio, B, "Motor capacity with special reference to vocational guidance," *Brit J Psychol*, 1922, *13*, 157–184 Seashore, R H, "Individual differences in motor skills," *J Gen Psychol*, 1930, *3*, 38–66

[10] Hansen, C F, "Serial action as a basic measure of motor capacity," *Psychol Monog.*, 1922, *31* (No 40) This fact will be discussed in more detail in a later chapter

[11] Freeman, G L, "The influence of attitude on learning," *J Gen Psychol*, 1930, *3*, 98–111

mountain roads, and in passing other cars on a crowded highway. They, too, are highly subject to training. They enable the driver to extend himself, so to speak, to the parts of his car. The feeling one has under these conditions is sometimes called empathy, that is, a sense of feeling one's self into an object.[12]

3. *Signs and Signals.*—The simple account we have just given of some of the motor factors found in the actual operation of a car reveal but a part of the whole picture. Another part has to do, in particular, with the way in which signs along the highway may be used and, in general, with other signals and marks that may play a part in safety. Perhaps the most significant of these are street signs and variations in illumination.

We may consider artificial signs first. The psychological problem here is simply this. What colors offer the best visibility, both during the day and during the night, when artificial light is thrown upon them? Since it is not possible to use one set of signs during the day,—in which case, white may be used,—and another set during the night, some compromise must be effected. As every driver knows, this compromise has turned out to be a certain quality of yellow. The experiments that have been made on this question seem to say that both the board and the instructions written upon it stand out to good advantage or to optimal advantage during all kinds of driving conditions. If black letters are placed upon a yellow background, the best average conditions are obtained whether it be day or night, wet, cloudy, or dry. There are, perhaps, other colors which would stand up better against wind, dust, and rain; but this would be to solve the problem of visibility in terms of paint rather than in terms of the human factor.[13]

We may grant, then, that an efficient board can be found. It is quite another matter, however, to make sure that this sign will be seen on all occasions. As a matter of fact, it happens too often that signs are not seen. In this event, we may question either the sign

[12] Hoisington, L B, "On the non-visual perception of the length of lifted rods," *Amer J. Psychol*, 1920, *31*, 114–146 Weber, C O, "Properties of space and time in kinesthetic fields of force," *Amer J Psychol*, 1927, *38*, 597–606 Fernberger, S W, "Experimental study of the stimulus error," *J Exper Psychol*, 1921, *4*, 63–70 Rudisill, E S, "Constancy of attitude in weight perception," *Amer J Psychol*, 1925, *36*, 562–587

[13] Luckiesh, M, and Moss, F F, *Seeing—A Partnership of Lighting and Vision*, Baltimore, Williams and Wilkins, 1931 Luckiesh, M, *Light and Work*, N Y, Van Nostrand, 1924. Sumner, F C, "Influence of color on legibility of copy," *J Appl Psychol*, 1932, *16*, 201–204 Feree, C E, and Rand, G, "Visibility of objects as affected by color and composition of light," *Person J*, 1931, *9*, 108–124, 475–492 See also Weinland, J D, "The perceptibility of automobile license numbers," *J. Appl. Psychol*, 1926, *10*, 277–283.

or the driver, but questions directed at the driver seem to be more significant. The psychological situation runs about as follows. No person can see everything in his field of vision at one and the same moment. On the contrary, one object will now become prepotent in determining the reactions of an individual only to lose its place in favor of another. This fact about stimulus situations is often described by the word attention Now it happens that some objects may become so dominating in their control of the movements of a person that all other objects, even though they may rest well within the field of vision, will have no effect upon him. It is this fact which often lies behind the puzzling feats of the sleight of hand performer. Much that he does depends upon the fact that, while we are attending to one object, we are almost sure to be drawn away from all others. So far as we are concerned, then, they will not be in existence.[14]

As an illustration of the frequency with which this sort of lapse in vision may occur, we may go to the athletic field. The basketball player, for example, often wonders why, during the heat of an attack on the goal, the ball is not thrown to him as he stands in the open. When the player who might have passed the ball to a free man is asked about the matter, his reply usually is that he did not see his teammate It can be shown that this sort of blindness for a teammate may occur even though the one man is standing directly within the field of vision of the other. In other words, looking, he does not see. So, too, on the highway. There are a great many objects along any road which will invite inspection. On occasion one of these objects may invite such close inspection as to make the driver blind to the danger signal at the side of the road. From one of the studies that have been made upon this factor, it appears that about eight per cent of the accidents occurring to employees of the Cleveland Railway Company were caused by lack of attention to the right of way [15]

There is, however, another feature of perception which is not often taken into account in driving a car It is now well known that short moments of blindness may be caused by eye movements. If the student will make a pinhole in the page of this book and then look, from the back side, at the eyes of a reader of the page, he will see that the reader's eyes move across the page in a series of jumps.

[14] Cf Houdini, *A Magician among the Spirits*, N Y , Harper, 1924, *passim*
[15] See Viteles, M S , *Industrial Psychology*, N Y , Norton, 1033, pp 382 ff

That is, the eyes will make a series of flights and perches. Now it can be shown that clearest vision occurs only during the perches. It can be shown, also, that vision during the flight of the eyes is highly blurred if not even obscured.' The author has read this paragraph with great care, but there may still be one or more typographical errors in it. If this is the case, he will excuse himself by saying that the misspelled word must have been looked at during the period of flight rather than during a momentary perch. In short, then, there are moments when the eyes are virtually blind, as every proofreader knows.[16]

Most athletes will be able to say that this fact certainly holds true on the field of competition. At the moment a forward pass is thrown, the defensive halfback has an almost irresistible impulse to let his eyes flutter over the whole field of play. The result is that he is almost certain not to see the significant parts of the play as it develops. The ball will be in the air or in the arms of the receiver before he is ready to protect his sector. Players of this type have been converted into very respectable defense men by the simple expedient of training them to keep their eyes more or less motionless during the development of a play instead of allowing them to flutter wildly over the field. In other words, where action is swift and where there are many things to be seen, one way of using the eyes leads to blurred vision while another leads to clear vision.[17]

We may now apply these facts to the act of driving. Let us suppose that we are approaching an unprotected crossing which is beset with signs pointing to various goods or places. If we are in a hurry, we shall dislike to apply the brake and will compensate with an extra quick glance at the road to the right and to the left, and to all of the signs which may tell us how to turn. Under these circumstances, it may easily happen that a car on the right will not be in existence for us simply because the eyes were in rapid flight during that particular moment in our inspection of the whole situation.

The remedy for failures of this type is easy to find. It consists

[16] Crosland, H R, "An investigation of the proofreader's illusions," *Univ of Oregon Pub.*, 1924, 2 (No. 6), 1–168

[17] Unpublished data from the University of Illinois Laboratories for Research in Athletics. There is a large experimental literature on the nature and functional significance of eye-movements References may be found in Travis, R C, and Dodge, R, "Ocular pursuit of objects which temporarily disappear," *J Exper Psychol*, 1930, *13*, 98–112 See also Dodge, R, "An experimental study of visual fixation," *Psychol Rev Monog Suppl*, 1907, *10* (No 35) Miles, W R, and Bell, H M, "Eye-movement records in the investigation of study habits," *J. Exper Psychol*, 1929, *9*, 450–458

simply of finding a point of fixation for the eyes at some favorable moment before actually running through the crossing. This remedy is particularly helpful during high speeds when times are short and choices must be made quickly During such moments a pair of fluttering eyes will lead to disaster just as quickly on the highway as on the athletic field. Where speeds are low, these points of fixation should be both to the right and to the left. If, in a more remote appraisal of a distant crossing, one has noted that there are no obstacles to vision on one side of the road, there will be a tendency on the part of the driver to make a last-moment sweeping inspection of this side and to give his particular attention to the point where there is an obstruction. Reports from drivers seem to suggest that this is a particularly dangerous situation, for accidents occur not with respect to cars which suddenly emerge from behind an obstruction but with respect to cars which were in "plain sight" all of the time.

Still another aspect of this problem of overlooking an object, even though it may be fairly familiar, has been noted by several observers. There is an older theory of such incidents which says that the average color scheme of an object may be leveled out because of the colors of surrounding objects. Then, too, there are times when, in looking at a whole situation, action may be directed by the situation as a whole rather than by some part of it. In looking down a roadway, for example, a driver might allow his perceptual functions to be regulated by the general pattern of the situation instead of by some particular item in it. This would mean, of course, that the particular item, say, a sign or a warning, could not become prepotent in the regulation of behavior.[18]

Although we shall present the main facts in more detail in Chapter Thirty, we ought to refer briefly here to the manner in which driving during the night is affected by variations in street illumination. In general, the perceptual situation on the street is very much like that which obtains in a room which is artificially lighted. Any areas which produce glare serve as a source of distraction. Moreover, variations in relative brightness are known to have a marked effect upon speed, accuracy, and constancy of response to visual stimuli. The automotive industry has already taken care of unnecessary reflections in windshields and from wet pavements. Some at-

[18] Titchener, E B, "The overlooking of familiar objects," *Amer J. Psychol.*, 1924, *35*, 304–305 Ruckmick, C. A, "On overlooking familiar objects," *Amer. J Psychol*, 1926, *37*, 631–632

tempts are also being made to introduce indirect lighting on highways wherever possible. It still remains true, however, that night-time driving is full of hazards, and the person who has not studied himself in relation to these hazards can scarcely call himself a competent driver.[19]

4. *Cutting In and Out.*—One of the most dangerous practices in cross-country driving is named by the phrase "cutting in and out."[11] When the car ahead is moving too slowly, one has a natural impulse to pass it by. If the roadway is congested with traffic, skill in passing the car ahead rests upon one's ability to make a quick judgment of a variety of speeds and of a variety of distances. The driver must, for example, estimate his own speed and his acceleration with reference to the speed of the car ahead of him. Moreover, he must calculate the speed of the car that is approaching in the other lane. Finally, he must make some judgment about the relative distances that must be covered by all three cars if the act of passing is to be done safely.

A normal adult makes all of these judgments more or less skillfully without ever having, to his own knowledge, practiced any of them. He is apt to conclude, therefore, that the perception of rates of movement and of distances is a natural born trait of which some persons get a great deal while others get a small amount. The same opinion prevails on the athletic field where a coach may say of a man that he is a natural born open-field runner. There is no truth in these statements. The perceptions of both distance and movement are skills which are acquired in childhood and which depend, for their excellence, on the way in which the child has used its eyes on the playground and in the schoolroom.[20]

Judgments of distance are known to rest upon a variety of factors. There is, first, the matter of size. Other things being equal, a small car must be some distance away. If the driver has paid no attention whatsoever to different makes of cars, he will be deceived, of course, when he makes his judgments rest upon the size factor alone. Very

[19] Johnson, H M, "Speed, accuracy, and constancy of response to visual stimuli as related to the distribution of brightnesses over the visual field," *J Exper Psychol*, 1924. 7, 1–44 Johnson, H M, "Influence of distribution of brightnesses over the visual field on time required for discriminative responses to visual stimuli." *Psychobiol*, 1918, *1*, 459–494. Holladay, L L, "Glare of street lamps and influence on vision," *Trans Illum Eng. Soc.*, 1926, *21*, 960 ff

[20] See Wagoner, L. C, *Development of Learning in Young Children*, N Y, McGraw-Hill, 1933, *passim* Carr, H, and Hardy, M C., "Perception of relative movement," *Psychol Rev*, 1920, *27*, 24 ff Loemker, K K, "Certain factors determining the accuracy of a response to the direction of a visual object," *J. Exper. Psychol*, 1930, *13*, 500–518.

remote cars are not only smaller in size but somewhat blurred in outline as well This holds true both by day and by night. By day, heat rising from the pavement blurs a distant car more than a near car. By night, reflections and dispersions of the headlights of an approaching car are greater, the greater the distance.[21]

There are other factors, however, which can be used to estimate distances. Most highways are lined with telephone poles. Any casual glance at these poles shows that they are evenly spaced. A glance which is just as casual will show that an approaching car is ten or twelve telephone posts away. The most important factor in the perception of distance, however, and especially of short distances, is created by the fact that every normal person has two eyes which are separated from each other by several inches. This means that the images cast upon the retinas of the two eyes differ slightly from each other. This fact is commonly and easily illustrated by the stereoscope which used to have a prominent place in every living room. Through experience we learn to interpret these double pictures of near objects in terms of their relative distances [22]

We do not propose, however, to go into a treatment of the psychology of vision For our purposes, there is only one important fact about perceptions of distance and of movement, viz , that skill in both is a product of learning. If one person is more skillful than another, he has become more skillful because he has had the opportunity,—unintentionally, perhaps,—to exercise himself in this respect. We seem, then, to have a very practical solution of the problems created by dangerous cutting in and out of traffic. The driver who finds himself incompetent in this respect might easily give himself further training with the same enthusiasm that he trains himself in driving a golf ball. The difference between these two situations is simply this Most of us feel that the accident will always happen to the other fellow, while the poor golfer is rarely the other fellow There is, perhaps, another difference in these two situations A golf club is not a very dangerous weapon. We should, therefore, learn to use it with as much skill as possible. A car, on the other hand, equipped as it is with tremendous power, and full of danger to life and limb, should be used with whatever skill we happen to possess when we get into it.

[21] Titchener, E B , *A Textbook of Psychology*, N Y , Macmillan, 1910, pp 303–338 Also Dashiell, J F , *Fundamentals of Objective Psychology*, Boston, Houghton Mifflin, 1929, Chap XIII

[22] Titchener, E B , *op cit* , pp 303–373

5. *Driving Habits.*—The above comment on human nature leads directly to the more general question of driving habits. These habits may concern either the perception of the road and of the dangers along it or the various tricks of turning the wheel and handling the foot pedals. From newspapers and special articles in the motor magazines we get an endless amount of advice about these matters. Much of this advice depends upon the human factor in driving.

It rarely happens, for example, that a driver will intentionally create for himself the habit of making sure, whenever he is getting into dangerous territory, that he always has a place into which he can turn. Imagine the following situation. The rear view mirror shows that a car is coming from behind. It is about to pass. Another car is coming forward on the other lane. The responsibility for an accident rests upon the man who wishes to pass, but the man who is being passed cannot keep to the road should the pass be attempted and prove untimely. All too often, a driver will let himself get caught in a situation that might have been avoided if he had developed the habit of planning his own actions in the light of what two other cars may do.

Foresightedness of this kind can be most effective, perhaps, when there are a good many cross roads. Most drivers will wait until they are upon a cross road before they look to the right or to the left. In a vast number of instances, however, it is possible to catch glimpses of side roads and of turns in a hilly road when one is still many hundred yards from a possible danger zone. This fact holds true, in particular, of mountain driving. That such anticipations do not become effective can be explained only by the fact that many persons dare not take their eyes from the road immediately in front of them. That is, they have not learned to coordinate their bodies so that hands and arms can do a steady job of driving even though the eyes are not fixed upon the road. Such persons never get a glimpse, then, of the car on the right that has just passed behind a tree and will not be seen again until it is met at the intersection, or of the car ahead that has just disappeared around a turn and which will not appear again until it is met at the top of a hill, or of a change in a line of telephone poles, fences, or houses that almost shut out a turn in the road, and so on.

Nothing is so characteristic of daily and weekly changes in accident rate as the way in which accidents will pile up just after a late fall rain has brought down the leaves or an early cold spell has

brought the first snow and ice.[23] This fact states that human beings adjust themselves to certain habits of driving when the ground is firm and the brakes will hold, and that then they will start out without a thought of roads that are slippery with wet leaves, ice, or snow. Moreover, it never occurs to some people that the art of stopping quickly on a slippery pavement or even of skidding a car into a reverse direction is an art that might be practiced in advance of an emergency. The paralysis that comes over a driver when he knows that his wheels are not gripping the ground is one of the strangest things of all in driving. It is such a simple matter to find a broad slippery area upon which to practice skillful skidding, and yet not one person in a thousand has thought it worth while to develop his habits in this respect.

Mountain driving is another source of fear and even of paralysis to a great many persons, yet absolute safety in such driving is certainly a matter of developing a few simple skills. For one thing, it is essential to know where the outside edge of the car is with respect to the roadway. On the prairies, many persons get the habit of directing their cars with the aid of a line painted in the middle of the road. It is not necessary, then, that they should learn how to "feel" the outside edge. Where the road is unmarked, however, and where the width of the road is limited, the chance of meeting a car in an awkward place means that the driver should be able to place his far wheels just where he wants them.

In general, then, increased safety in driving means the establishment of habits with respect to bad weather as well as to good weather and with respect to mountain roads as well as to level roads. A good driver is a man who never gets his car into a situation from which he cannot escape. This admonition sounds somewhat heroic; but it is heroic only because most people do not realize that the habitual use of the eyes in connection with all kinds of signs and suggestions along the roadway is a very simple skill to acquire.

6. *Attitudes in Driving* —There is general agreement among the men who have studied accident proneness among taxi drivers and truck drivers that a considerable number of accidents may be caused by a faulty attitude.[24] This phrase may cover, to be sure, a wide variety of psychological factors; but some of them are easy to name

[23] Weiss, A P, and Lauer, A R, *Psychological Principles in Automotive Driving*, Columbus, Ohio State Univ Press, 1930, Chap XVIII.

[24] Cf Vitales, M S, *op cit*, pp. 381 ff.

and to illustrate. It is known, for example, that the two most dangerous hours in the day are the first hour of the morning and the last hour of the afternoon. Even after due allowance is made for the fact that more cars are on the highways at these hours, it still seems to be true that these are dangerous hours.

One of the psychological sources of such danger will be illustrated in this case. Here is a person who is pressed for time in getting away from his home. He may have overslept and there may have been disturbing factors in the home situation such as irritable children, an unsatisfactory breakfast, lack of preparation for a task that must be done during the day, and so on. With these things on his mind, the person in question jumps into his car and starts out on the highway. He may have gone scarcely a block when there will be screeching brakes and the crash of two cars coming together. The explanation almost speaks for itself. Psychologically, this person is not prepared to drive. Instead of being directed toward the handling of the car, he is directed toward the events which he should have left behind him at the garage doors.[25]

As we have said, this factor has been much studied in the case of taxi drivers. All sorts of things have emerged from a direct clinical examination of faulty attitudes. These things fill the range from worries over the family income to sheer daydreaming. One of the predisposing causes toward a faulty attitude is bad physical condition. This and other features of the driving situation appear to good advantage in the conclusions drawn from one of the best experimental studies of driving habits. Some 357 subjects were examined for eye, hand, and foot coordination, for judgments as to velocity, for various kinds of sensory acuity, and the like. It appeared that the having of accidents could not often be attributed to any single factor, because such factors may be compensated for when the individual knows where he is deficient; but the presence of certain kinds of factors does modify the whole attitude of the individual. Nervousness, for example, stood out as one of the major conditions leading to accidents. This word was used to cover not only specific types of organic disturbance but the general irritating effect of home and social conditions as well. Low vitality with one of its main accompaniments, viz., lack of attention, was found to play an important part in the whole picture. In general, these experiments made

[25] This fact raises the whole problem of set or attitude. We shall consider it in more detail in the next chapter

it very plain that the safe operation of a car is, to a considerable extent, a matter of education. As we have said above, most persons simply take it for granted that the manual skills necessary to shift gears and to drive are the only essential requirements that should be made of a driver. The reader ought to be able to see that safety depends upon a great many other skills, most of which can be developed whenever he takes the time to devote a few practice periods to them.[26]

7. *First and Second Thought*—The phrase "first thought" is one that is used not only in driving but in a great many other activities as well. Its meaning is expressed in the common comment that one's first thought is most apt to be right. On barely escaping from an accident, a driver will say that his first thought was to accelerate quickly out of danger but that, on second thought, he decided it would be safer to stop Athletes use this phrase in the same way.

It is important to know just what is implied in a first thought and in a second thought, for the use of either may make a great difference in the success of any action. We may illustrate the matter in the following way. Let us gather from a group of athletes all the cases we can find of actions that were the result either of a first or of a second thought. We may do this by asking an athlete about his intentions immediately after he is observed to have made some quick decision. We may find out not only what his first thought was but whether he acted upon this or upon a second or third thought. Such data may be compared with the actual training period of the athlete or with ratings of his skill made by his coach and by competent fellow-players When such comparisons are drawn, it turns out that the more often a man has practiced a given skill the more certain it is that his first thought will be right. On the contrary, the less frequently a man has met a given situation the more often his first thought will be wrong. In this case, however, it does not follow that the second thought will be any more right than the first.

In studies of this kind one cannot be sure that one will know just what action should have been the right one. If a ball carrier, for example, has got into a broken field, he will immediately be faced with choices of direction and rate of movement In turning away from one tackler he may run into another, but by changing his pace

[26] Weiss, A P and Lauer, A R, *op cit*, *passim*.

he might have avoided the first In these cases, coaches and other qualified men may make some judgment as to what is right or wrong and thus comparisons can be drawn between these judgments and the actual intentions of the runner himself.[27]

The inference to be drawn from such empirical surveys as this seems clear If first thoughts are apt to be right in direct proportion to the amount of training, neither a driver nor an athlete could hope to appeal to some native instinct which would tell him what to do in a difficult situation. The driver of a car, then, might make a serious mistake were he to suppose that his safety in a tight place would depend upon his first thought when there had been nothing in his training that would throw the dice in favor of a first thought that was right Once more, then, we come back to the statement that some of the problems of automobile driving depend upon the fidelity with which a driver has practiced himself in situations that have better than an even chance to occur.

The facts just cited take us necessarily to types of action that may be used in wholly new situations. No amount of practice, either in driving a car or in playing a game of football, would ever enable a man to prepare in advance for every situation he might be called upon to face Fortunately, this is not necessary. It looks as though practice periods can lead to two results. On the one hand, there comes an increased amount of skill which is directly related to the learning situation as such. On the other hand, experienced men come to the place in their practice where they begin to reap some of the fruits of faithful work in the form of unearned increments of skill. That is, in addition to specific skills which are related to specific situations, athletes seem to acquire a general sense of good judgment No experienced person could ever meet a situation which was new in all of its parts. On the contrary, situations always have a total character which is a composite of old and new. The parts may be old but the patterning new. Situations of this kind often call out a response which is likewise new but nevertheless adequate. In other words, given several men who are equally skillful by all of the tests that can be applied but who differ from one another in experience, the more experienced will have more right first thoughts than the unexperienced man. In short, to him that hath shall be given. It has not been shown that these same facts would hold true of the driver, but there seems to be no good reason why this should not be the case.

[27] Unpublished data from the University of Illinois Laboratories for Research in Athletics.

GENERAL READINGS

Note to the Student—The readings listed at the ends of the several chapters should be used in order to gain a general orientation with respect to each chapter. The references in the body of the text will serve two purposes On the one hand, they name the places where more detailed information can be secured concerning matters discussed in the text. On the other hand, a good many titles have been added which refer to kindred topics and, especially, to the way in which experimental methods are used in psychology. These references ought to aid the student in the preparation of special reports In short, the author has furnished a liberal supply of footnotes, not for the sake of adornment, but for practical service to the reader.

Bingham, W. V, "Psychology and highway safety," *Scient Mo*, 1930, *31*, 552–556.
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CHAPTER TWO

PSYCHOLOGY AND ATHLETICS

1. *Introduction.*—Next to the relaxation which one may get by tramping through the woods, hooking and playing a trout, or dreaming beside a camp fire, the chief means which men use to keep in good physical and psychological health are such games as golf, tennis, baseball, and the like. For the younger men, there are the more heroic sports of football, basketball, wrestling, and boxing. Since all of these activities are a rich source of psychological information, they have been much studied in recent years. Moreover, athletic sports of various types have been used by all people at all ages and we may well wonder, therefore, what can be said about their origin and motivating causes. This topic will be discussed in Chapter Four, since it bears directly upon the way in which men may keep themselves in good psychological and physical form.

The athletic field, itself, however, holds even more interest for the psychologist because it is, in a sense, a brief and a very concentrated picture of all of the psychological things which men are. Every athletic game, for example, is filled with action which depends upon the use of every bit of skill which a man may acquire. The athlete is, therefore, a constant learner. If these actions are to be appropriate to the situations which arouse them, it is necessary that sight and hearing be quick and accurate. Thus the perceptual functions of the athlete are in constant play. The whole strategy of a game or the success of a single part of it may and does depend upon the skill which one group of men exercises in controlling the attention of its opponents. Thus the problems of attention take on a particular importance.

All of the more complex forms of psychological operation play a rôle that is no less significant. We shall be able to show perhaps, in what follows, that thinking or problem-solving occurs with more frequency in a game of football than even popular opinion has said. Moreover, the athletic field and the dressing room are veritable experimental laboratories for the study of emotion and mood. Were the athlete himself to fail us, we could easily go to the spec-

tator in the bleachers All of the problems of motivation likewise play their part Whether we think of motives as "will power" and "determination" or whether we think of them as the experimental psychologist would, each game is full of data on this phase of human nature. And finally, more than one victory has hung upon so slender a thread as a slight difference in the personalities of two men.

Altogether, then, the athletic field makes a more accessible laboratory for the practical study of various psychological traits than is made by almost any other situation into which human beings may venture Some traits appear in a more or less normal form, but others appear in a variety of special forms This fact makes them particularly useful when it comes to the explanation of more normal modes of action. We cannot, of course, write a whole volume upon this one topic, but there are certain problems in athletic competition which are so rich in suggestion to applied psychology that we must spend at least a short time with them.

2. *Timing or Pace Habits.*—When a man sets out to gain a skill, his first movements will be slow and awkward. He knows that, as he continues to practice, his movements will become more and more graceful and that he will be able to act much more quickly than he could before. In most of the experiments that have been made in the field of learning, it has been assumed that a performance has not reached its final level of skill until it can be carried through in the shortest time possible Every student who has taken a mental test knows that much emphasis must be placed upon speed, for he is always asked to do the best he can in the time allotted to him. Likewise, in piano playing, in running short distances, in typing, and in a great many other activities the best person is often thought of as the fastest person [1]

There are times, however, when the excellency of a skill does not depend at all upon maximum speed. On the contrary, it depends upon an optimal or best speed. We have been made familiar with this fact in the playing of golf where it is pointed out that distance and accuracy come to the man who uses a measured speed of movement rather than to the man who lunges into the ball. The athlete, also, knows something about optimal speeds for he has been told that he must run a mile not as fast as he can from the very start but

[1] The factor of speed and its relation to various types of activity is a puzzling question. Some of the literature has been reviewed by Beck, L F, "The rôle of speed in intelligence," *Psychol Bull*, 1933, *30*, 169–178.

at that optimal pace which will let him cover the most ground with a minimal expenditure of energy.[2] The football player, too, has learned that the success of a great many formations depends upon the timing or pace of the men involved rather than upon the utmost speed. The ball carrier, for example, often hesitates at certain points in some plays in order that the time-pattern of the whole attack may work to his advantage. In other words, there are a great many activities which depend upon special timing or pace habits rather than upon maximal speed of movement.[3]

Now there is one thing about pace habits that has a decidedly practical value. In general, pace habits are developed in the same way that some particular form of movement is developed. The golfer knows that the various parts of his body must be coordinated with one another in highly refined patterns, but he knows also that the word coordination must include the proper time relations between various types of movement. The stride that a man uses when he is running a half-mile race is very much like the stride that he uses when running a mile or two miles That is, the strides are similar in their form but they may be,—indeed they must be,—dissimilar in their tempo It follows, therefore, that a man could have the best possible type of running form, but be so poor a judge of running tempo as to be quite useless to his team

If timing or pace habits can be acquired, then it must follow that, whether we realize it or not, we all carry out our actions at some speed which represents a learning plateau in our own development.[4] This fact may be illustrated in the following manner. Let us suppose that two football men have been sent to the side lines in order to practice punting. A center passes the ball to the kickers and they try to get the ball away in the best manner possible. That is, they practice the form of punting until they can get the right kind of distance and height and at the same time have some control over direction. At the end of several such practice periods they will assume that they have acquired the art of punting. Their coach is pleased with their style and they are used, therefore, in the next game. During the game, however, the men fail to get a single good punt. The

[2] Hill, A V, *Muscular Activity*, Baltimore, Williams and Wilkins, 1926, *passim* *Living Machinery*, N Y, Harcourt Brace, 1927, *passim* *Muscular Movement in Man*, N. Y., McGraw-Hill, 1927

[3] One naturally turns at this point to the whole problem of rhythm It will be more convenient, however, to study this problem in connection with aesthetics See Chapter Thirty-Four

[4] Griffith, C R, "Timing as a phase of skill," *J Educ Psychol*, 1932, *23*, 204–213

coach may suppose that his punters have become crowd-shy or that they are good fair-weather performers but poor game performers.

There is, however, another explanation. It rests upon an assumption that has been made both by the coach and the player, viz., that once good form in a series of movements has been attained, this form or pattern of movement can be used at any tempo whatsoever. The fact that the men just described did poorly in actual play shows that this is not the case. During their side-line practice, there was no one to hurry them. They could devote their whole attention to perfection in form. In the meantime, however, they have been developing pace or timing habits as well as form habits. In the game they are suddenly called upon to use a pace habit which they may not have practiced. The opposing players rush in and hurry the punt. Such a punt is done about as poorly as it would have been done if the coach had asked them to use an entirely different form of movement at the last minute. The only remedy for a fault of this kind is to practice the art of punting not only with the form but at the rate of speed which will be demanded of a man when he actually gets into the game.

A great many illustrations of this feature of skill come from the athletic field. There is the boxer, for example, who depends upon the timing of his blows and of his defense as much as he depends upon any other single factor. If he has persistently boxed against slow men, his timing habits will not be adequate to meet the pace of a faster man. A football team frequently prepares itself for an important game by scrimmaging against a freshman squad which has been taught to use the plays and formations that are expected. It may turn out that the freshmen will be able exactly to reproduce these plays and formations so far as their form or pattern is concerned; but as often as not they will fail to develop the right timing habits. They will not launch their plays with the same tempo that will be used by the team in question. The result is that the one team is only half prepared to meet the other. One of the best examples of the effect of timing habits is given by a baseball team which has prepared itself to face a fast ball pitcher but which finds, at the last moment, that a slow ball pitcher will be used.

There is one consequence of pace or timing habits that has a more general significance than we have mentioned up to this point. The facts we have been talking about hold true of other than athletic skills. In other words, as men go about it to acquire reading habits, writing habits, and other daily skills, they learn not only the form

of the performance that is required of them but a time or pace habit as well. Reading may be taken as a single example. It is well known that students differ widely from one another in their reading habits. Some read very rapidly while others read very slowly. Recent experiments have shown, however, that both the rate of reading and the degree of comprehension can be increased greatly by a relatively small amount of practice. In other words, when, as children, we learned how to use our eyes in reading we learned, also, how fast to use them.[5] So, too, with other daily skills. Having learned these habits and having learned a pace for them, we stick to them just as we stick to any type of "second nature."

It is entirely possible that the unintentional learning of pace or timing habits is one of the things that stands in the way of getting better form habits. It is not possible, of course, wholly to separate form and pace. In any case, a man might develop such a pace habit with respect to typewriting that no amount of practice would give him greater speed until he had acquired an entirely new tempo of movement.[6]

3. *Posture and Stance.*—The words "posture" and "stance" describe psychological facts that are closely related to form and timing. In general, we think of stance as a position of the body, say, such a position as a runner would take when he crouches on his marks awaiting the starting gun. We may, if we wish, call this sort of stance a static stance. By contrast, then, a phasic stance would be the running form of a track man or the driving form of a golfer. The static stance of a diver would be the position he takes just before the dive is begun; his phasic stance would be the graceful movements he makes as he rises from the springboard, arches, and then slips into the water.[7]

It is commonly supposed that the words posture and stance can refer only to the positions which a human body may take. It

[5] A large amount of experimental material in this field has been summarized by Tinker, M A, "Physiological psychology of reading," *Psychol Bull*, 1931, *28*, 181–198 See also Bott, E A, Brown, G G and Cohen, L H, "Educability of binocular motor patterns," *J Exper Psychol*, 1928, *11*, 1–16 Loemker, K K, "Certain factors determining the accuracy of response to the direction of visual object," *J Exper Psychol*, 1930, *13*, 500–518. For audition, see Young, P T, "Auditory localization with acoustical transposition of the ears," *J Exper Psychol*, 1928, *11*, 399–429

[6] The problem we are discussing is closely related to the relation between speed and accuracy See Myers, G C, "Some variabilities and correlations in learning," *Amer J. Psychol*, 1918, *29*, 316–326 Sturt, M, "A comparison of speed with accuracy in the learning process," *Brit J Psychol*, 1921, *12*, 289–300

[7] See Washburn, M F, *Movement and Mental Imagery*, Boston, Houghton Mifflin, 1916, Chap I

is fairly easy to see, however, that both words may also have a psychological meaning As a matter of fact, we may say that most bodily stances are, at one and the same time, psychological stances as well Thus we speak of the frame of mind of a man or of his attitude, disposition, or set. This, then, is another kind of psychological event which appears to exceptionally good advantage on the athletic field. Since a psychological stance is probably one of the most important concepts we have, it will be well to find out a little more about it [8]

Let us compare the following situations Here is a track man who is crouched on his marks waiting for the starter to fire the gun. He knows that he must get away from his marks just the moment the signal comes In other words, his physical stance means that his body is in the best starting position, but it must mean also that his "mind" is made up to start when the time comes Elsewhere on the field we may see a pole vaulter. This man does not have to start at a pistol shot, on the contrary, he may start when he is ready. That is, he will start when his psychological preparation for starting is the same as that already attained by the track man.

Now we may ask what sort of preparation this is and what relation it has to actual performance? In order to answer this question, let us insist that the pole vaulter start his movement at a pistol shot and let the track man get away from his marks whenever he is ready to go. We shall find that the track man does not better his performance, whereas the pole vaulter is seriously handicapped by the new conditions In other words, we get the suggestion that the track man has learned to do something with himself at a signal which the pole vaulter has not learned In short, the thing we are talking about, viz., mental attitude, bodily set, stance or posture is a psychological disposition that may be learned.[9]

We must now ask what this disposition is and how one may go about it to gain greater skill in using it. The answer runs somewhat as follows. When an athlete first comes to his marks, there are a

[8] Griffith, C R, "Stance," *Athletic J*, 1929, *9*, 44–46 "Mental stance," *Athletic J*, 1929, *9*, 24–26

[9] The experimental literature on attitude or set is voluminous See Gundlach R, Rothschild, D A, and Young, P T, "A test and analysis of 'set,'" *J Exper Psychol*, 1927, *10*, 247–280. Young, P T, "The phenomena of organic set," *Psychol Rev*, 1925, *32*, 472–478 Bills, A G, and Brown, C, "The quantitative set," *J Exper Psychol*, 1929, *12*, 301–323. Golla, F L, and Antonovitch, S, "The relationship of muscular tonus and the patellar reflex to mental work," *J Ment Sci*, 1929, *75*, 234–241 Travis, R C "A study in the measurement of muscle tonus and its relation to fatigue," *J Exper Psychol*, 1924, *7*, 201–212.

great many different factors in his environment which are effective in determining his behavior. The unevennesses in the holes he has dug for starting, the unsatisfactory postures he may assume, the shouts of the crowd, the last-minute instructions of his coach, his knowledge that he must do his best if he is to win, the residues of much previous practice, and numberless other events attract his attention. The fact that they do attract his attention means that he is reacting to them in some way or other. In short, he is multi-bodied in the sense that his devices for response are being asked to do a number of different things at once Were the starting signal to come at this point, his reaction to it would be modified by reactions to other objects and events which are in all stages of completion. Naturally, his start would be ineffective while such conditions prevailed.

It seems to follow from these considerations that an athlete cannot hope to start from his marks effectively until his whole reaction mechanism is literally in the act of starting. In other words, he cannot start effectively until the only stimulus to action of which he is aware consists of the pistol shot which will be heard in a moment. The reader will not be able to sense this situation unless he remembers that to have an idea is already to be acting it. This theory of the relation between mental events and behavioral events is known as the motor theory of consciousness or the theory of ideo-motor action.[10] This theory asserts that mental events are an intimate part of action. To make up one's mind, then, is to make up one's reactions as though they were already in process. In any case, runners report that, when they are set to go, that is, when they have the right psychological stance or posture, they are thinking of nothing but the act of movement in conjunction with the pistol shot that is about to come If they are thinking of anything else, they must be tentatively acting about something else, and their start is, therefore, unsatisfactory.

This is exactly the situation which faces the pole vaulter who, in the absence of practice in the art of starting from a pistol shot, is required so to start. His unreadiness interferes not only with his preliminary run but with his actual vault over the bar as well.

Another phase of this situation may be illustrated by the following means. Let us say that a pole vaulter is near the limit of his skill. He can just cross the bar at thirteen feet but fails frequently

[10] A *locus classicus* for this theory is James, W, *Principles of Psychology*, N Y, Henry Holt, 1890, Vol II, pp 522 ff.

when the height is six inches greater Now let us set the bar at thirteen feet but at the same time let us place the standards nearer together. As the vaulter looks at the situation it will appear to him that the bar is higher than it actually is. In other words, the stimulus-situation will now act upon him in much the same way that it would were the bar actually higher. In any case, even though the height remains at thirteen feet, he will now fail to clear the bar as frequently as he did when it was actually six inches higher. Obviously something has happened to this man's frame of mind.[11]

The inference we wish to draw from this experiment runs as follows. As a rule, athletes allow their attitudes or stances to be determined too easily by the nature of the circumstances around them. They may, however, develop stances with respect to circumstances within their own bodies. It is known, of course, that the muscles, tendons, and joints of the body have receptors which play a part in the regulation of behavior which is very much like that played by the eye, or the ear. When any physical posture is taken, therefore, this posture becomes a source of stimulus to the athlete in the same way that sights and sounds around him may do. If an athlete were as conscientious in relating his skill to these internal sources of stimulation as he is to external sources, he would be able to develop stances independently of the character of the environment. As a matter of fact, this is just what the track man has learned to do for he knows that, at the last minute, he must shut his eyes and his ears, so to speak, to everything around him. Only two things must determine his behavior, viz., his past training in the art of quick starting and the pistol shot.

One very important point about stances of the psychological sort is that they must be kept just as constant as are other phases of skill, say, form of movement or timing. Suppose that a man is near a world's record and is given a chance to equal or break the record. All too frequently he uses the occasion to give himself a special motivation. This means that he changes his whole stance. Every muscle becomes tauter than usual. In other words, he becomes like the man who, having practiced one timing or pace habit, now tries quite another. Having practiced one stance, the athlete now tries another with the hope that he may break the world's record. His chances would be far greater, were he to trust to the habitual stance and let the general condition of his body take care of the rest.

[11] Unpublished data from the University of Illinois Laboratories for Research in Athletics.

The facts we have just been describing play a tremendously important part in almost everything we do. In a few moments we shall try to describe a major stance which may be taken by all people in all kinds of situations. This stance goes by the name of morale. We shall, therefore, leave this topic for the moment.

4. *The Yellow Streak.*—This phrase is a popular and rather venomous way of describing several different kinds of shyness, on the one hand, and of fear, on the other. Some persons, for example, are crowd-shy. That is, they have never learned to stand at their ease in a group, when talking to one of the other sex, or when talking to a person of superior rank. Other persons are water-shy or ground-shy or ball-shy, or indisposed toward sharp bodily contact. That is, they are afraid of the water, or of falling heavily to the ground, or of standing up to the plate when a fast ball is pitched, or of giving and taking punishment as in football, boxing, and wrestling.

It used to be supposed of these various kinds of fear that they were native or instinctive. Coaches often assume that certain players are born with a yellow streak. It is now known that this is not the case. On the contrary, all of the fears which men have, and their several types of shyness as well, are acquired through previous experiences.[12]

This proposition may be illustrated in the following way. Here is a football player who has several years of dependable play behind him. He has been particularly useful as a safety for he has always been able to catch punts and return them well. On a certain occasion, however, when the wind was blowing across the field, he has misjudged a punt He has also misjudged the speed of the ends charging toward him. It turns out that, just as he takes the ball in his arms, and while he is still relaxed,—as he must be in order to get hold of it,—the two ends crash into him, hurling him to the ground. He suffers a slight concussion; but after a short rest he resumes play. It is easy to see, however, that he has lost his confidence for he lets the remaining punts fall to the ground. Moreover, he does not recover his confidence during the following week. He has developed what the coach would call "a yellow streak", and, after the fashion of most coaches, he is ridiculed or benched in the hope that he will "come to his senses." If he does not come to his senses, the coach will infer that the man was probably yellow from the be-

[12] Jones, M C., "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass., Clark Univ. Press, 1933, Chap VI

ginning and that it took a hard situation to bring out his inherent weakness

It is clear, however, from the description we have given of this case, that the man must have learned how to be afraid of a punt He had learned how to flinch just as it came near him or to tighten his muscles so that the ball will bounce out of his arms We shall describe this kind of learning in Chapter Thirty-Eight. In the meantime, we may say that, in a situation of this type, the pain and the flinching that come from hitting the ground will be associated with one or more of the objects that were present during this particular period of action The ball is one of these objects In other words, the mere sight of a ball coming through the air may serve as a stimulus to flinching or to protective movements

If ball-shyness of this type has been learned, it ought to follow that it can be unlearned In other words, this type of yellow streak is not something that is inherited, but neither is it something that can be overcome by ridicule or by benching the man. On the contrary, the player must learn again how to catch a punt with nothing but the right kind of skill. The following case will illustrate the method The man described above was asked to play catch with another man, a football being used This is a situation so far removed from the fateful situation which gave rise to shyness that handling the ball does not excite a fear response. After two or three days of this sort of practice, two other men were brought into the picture, the one standing on the right, the other on the left, side of the learner and at some distance from him. These men did not move Shortly they were asked to move toward the learner as he caught the ball. Their movements were slow at first, but gradually they became more rapid until they were running at full speed into the learner just as he caught the ball from his companion. The final step in the relearning process was taken when the subject could allow himself to be mildly tackled while catching the ball At this juncture he was brought back to the squad where he resumed his normal playing position [13]

It seems to follow from our study of this case that all fears may be occasioned in a similar manner and that they may be cured in the same manner This inference is supported by a vast amount of experimental evidence upon the origin and the development of emotional action. When we think of boys who have fallen into water or

[13] Unpublished data from the University of Illinois Laboratories for Research in Athletics.

who have dived too deeply into shallow water, when we think of persons who have fallen out of trees or who have been knocked down by larger persons, when we think of juvenile gang leaders who have handled smaller youngsters with an iron hand, and when we think of the thousands of circumstances which may lead to embarrassment in the presence of others, it becomes easy to see that normal experience gives plenty of occasion for the development of a yellow streak [14]

The practical conclusions we may draw from this discussion seem to run as follows. Where there is a fear or a shyness of any type, one does not have to live with it as though it were an ineradicable part of one's nature On the contrary, we may treat it just as we would any other problem of learning To be sure, it is not always as easy to break habits of emotional action as it was to break the yellow streak described above, but as we shall see, learning is not usually a process that can be hastened. If the reader wished to become a better golfer he would think nothing of spending a full afternoon every day in the week in the improvement of his drive or of his putting But if he wishes to have more ease while he is in the presence of others, it does not seem to occur to him that he should use others as a stimulus-situation instead of withdrawing from the very circumstances that might help him [15]

5. *Hoodoos and Jinxes.*—There are times when all of the breaks seem to be in one's favor. Games go well, study hours pass easily, skills grow quickly in usefulness, sleep is restful, and friends are generous There are other times, however, when the sorrows that come seem to come not in single file but in whole battalions. Both of these trends in thought and conduct appear to particular advantage on the athletic field because they make so great a difference in achievements that are of particular interest to the student It is not for this reason, however, that we shall consider them. On the contrary, they have a certain psychological value which stands as a very important factor in most of the things we do. For sequences of events that are favorable we use the words "mascot," or "lucky day." For sequences that are unfavorable there are the words "hoodoo" and "jinx"

It will be helpful to consider events of the second type first, for an understanding of them will make clear at once the nature of events

[14] Some of these problems will be studied in Chapter Nineteen

[15] Jones, H E and Jones, M C, "A study of fear" *Childhood Educ*, 1928 5, 136–143. Jones, M C, "A laboratory study of fear the case of Peter," *Ped Sem*, 1924, 31, 308–315

of the first type For this purpose we may take a particular illustration Here is an athlete who has just turned an ankle in football scrimmage He is sent to the dressing room and from thence to the hospital After a day in the hospital he is allowed to return to his home whereupon he discovers that he has mislaid an important notebook. Moreover, his fountain pen is missing On the next day he goes back to the field but does not get into his football togs. At that moment, one of the student managers reminds him of the fact that he must pass a certain quiz on the morrow if he is to remain eligible Coming back to his room he settles down to his books but much that he reads seems meaningless The next day he comes away from the quiz with the certain knowledge that he has failed and during the afternoon play he is injured once more, this time seriously enough to keep him out of the game for the rest of the season., He has suffered, however, a shoulder injury and not a further injury to the ankle

Truly, one might agree with this athlete that he was hoodooed. In any case, the athlete himself is inclined to say that some malign force or agent is working against him And this is the thing about beliefs in hoodoos, on the one hand, and mascots, on the other, which makes them such important psychological facts. The man who feels that a jinx is upon him does not think it worth while to examine himself and his doings for the possible source of the jinx. On the contrary, he looks for some vague and otherwise mysterious agent which has placed its fateful hand upon him. Since he believes this to be true, he makes no effort to avoid that which the fates have decreed for him and he settles down, therefore, to await the end of their displeasure.

It goes almost without saying, of course, that there are no such malign influences at work over the stream of human behavior. To think in this wise is to go back to the cultures of those in whose beliefs the words hoodoo, jinx, charm, mascot, and the like had their origin [16] Where, then, shall we look for the causes of sequences of this type?

One might look first, of course, at sheer chance. It is reasonable to suppose that, just as one will draw, on rare occasions, an outstanding hand at bridge, one may "draw" a series of either fortunate or unfortunate experiences This is not, however, a very satisfactory way of explaining events which seem so beneficent or so

[16] Williams J J , *Voodoos and Obeahs* N Y , Dial Press, 1932.

malicious as the kind we are studying. We must, therefore, push further. In lengthy studies that have been made on this question, it turns out that most hoodoos and jinxes relate in some way or other to fatigue. In the case cited above, for example, we have given only an objective record of what occurred. The background for this record runs somewhat as follows. On the day before the initial injury to the ankle, this player had gone through a particularly long period of scrimmage. That night he had found a letter on his table saying that financial difficulties at home would probably mean that he could not continue through the year. The player had not slept well. The coach had already noted that, on the afternoon of the first injury, this player was just a little slow in reaction and that, here and there, there were signs of awkwardness in protecting himself. The player himself admitted later that his ankle injury was more the result of his own awkwardness than of any other cause.

The time spent at the hospital had not been restful. There was still the matter of finding some way whereby he might finish out his year even though he could not expect help from home. After leaving the hospital he had consulted one or two persons concerning a position for the second semester and it was during one of these visits that he had misplaced his notebook and his pen. The rest of the situation is clear enough. He came back to the practice sessions without proper rest and with other matters on his mind Under these circumstances it was inevitable that he should have let himself get into a situation where a more severe injury would be almost certain to occur. Almost without exception, supposedly unexplainable sequences of bad luck on the athletic field can be traced back to an initial situation in which fatigue and distraction have developed. From this point on, fatigue, together with a sort of shyness in attitude, will bring almost any series of unfortunate events in its train.[17]

An attitude or disposition which is just the contrary of the hoodoo is named by the word "confidence." It is not easy to get a description of this attitude, but our common sense tells us quickly enough just what is meant by it. In answering a question, for example, we may be more or less sure that the answer is right. It must not be supposed, however, that there is any relation between our degree of confidence and the correctness of our answer.[18] It is very easy to be

[17] Unpublished data from the University of Illinois Laboratories for Research in Athletics.

[18] Trow, C W, "The psychology of confidence," *Arch Psychol*, 1923 (No 67) Hollingworth, H L, "Experimental studies in judgment," *Arch Psychol*, 1913 (No 29)

absolutely sure although we are wholly wrong In general, the feeling of confidence arises whenever a present situation is recognized as more or less like some previous situation. It would seem to follow, then, that confidence is one of the by-products of training. The higher the skill or the broader the experience, the greater the degree of confidence If, then, a man of no skill or of no experience acts in a confident manner, his attitude should be described as optimism rather than confidence. We shall consider this matter in more detail below [19]

6 *Unconscious Skills*.—It happens not infrequently in football that a man is hit upon the head so sharply as to bring about a slight concussion, and yet this man may continue to play his normal game. This is taken as a very strange fact by most persons and they usually seek to explain it by saying that there must be a subconscious mind which will direct skill after the normal mind has been interfered with. If we can find the right way of explaining events of this sort we shall have cleared up not only a problem in athletics but also a very perplexing problem in the science of psychology.

The author has been able to study about a dozen cases of this type and some of the main facts about them run as follows. A man who has suffered a slight concussion will often continue to play and he will ordinarily use what a coach would call fairly good judgment One of the cases studied was that of a quarterback. This man continued to call signals for a full twenty minutes after his injury. A record was kept of the plays called and when these were inspected by his coach and compared with the general position of the team on the field, it was decided that the concussion had not seriously modified the player's usual level of strategy The main difference in this player noted by his teammates was his hyper-excitability, his dogmatic attitude on questionable signals, and his tendency frequently to carry the ball himself. It seems to be fairly clear that men in this condition will not meet new situations effectively. In other words, they will play at about their normal level of skill

If we were obliged to say that no act of skill can be carried out without the aid of consciousness, the appeal to a subconscious mind as a way of explaining these facts would be forced upon us If the conscious mind does not appear to function properly and if skillful things are still done, then some other concept of mental function

[19] Jersild, A., "The determinants of confidence," *Amer J Psychol*, 1929, 41, 640–642. Lund, F H., "The criteria of confidence," *Amer J Psychol*, 1929, 37, 377–381

must be devised Many of our everyday actions, however, show that skills may begin and come to a successful conclusion without our being conscious of them at any time Consider the piano player, for example, who carries on an animated conversation while playing a given piece of music. Surely, the normal mind is not effective so far as the music is concerned and yet the piece is begun and finished with a high degree of skill. We may, however, take even a simpler illustration. As a rule, we do not find it necessary sharply to watch our feet while walking in order that the left may alternate with the right in the proper manner. Walking is an act that takes care of itself We might still urge that a subconscious mind directs the piano playing, but we do not usually suppose that it takes such a mind to order the movements of the limbs

To make a long story short, we shall say that habits and skills describe movement systems which have been committed to the nervous system All subjects of experimentation report that they are intensely conscious of what they are doing when first they begin a new kind of movement pattern As skill is acquired, that is, as the movements become more and more habitual, the amount of consciousness decreases, until finally, all that is needed is some initiating stimulus and the whole pattern will run off of its own accord. As we shall see, this is made possible, in part, through the fact that the muscles and tendons of the body have their own sensory apparatus The making of one movement, then, will serve as an adequate stimulus for making the next movement in the learned series. The man who has suffered a slight concussion may be more or less witless, but so long as stimulus situations may become effective, they will initiate the manual and verbal movements which have become more or less habitual through his previous training. He will continue to call the kind of signals he has learned to call in any particular situation. Moreover, he will do the other habitual things that fall to his lot during the course of the game [20]

There are two things about these facts that should merit our attention In the first place, all scientific men are committed to what is sometimes called the doctrine of parsimony. This doctrine means that explanations of any given event should not be more complicated nor more numerous than the event actually demands. One might, of course, advance just as many explanations of any set of circum-

[20] Fourteen such cases have been collected by the University of Illinois Laboratories for Research in Athletics.

stances as the imagination will allow, but men of science prefer to strike at a very minimum number. In the situation under discussion, an experimenter would be inclined to say that a trained nervous system was an adequate explanation He says this, partly, because he knows facts about the nervous system which make the explanation plausible and, partly, because the word "subconscious" is nothing more than a word. Nothing is explained by using it. On the contrary, the word itself has to be explained. If it should turn out, on further investigation, that the normal operations of a nervous system do not form an adequate foundation for this kind of event, then the experimenter will be forced to turn to other considerations

In the second place, the facts described above will be found to have a great many relatives elsewhere in human action When, for example, we come to a study of the different kinds of psychological ailment, we shall find that persistent use is made of an alleged subconscious mind. The argument for a subconscious mind runs somewhat as follows. It is well known that physical events are essentially continuous. The nervous system, with its various functions, does not disappear from time to time and then suddenly come back into existence. We all firmly believe that, whether we are awake or asleep, our nervous systems persist in the same way that other physical objects persist. The private view which a man has of his own conscious experience, however, does not persist. As he falls asleep, he loses his inner view of his stream of behavior. If, today, he has enjoyed an experience, tomorrow the experience will have disappeared so far as he is concerned. At some future time, however, the experience may come back to him with all the freshness it had on the first occasion In view of this circumstance, it seems fair to ask where the experience has gone or what it has been doing during the interval Should we say that mental events are not continuous but that they may drop out of sight and, perhaps, out of existence, only to be resurrected again? Or do they actually continue on as parts of the body continue? The concept of a subconscious mind argues that memories actually live on but at some point below the normal level of consciousness. In other words, memories must be actual psychic structures which have an enduring and a continuous life. They must resemble physical events in at least this one respect, viz, that they are continuous.

As we shall see in our study of the various forms of psychological ailment, this doctrine of the subconscious plays a very important

part. In the meantime, we shall state as briefly as possible a counter proposal The inner or private life of a man is known to be contingent upon a whole series of physico-chemical events. Some of these events occur outside of his body, while the others take place within him It looks as though the events that take place within his body and, in particular, within his nervous system, are the most important of all. If this hypothesis be granted, we may go still further and say that, for every distinctive kind of inner experience, there will be an equally distinctive kind of neural event. Now it happens that learning and other kinds of psychological events are of such a character that some neural events may be created again without the advent of the same stimulus-situation which gave rise to them in the first place. In this case, a neural event which has been continuous would give rise to the kind of conscious event normally contingent upon it. The conscious event, then, could be discontinuous even though the bodily events upon which they are contingent are continuous [21]

We may infer, then, that athletes who continue play after they have suffered a mild concussion may play with almost their normal level of skill, especially if they have been well trained. There is no evidence that they use resources other than those whose history is known. To be sure, they will have scanty memories of what they have been doing, but sound training will enable almost anyone to do the right thing at the right time.

7. *Morale*—We shall have much more to say about this problem in other chapters. For the present, we must turn our attention to one more phase of the psychology of athletics, viz, morale. Morale, like some of the other matters we have discussed, touches our daily experiences at a great many places aside from the athletic field There is war-time morale, peace-time morale, the morale of a teaching staff, and the morale that may exist among the employees of a great industry. We consider this topic now because the athletic field is the one place where morale may be studied to good advantage

Morale is a kind of psychological posture or attitude. It is like the psychological stances described earlier in the chapter save that it has reference to wider fields of action and to more general types of disposition One may take a stance, either physical or psychological, just as one begins the hundred-yard dash, but this will not mean

[21] See Prince, M., *The Unconscious*, N Y., Macmillan, 1921.

that one will, or even ought to, take the same postures toward a full day of living Morale describes a generalized attitude or posture against which all other actions may be projected. Just as muscles may be in a good state of tonus or an engine nicely tuned, so the whole attitude of a person may be made fit for any kind of activity [22]

We may get more intimately into the nature of morale by describing, first, some of the things it is not. In the first place, morale stands in direct contrast with lethargy A slow-moving, dull-witted person does not have that kind of pith and zest which we associate with, say, a race horse that is in good fettle. There is a sparkling crispness about some attitudes and dispositions that puts them in a class by themselves. In the second place, morale is wholly unlike melancholy. The person who is moody and depressed not only for the moment but as a permanent thing seldom strikes fire as he goes into action This is not to say, however, that high morale is equivalent to a free and uncontrolled optimism. Neither is it unfounded eagerness It happens all too often that the eager man is eager simply because he has not taken account of the obstacles he may have to meet The attitude expressed by the word "morale" never lends itself to the underestimation of a task [23]

True morale is not the same as crowd emotionalism As we shall see in our study of the behavior of groups, there are times when a wave of enthusiasm will sweep so fiercely over a group as to remove almost all restraints against action The person who is moved in this way does not have that sound attitude which keeps his enthusiasm at a constant but adequate level. Morale is not blind determination The person who is merely dogged or obstinate is usually on the defensive whereas true morale prompts a man to take a zestful but not over-enthusiastic offensive. Finally, morale is not overconfidence On the contrary, it is a well-founded and comfortable supply of self-confidence based upon adequate past experience. If a man has had to stretch himself both physically and psychologically, and if he has not been found wanting, he will gain a quiet assurance in himself which is made of just such stuff as is described by the word "morale."

We may now turn to the positive side of the picture. In order to make our characterization concrete, we shall think of morale in con-

[22] Cf Hocking, W E, *Morale and Its Enemies*, New Haven, Yale Univ Press, 1918
[23] Griffith, C R, *Psychology of Coaching*, N Y, Scribner's, 1926, Chap VII

nection with the possible actions of a football player The reader can easily apply these characterizations to almost any other activity. For example, let us inquire about the readiness with which a man may take the initiative during a game He who has good morale ought to be able to take the initiative at any time. As a matter of fact, his whole attitude is one that stands just on the forward edge of initiative. Men of low morale, however, lose this readiness when defeat is staring them in the face or whenever they become fatigued. Another way to say this is that men who have a right attitude will respond both to fatigue and to pain with greater resolution rather than with fear. They will certainly respond with greater resolution instead of with anger as is the case with persons who have acquired no steady and dependable character

Further characterizations of morale may be stated as follows It is sometimes said that fatigue or pain may turn a man away from some of his more recently acquired cultural attitudes and back to some of his more primitive modes of action. We might, then, ask of a football player how the level of his sense of loyalty changes during a hard game. Men who possess good morale would suffer no change in the claims of loyalty, whereas men with low morale tend to think less of their principles and more of angry or violent action. From one point of view this difference is expressed by a contrast that is sometimes drawn between boxing and fighting. Boxing represents a series of skills acquired through training Fighting usually depends upon more primitive and less skillful types of action. So, too, our concept of sportsmanship covers a series of principles in action that are a product of training. Men who have good morale continue to adhere to these principles no matter how the game goes.[24]

Closely related to this aspect of morale, there is the question of getting and keeping a proper sense of perspective over one's self and over the events in which one is immersed It is characteristic of human nature, of course, to take each event as it comes as the most important event of the hour The "specious present" has a prior claim upon attention. A sense of perspective, however, puts the immediate present into a large time-wise and spatial framework. Perspective enables a man to see an immediate event in terms of the past, the present, and the future It gives the man of experience a decided advantage over those who let themselves become absorbed in the things that are going on as of now In other words, the con-

[24] Royce, J, *The Meaning of Loyalty*, N Y, Macmillan, 1908

fident man not only remembers the previous trend of the game but his imagination is alert to the plans which must be fulfilled before the game is over. In more general terms, the man who has good morale can place a success or a setback of the immediate present into a whole picture which includes not only the past but the future as well A regard for perspective is always a source of steadiness or of balance It is one of the surest marks of good morale

To summarize, then, morale is, in its general psychological character, a stance, a posture, or an attitude which one may take toward the whole business of living It is a kind of psychological tonus. It is not some single act of courage brought out by a specific situation but a general disposition against which the details of living may be projected. Morale is an enduring steadiness which is pervaded with eagerness, zest, and confidence It describes the general attitude of the happy warrior We may infer, then, that the attainment of a good state of morale might well stand as one of the main objectives of the educative process

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CHAPTER THREE

RELAXATION AND SLEEP

1. *Introduction.*—Up to this point, perhaps, we have been a little unfair to the reader for we have asked him to keep rather active in a number of strenuous modes of behavior. We have tried to catch him when he was facing the hazards of the open road, when he was playing a hard game of football, and when he was deeply immersed in the study of some book. We have caused him to apply his brakes quickly, cut in and out of traffic cleverly, suffer the impact of a vicious tackle, and order and arrange his lecture notes so that he might prepare himself for an examination most effectively. The reader will be just as well satisfied, then, if we turn quickly to the topic of rest or relaxation.

It is not for this reason alone, however, that we may think of escape from labor as a topic that should be included in an introduction to applied psychology. On the contrary, there are a great many other reasons why it must stand high among the practical problems of self-control. It has been pointed out, for example, that the pace at which our modern manner of living moves is faster than has ever been the case before.[1] There was a time when a human being might move slowly along with the seasons and with the rising and setting of the sun, but now his actions have been quickened by the advent of machinery and by a tremendous increase in the speed of his communication with other persons. Whether we think of the man in the factory, the stenographer at her typewriter, the vacationist on the highway, or even of the athlete in his escape from academic affairs, the emphasis is upon action and speed rather than upon rest.

It has sometimes been said that this tremendously increased tempo of living is one of the factors responsible for the increase in certain kinds of human affliction. There is some evidence, for example, that the death rate from heart failure is on the increase. There is still more evidence that various types of nervous or psychological break-

[1] Burns, L D, *Civilization on Trial*, N Y, Macmillan, 1931, *passim* See also Schmalhausen, S D. (ed), *Behold America*, N. Y, Farrar and Rinehart, 1931, *passim.*

down are also on the increase.[2] The psychologist is called upon, therefore, to study this situation in a practical way in order to find out whether there are any means of relaxation or of rest which can be used to counteract the increasing drain upon human energy.[3] In short, what truth is there in the statement of the person who said that he could do seven days' work in six, but that he could not do it in seven?

2 *Sleep*.—The most effective kind of rest is to be found, of course, in that more or less vegetative type of living which commonly goes by the name "sleep." In view of the fact that sleeping activity is one of the most frequent things which human beings do, it is strange that we have no more information about it than is the case.[4] We have used the phrase "sleeping activity" advisedly because, from one point of view, sleeping is a mode of response which human beings will make to certain kinds of situations. Moreover, as we shall see in a moment, the sleeping period is characterized by a large amount of actual bodily movement.

One of the chief stimuli to sleep is, of course, the presence in the blood stream and in the bodily tissues of a considerable amount of carbon dioxide, lactic acid, and other products of muscular work.[5] This much is simple, but how these products operate in producing a state of sleep is not altogether clear. Some have supposed that the toxic products of excessive work must increase the amount of resistance between the nerve cells in the brain so that excitations cannot pass from one to another as readily as they otherwise would. Others have supposed that toxic products must cause a slight shrinkage in the nerve cells, but the end effect of such shrinkage would also make for an increase in resistance.[6] On the physiological side, then, there is much ignorance, but of one psychological fact we may be fairly certain. There is a good deal of evidence to show that the act of falling asleep, like the act of awakening, is of the order of a habit. The organic condition of the body would make a person particularly sensitive to the stimulus values supplied by a late hour of the day,—

[2] Data on all aspects of this problem can be found in the *Reports of the United States Census Bureau*. The Metropolitan Life Insurance Company also publishes relevant material.

[3] Consult the report by J. F. Steiner on Recreation and Leisure Time Activities, in *Recent Social Trends*, N. Y., McGraw-Hill, 1933, Chap. XVIII.

[4] Johnson, H. M. *et al.*, "Sleep," *Psychol. Bull.*, 1926, *23*, 482–503, 1930, *27*, 1–30.

[5] Johnson, H. M., "An essay toward an adequate explanation of sleep," *Psychol. Bull.*, 1926, *23*, 141–142.

[6] Herrick, C. J., *An Introduction to Neurology* (5th ed.), Philadelphia, Saunders, 1931, pp. 118 ff.

say, eleven or twelve o'clock in the evening Among these stimuli we may mention increasing quietness, the actions of others, the sound of the chimes, and other night-time stimulus patterns. In any case, it seems fairly certain that, at a given time during the late evening, the average person will become increasingly drowsy Moreover, it is certain that, after a given period of deep sleep, this same person will become increasingly awake This process of awakening may be easily associated with changes in bodily condition, with changes in the illumination, or with other sources of stimuli in the sleeping room or on the street so that an instruction given on the night before to awaken at some predetermined hour will usually become effective [7]

Some of the main facts about the sleeping period run as follows. In the first place, it is known that a sufficient number of hours of sleep, say, eighteen or twenty for small infants, twelve to fifteen for small children, and eight to nine for adults, will serve completely to eliminate all excessive toxic products which result from effort expended during the waking hours [8] In view of this fact and in view of the way in which sleeping habits may be developed, it would seem to follow that a person should treat his hours of sleep in much the same way that he would treat any other skill upon which he placed any value. Persons who have become highly expert in playing golf never allow exceptions to take place in their golfing habits and neither do they engage in types of action that might interfere with golfing movements The same facts may be said to hold true of sleeping habits It is commonly agreed that a regular hour for retiring and for awakening is one of the surest means of keeping a person in good physical and psychological health.

A number of studies have recently been made on the nature of the movements that accompany the sleeping period and upon the postures that are most restful These studies have required that a sleeper be photographed regularly during the sleeping period and that devices be attached to his bed which will register the movements he makes. It has been shown that some kind of bodily movement will be made by the average sleeper at least once every twelve

[7] Omwake, K T, and Loranz, M, "Study of ability to wake at a specified time," *J Appl Psychol*, 1929, *13*, 214–225 Bond, N B, "The psychology of waking," *J Abnorm and Soc Psychol*, 1929, *23*, 226–230 Hall, W W, "The time sense," *J Ment Sci*, 1927, *73*, 421–428

[8] The experimental material on the development of sleeping habits in children has been reviewed by Wooley, H T, "Eating, sleeping, and elimination," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1931 (1st ed), Chap II

minutes during the night. These movements vary greatly from age to age and from person to person depending upon whether the subject is in good health or suffering from some bodily ailment. They are known to vary also with the kind of activity in which a person may have engaged during the day. Moreover, they will vary according to one's plans for the ensuing day. There is some evidence, for example, which shows that athletes who are nervously anxious about a coming game will display an increased number of movements during the night before a game. Save for those which express anxiety, the movements made by a sleeper during the night contribute to the restfulness of sleep rather than detract from it. In other words, it looks as though motionless sleep is not always restful sleep.[9]

Sleepers will, of course, take all kinds of postures. The experiments suggest, however, that a bodily position somewhat like that taken by a kitten is one of the most comfortable and restful postures. It is easy to see that, were an athlete to lie in the same position throughout the night, some parts of his body could easily be washed with bodily fluids whereas other parts would go unwashed. Since it is the function of these fluids to facilitate the removal of toxins and to replenish the food supply of various tissues, changes in posture would be more natural than motionless sleep.

Other experiments have considered the length of time a person may remain awake and the character of his psychological work during the period of wakefulness. These experiments are of interest, partly, because they show the power of high motivation under adverse conditions and, partly, because they illustrate the great value of momentary periods of rest. In connection with the first fact, it has been shown that human subjects may be kept awake for as long as eighty or ninety hours and that their performances during this time may be equal to or even superior to their initial performances.[10]

[9] Johnson, H M, and Weigand, G E, "The measurement of sleep," *Proc Penn Acad. Sci*, 1927, *2*, 43–48

[10] Some of the experimental data on this problem can be found in Patrick, G T W, and Gilbert, J A, "Effects of loss of sleep," *Psychol Rev*, 1896, *3*, 469–483; Smith, M, "Contribution to the study of fatigue," *Brit J Psychol*, 1916, *8*, 327–350, Robinson, E S, and Herrmann, S O, "Effects of loss of sleep," *J Exper Psychol*, 1922, *5*, 19–32, 93–100; Weiskotten, T F, and Ferguson, J E, "On the effects of loss of sleep," *J Exper Psychol*, 1925, *8*, 363–380, Weiskotten, T F, and Ferguson, J E, "A further study of loss of sleep," *J Exper Psychol*, 1930 *13*, 247–266, Laslett, H A, "An experiment on the effects of loss of sleep," *J Exper Psychol*, 1924, *7*, 45–58, Laird, D A, and Wheeler, W, "What it costs to lose sleep," *Indus Psychol*, 1926, *1*, 694–696, Miles, W R, and Laslett, H A, "Eye movement and visual fixation during profound sleepiness," *J Exper Psychol*, 1931, *38*, 1–13; Freeman, G L, "Compensatory reinforcements of muscular tension subsequent to sleep loss," *J Exper Psychol*, 1932, *15*, 267–283

It is this fact which illustrates the extraordinary power of motivation. Since we shall have much more to say about this factor in the next chapter on the "Problems of Motivation," we may postpone, for the moment, any further comment about it.

The second fact mentioned above, viz, the high rest value of short naps, throws a great deal of light upon the practical use of sleeping and napping periods. Although this fact has not appeared in laboratory experiments on prolonged sleeplessness where means were taken to prevent short rests, it is one of the products of the marathon craze which swept over the country a short time ago. In some of the dance marathons, for example, pairs of dancers were recorded as having remained in "continuous" movement for as many as 400 hours. The laboratory experiments on prolonged wakefulness seem to say that human beings cannot remain awake for such long periods of time without suffering serious damage. Since it is relatively easy for alternate members of a pair of dancers to take short naps, we may draw the inference that these naps must have had a tremendous recuperative value. We shall say more about this fact in a moment.

In the experiments on prolonged wakefulness it has been shown that return to a normal condition does not depend upon remaining asleep for the full number of hours that have been missed. On the contrary, it appears that four or five additional hours of sleep over the customary eight will be sufficient to bring the subject back to a normal condition. Altogether, then, the sleeping period is one of the most effective means which human beings possess for maintaining themselves in fit physical and psychological condition.

3. *Rest Intervals*.—We have already mentioned the fact that a great amount of rest may be gained from even such short intervals as one might take while nodding during a prolonged period of wakefulness. This type of rest has been much studied, especially in industry.[11]

We may summarize a very large number of experiments in the following way. Let us suppose that men are working more or less steadily through an eight-hour day. As a rule, such a day is broken up into two four-hour periods. The interval between these periods is used, partly, for the sake of the noon meal and, partly, for rest. It is generally believed that this rest period is one of the factors that makes an eight-hour day as comfortable as it is. If this is true, why

[11] Data bearing on this problem have been summarized by Viteles, M. S., *Industrial Psychology*, N. Y., Norton, 1932, Chap. XXIV.

might it not follow that still other rest intervals of briefer duration would exercise a favorable effect upon the efficiency of the working period? Let us suppose, for example, that a man were to work fifty minutes and then rest for ten, and that he were to continue this method throughout the day.[12] What influence would this procedure have upon his output for the day?

As a matter of fact, this is just the situation which some of the experimenters have attacked. It has been shown that the amount of work that can be done increases in direct proportion as a working period is interrupted by short intervals of rest. This fact holds true not only with respect to the total amount of work done but with respect to the accuracy of work, with respect to a decreased proneness for accidents, and with respect to the general monotony of work. As an illustration we may take a typical laboratory experiment. A group of subjects was asked to do that kind of work necessary to add numbers, as the saying goes, in one's head The work period was forty minutes long and the experimenter in this case varied the experimental situation by introducing rest pauses of one-half, two, and five minutes' duration. It was found that a two-minute rest interval contributed materially to the efficiency of this type of work When the total work period was extended to eighty minutes, a five-minute rest pause was most effective [13] This fact about the beneficial use of rest periods has been widely recognized in industry, and we shall find occasion to call attention to some of the experiments that have been made on this problem in Chapters Twenty-Nine and Thirty.

There are, of course, a great many other factors entering into a situation of this kind. When a worker is assigned a given task, he will adjust his working tempo to the total length of the working period [14] This may sometimes mean the introduction of rest intervals on his own initiative. These rest intervals have usually been found to be of fairly short duration, but they reveal the fact that even an uninstructed worker has discovered the recuperative value of short pauses in otherwise continuous labor.

In addition to rest pauses of this type, the term "rest" is frequently used to name a sort of therapeutic measure in the field of medicine. This measure may consist either of complete relaxation

[12] This question is clearly related to a principle to be studied in a later chapter, viz, the principle of distributed effort in learning

[13] Graf, O, "Ueber lohnendste Arbeitspausen bei geistiger Arbeit," *Psychol Arb*, 1927, 7, pp 458 ff

[14] Hersey, R B, "Rests—authorized and unauthorized," *J Person Res*, 1925, 4, pp 58 ff.

over a period of time as is demanded by some types of heart trouble or of a complete change in the environment of the patient. It stands to reason that certain kinds of fatigue might be induced simply because the objects and events around a person have become so highly stabilized that temporary escape from them may be desirable. In this case, the rest cure simply means a total change in environmental objects, including even the other persons with whom one may have a daily contact. We shall have something further to say about this feature of rest in Chapter Twenty-Two.

4. *Progressive Relaxation.*—In the waking condition and during a great many forms of sleep as well, the various parts of the body are not actually at complete rest. This is certainly true of all of the bodily devices by which metabolism is carried on. The heart, the lungs, parts of the digestive apparatus, and the organs of elimination must keep more or less steadily at their work. It is not these bodily parts, however, which we have in mind at the moment. On the contrary, there is plenty of evidence to show that even the muscles are constantly under a considerable amount of tension. This tension is known as tonus [15]

It follows from what was said on pages 28–31 that various degrees of tonus may mean a continuation of what we commonly describe as mental work Persons who cannot fall asleep commonly report that they cannot sleep because of ceaseless mental activity. If we assume that this mental activity must be reflected somewhere in changes of bodily tonus, then it would seem to follow that any persistent effort to change or decrease bodily tonus during the night would bring about more favorable conditions for rest.

This has, as a matter of fact, turned out to be the case. It can be shown that a great many types of mental alertness are intimately dependent upon activity (high tonus) in the vocal apparatus, in the eyes, and in the general musculature of the body. It has been discovered, moreover, that certain types of practice will enable a person suffering from insomnia to acquire new habits of bodily tonus. That is, he can learn to diminish the amount of work that is done in what otherwise might be called non-working periods. This method is known as the method of progressive relaxation.[16]

The method may be described somewhat as follows. As we know,

[15] Travis, R C., "A study in the measurement of muscle tonus and its relation to fatigue," *J Exper Psychol*, 1924, 7, 201–212

[16] Jacobson, E., *Progressive Relaxation*, Chicago, Univ. of Chicago Press, 1930, *passim.*

there are sense organs in the muscles, tendons, and joints of the body. These sense organs give us the information which we recognize as the feeling of bodily condition, the feeling of muscular tonus, and the feeling of tendinous strain [17] Most persons know what it means or what it feels like to increase the degree of muscle tonus. They may, for example, tighten a given muscle group, in which case they will report a sense of increased load on the part concerned. Under normal conditions we are more tuned to these increases of load than we are to decreases in them.

The method of progressive relaxation starts with the argument that it might be possible, through practice, to promote lower levels of relaxation just as we normally promote higher levels of tonus. Practice begins, therefore, with some major muscle group in which changes of bodily tonus are easily felt. The subject finds out, after a little effort, just what it means to decrease tonus. Moreover, he finds out how to bring tonus down to a lower level than may be habitual with him.

After a certain amount of skill has been acquired in relaxing large muscles, the method is gradually extended to all other groups and eventually even to the speech mechanisms and to other motor organs in the head region. It has been shown that, when this stage of relaxation is reached, there is almost, if not quite, a complete cessation of "mental work." In other words, the relaxed person is ready to secure the greatest advantage from either a short rest pause or from the sleeping period itself Moreover, it has been shown that relaxation which has been pushed to an extreme may have a very helpful effect upon a number of bodily disorders. It has long been known that excessive psychological effort of certain types,—say worry, nervousness, irritability, and sleeplessness,—may have an immediate bodily echo in such ailments as indigestion, improper elimination, and even in pseudo-heart conditions. The method of progressive relaxation has offered itself, therefore, as a means of attack upon such disorders for, by eliminating their causes, the symptoms themselves disappear [18]

The useful thing about progressive relaxation is the ease with which it may be put into effect at almost any time during the day. It has been found especially useful, for example, to athletes who must un-

[17] Pillsbury, W B, "Does the sensation of movement originate in the joint?" *Amer J. Psychol*, 1900, *12*, 346–353

[18] Jacobson, E, *op cit*, *passim.*

dergo short periods of intense effort. Even in a football game where it may look as though ceaseless activity and alertness are necessary, an athlete may learn how to take advantage of short rest periods by falling into a state of complete relaxation. A player must, of course, gain almost immediately a normal level of tonus if he is to react quickly and coordinate himself well, for reaction time and other features of physical and psychological work take place to better advantage where the bodily tonus is high than where it is low.[19] It is possible, however, to use short intervals for complete rest even though one may be standing on one's feet.

5. *Play*—Play, like sleep, is one of the most common things we do and yet, like sleep, there is more theory and speculation about it than about almost any other type of human action Since play stands so high among the activities preferred by children and since it touches not only the problems of growth but the problems of rest or of relaxation as well, it may be that it should be counted as a major form of adult relaxation. We have, of course, already considered one type of play, viz , that which furnishes the incentive behind the more common sports. There is also another form of play gained through the hours spent in the woods, along a stream, or by a campfire. This second type will be described briefly in the next section Neither with respect to athletics nor with respect to outdoor life, however, has anything been said concerning the biological significance of play. It is this feature of relaxation which concerns us at the moment.

A great many ways have been used to distinguish playful activities from other types of activities One of the most common of these is to the effect that play is a kind of activity which is indulged in for its own sake whereas work is a type of activity pursued for the sake of some gain beyond the activity itself. One may, for example, play baseball simply for the fun of playing, but one may also play it as a means of livelihood. In this second case, a playful activity is said to become work [20] It would seem to follow from these definitions that there ought to be more spontaneity about play than about work. Moreover, playful activities are less definitely organized with respect to a goal than is gainful activity. These two factors might mean that play, in general, would be more pleasant and lead to more intense feelings of exhilaration than work. Still more important, perhaps, is

[19] See Bills, A G , and Brown, C , "The quantitative set," *J Exper Psychol*, 1929, *12*, 301–323, Young, P T , "The phenomena of organic set," *Psychol Rev*, 1925, *32*, 472–478.

[20] Lehman, H C , and Witty, P A , *The Psychology of Play Activities*, N Y , Barnes, 1927.

the fact that play activities are not often characterized by conflict. The very fact that games and playful random activity are used for their own sake rather than for some ulterior gain means that there could be no conflicts between goals or purposes.[21] Work, on the contrary, often involves effort and it is tied up also with aims which can easily enter into conflict with other motives.

These various ways of trying to distinguish play from work imply various theories as to the origin of play and as to its general functional value for the growing child. A great many such theories have been invented and as we name them briefly the reader will rightfully get the impression that the theorists have tried to explain a very complex type of activity in terms of some single causal factor. Among the traditional theories of play we may mention the preparation theory, the surplus-energy theory, and the recapitulation theory. The preparation theory argues that playful activities are instinctive in their origin and have, as their chief function, the preparation of the child for more adult forms of action.[22] The surplus-energy theory argues that play activities are the result of a need on the part of an animal or of a child to find some sort of outlet for its excess energies. This theory has often been more nearly a fabrication of those who like to set up an argument in order to knock it down than a serious effort to explain the nature of play. It is clear, however, that activity for its own sake might easily provide an outlet for an exuberant spirit.[23] The recapitulation theory argues that play is an echo in the life of a child of the actions which have played an important part in the history of the species. This means, of course, that play is more or less instinctive in the sense that a present generation spontaneously acts in the way that previous generations have acted.[24] Of these three theories the third has now been almost wholly overthrown.[25] The preparation theory merits attention because it has been shown that, as a matter of fact, play activities do serve a great many different educational purposes.[26]

[21] Carr, H. A., "The Survival Values of Play," *Pub. Dept. Psychol. and Educ.*, Univ. of Colorado, 1902, *1*, No. 2.

[22] Groos, K., *The Play of Animals*, N. Y. Appleton, 1898 (trans. by E. L. Baldwin). Also *The Play of Man*, N. Y., Appleton, 1901 (trans. by E. L. Baldwin).

[23] The excess-energy theory is frequently ascribed to Schiller, F., *Essays, Aesthetical and Philosophical*, London, Bell, 1875, pp. 112 ff., and to Spencer, H., *Principles of Psychology*, N. Y., Appleton, 1896, pp. 627–638.

[24] Hall, G. S., *Adolescence*, N. Y., Appleton, 1904, Vol. I, pp. 202–203 and *passim*.

[25] Lehman, H. C., and Witty, P. A., *op. cit.*, pp. 35–43.

[26] Much of the recent experimental literature on the nature and function of play among children is reviewed by Jones, M. E., in *Handbook of Child Psychology* (ed. C. Murchison), Worcester, Mass., Clark Univ. Press, 1930, Chap. VII.

Other theories have now been added to these three traditional theories. It will be convenient to describe some phases of the relaxation theory in the next section. The compensatory theory argues that play is essentially a mode of escaping conflicts. As we shall see later on, the conditions under which children normally develop make for, rather than against, the creation of a great many types of friction between the child and his parents or between one child and another. Playful activity, then, may serve as an outlet for imaginative indulgence in activities which could not otherwise take place. There are, of course, other types of escape from conflict, as a later chapter will abundantly show. It may be argued, however, that play has the advantage of being more or less harmless but at the same time promoting the growth of the individual.[27] It would follow, then, that play should be an activity in which there is considerable freedom from conflict.[28]

There is now no doubt, in the opinions of experimenters, that play serves a very important function in the promotion of development during childhood. Its educational value extends, in part, to the proper motor development of the child and, in part, to the development of the perceptual functions. Moreover, it is sometimes pointed out that the higher psychological functions, as well, must receive considerable exercise in playful activity. Our first interest in play, however, is created by its restful value. If, as some of the more recent theories have it, play marks a method of escape from conflict or if it is to be characterized by its freedom and spontaneity, we must draw the conclusion that play could easily have a high therapeutic value. As we shall see in later chapters, one of the most serious problems which human beings have to face is raised by conflict or lack of organization in psychological functions. No immediate gain is to be had, of course, from playful activities which are merely substitutional in character In other words, if one were to play constantly one would be continually escaping from more serious problems. It seems to be clear, however, that no person can confine himself endlessly to serious work. Rest through play would come not so much because of actual rest as in sleep but because of the escape which it affords from conflict, repression, and disintegration.

[27] Robinson, E S, "The compensatory function of make-believe play," *Psychol Rev*, 1920, *27*, 429–439, "A concept of compensation and its psychological setting," *J Abnorm Psychol*, 1923, *17* 383–394 See also Rainey, M J, "The psychology of organized group games," *Brit J Psychol Monog Suppl*, 1916, *4*, pp 76 ff

[28] Freedom from conflict has been described as the distinguishing feature of play It stands, therefore, as a theory of the nature of play in its own right Cf Curti, M. W. *Child Psychology*, N Y, Longmans Green, 1931, pp 359 ff

6. *Outdoor Life.*—We have left over from the preceding section that theory of the nature of play known as the relaxation theory. This theory is closely tied up with the desire of most adults to "lose" themselves as often as possible in the midst of a forest with its game, its streams, its invitation to hiking and climbing, and its solitude. In order to illustrate the wide extremes to which speculation may go regarding this hunger for a more primitive mode of living, we may take two particular theories.

On the one hand, there is a theory which says that human beings are most happy and comfortable when they are still in the womb of the mother.[29] During the pre-natal period, the embryo is called upon for no type of action and neither does it have to adjust itself to perplexing changes in its environment. Immediately upon birth, the new-born infant suffers a major shock. It now finds itself, for the first time, out of adjustment with its environment. The infant is forced to set out on a life-long search for escape from the real world into which it has been thrust. Instead of remaining a passive recipient of everything that is necessary for its welfare, it must now go into action in order to secure even the very essentials of life. This theory goes on to say that the effort to escape from reality, that is, the effort to return to the pre-natal condition, will manifest itself in almost everything the mature person does. It has even been urged that the act of sleeping may be explained on these grounds, for the tired worker or the aged person lies on a soft mattress, covered with even softer clothing as a substitute for a return to the mother's womb. If a man seeks the solitude of nature, this too may be taken as an example of his desire to escape reality. He goes back to nature because he wishes to get away from all of the artificialities with which he has been surrounded from the moment of birth.

A second theory about the restful nature of outdoor life runs as follows. We know that the human race has lived through a very long history. In the early stages of this history, human beings lived very much as the animals live,—that is, in a simple and more or less direct relation to the easy-flowing events of nature. The growth of the brain and the development of more complex social groups have lifted human beings out of this natural simplicity and placed them in an environment which is more or less artificial so far as native interests and activities are concerned. This fact is said to hold true, in particular, of our modern industrial or machine age where the artificialities have

[29] Cf. Freud, S., *New Introductory Lectures on Psychoanalysis*, N. Y., Norton, 1933, *passim.*

replaced, as never before, the natural environments with which the lower animals are familiar. Now it happens that, in the early stages of human development and in the development of the higher animals, there are certain activities called "play activities" which seem to be indulged in simply for their own sake. These activities represent the more natural activities of a child. When, therefore, modern man tires of his endless attempts to adjust himself to what he calls the civilized world, he may seek escape from it by going back to more childish or more primitive modes of action. That is, he goes to forest and to stream or builds for himself again the campfires of his remote ancestors.[30]

This mode of explaining the relaxation value of outdoor life has been applied to each of the various games which men play. Golf, for example, has been described as a modern form of the much more ancient hunting activities of men The ball represents the animal that is hunted, whereas the journey from tee to tee stands as a kind of echo of the chase itself. Hints of this same echo are to be found in other chasing games, such as basketball and football. Then, too, there is the pleasure of bodily contact, especially in such games as football. This pleasure is said to be an echo from the days when fighting was not only an endless matter but a source of pleasure, as well. In short, all of the play activities of men have been described as some sort of modernized echo of more primitive types of action.

A possible method of making a choice between these two theories and of changing them both so that they will better fit the facts will be one of the tasks of Chapter Twenty-Two. In the meantime, we may be fairly sure that outdoor life does have, in part at least, the restful value that has long been claimed for it. This value may be derived, in part, from an increased amount of physical exercise, in part, from more restful sleeping periods, and in part, from a sheer change of environment. In any case, some of the hours and days spent in the woods or along a stream serve as a most adequate type of relaxation.

Some students of current attitudes and dispositions hold it a pity that facts such as have been included in this chapter cannot be made so plain to young people that they will merit more than passing attention. It may be, of course, that our nervous systems can adjust themselves to new tempos of living, for most animals, including man, possess large powers of adaptation. In any case, it is easy to see that life is now ordered not so much by our own inner resources to action

[30] Patrick, G T W, *op cit*, *passim*

as by a fast-moving series of bells, signals, notices, warnings, and other types of external invitation Having created a mechanical system around us, we are no longer masters of it but servants It drives us almost beyond our normal powers of recuperation This is at least one of the reasons why rest and relaxation, in their various forms, touch not only the patient in the hospital but the "healthy" person in his daily labors. Proper modes of rest and relaxation hold more value for the fit than they do for the weary because the fit can thereby avoid weariness.

GENERAL READINGS

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CHAPTER FOUR

PROBLEMS OF MOTIVATION

1. *Introduction*.—The reader may get quickly into the substance of this chapter if he will remind himself of a refrain that has echoed back and forth in the preceding discussions. We have found, for example, that many of the hazards of the open road are created, not because drivers know no better, but because, hoping for the best, they continue to do worse through lack of skill. No person would think of trying to play a game of golf without sufficient practice, but he rarely has any incentive for training himself in right action when quick and alert choices must be made where traffic conditions are difficult. This same thought came out most clearly in our brief study of some of the problems of athletics and especially in conjunction with the disposition or attitude known as morale. A still better illustration will come in our remarks on the best methods of study where we shall speak of the way in which a learner will know much about the conditions that should be obeyed and yet his work come to nought because he has not set himself vigorously to the task.

Our general problem in this chapter, then, is to inquire after the nature of determination or will power or motivation. We take it for granted at the outset that a student may know ever so well how to budget his time, and he may stand ever so high in tests of his general alertness, but neither budgeting nor alertness will serve him to good advantage unless there is that kind of devotion to physical and intellectual labor which is expressed by the word "desire." It is a plain fact that the success which any person will achieve depends, in large part, upon his willingness to apply himself to the various tasks assigned to him. This willingness may take the form either of a motive or of a desire. The difference between these two terms is a minor matter of definition, for the latter usually refers to some major tissue need, whereas the former refers to derived or secondary interests and purposes.

It used to be thought that incentives, motives, and desires named a way which the mind had of revealing what has been called its will, its power of choice, or its determination. Most of the older books in

psychology, for example, divided the powers of the mind into three parts, viz., cognition or knowing, the power of having an affective preference for objects, and conation, or the power of both spontaneous and deliberate action For example, if the student were to read a book of this kind with a high level of concentration, one would have to say of him that he was exercising his conative power or his determination. The more dull and uninteresting the book, the more directly the reader would have to draw upon his powers of concentration. If a worker in a factory finished more pieces than another, in spite of monotony and of fatigue, it would have to be said of him that he was voluntarily making his desire for a greater income increase his rate of work.[1]

The whole problem of voluntary action or will power has now been brought into the experimental laboratory. Even though the subject of an experiment may be familiar, so far as his own intimate view of it is concerned, with the kind of action which he calls voluntary action, it has not been possible to make more than a preliminary definition of such action. A clever experiment in this field runs somewhat as follows. The task was to condition progressively the pupillary reflex to other than visual forms of stimuli. First, the reflex was conditioned to a bell, while light served as the unconditioned stimulus. Next, the subject himself contracted his hand in closing and opening the light and bell circuits. The third step was taken when verbal commands were substituted in place of the bell and in place of the contractions of the hand. Finally, the subjects were asked to repeat the verbal stimuli, then to whisper them, and finally to reduce them to silent speech. The results of this experiment in learning showed that the pupillary reflex (both dilation and constriction) could be evoked by verbal stimuli from the experimenter or by verbal stimuli from the subject himself. These verbal stimuli might be either overt, whispered, or silent.

Since most of the subjects did not know the nature of the experiment and since there are no afferent nerve endings in the iris which could be used for a more direct type of conditioning, it was inferred that voluntary control of the pupillary reflex must be related, in some intimate way, to that kind of learning known as conditioning. Moreover, the newly conditioned pupillary response was found to differ in certain essential respects from the original unconditioned light reflex. Among other things, its latency time was somewhat longer. It endured for a

[1] The doctrine of the will finds its classical expression in Bain, A., *The Emotions and the Will*, London, Longmans Green, 1888 James, W., *The Principles of Psychology*, N Y, Henry Holt, 1890, Vol II, Chap XXVI Stout, G F, *A Manual of Psychology*, Oxford, Univ Tutorial Press, 1929 (4th ed.), pp 616–629 and *passim*

longer period of time and there was no evidence of what are known as the phenomena of "experimental extinction." That is, the newly conditioned reflex did not disappear after the original unconditioned stimulus had been withdrawn.[2]

Although experimentation of this kind has not yet definitely answered the question as to how voluntary action may be defined, most psychologists are inclined to say that there is no reason to suppose that the mind has a special faculty which can be called "will." On the contrary, they are inclined to argue that will power is the way in which certain kinds of stimulus situations may become effective in guiding and promoting the reactions of an individual over a long period of time. A corollary of this conclusion is clear. If will power is not a native property of the soul, that is, if it is a feature of the long-time stimulus value of certain kinds of situations, then it must follow that a great many volitional acts, and all types of motives and incentives as well, can be developed by training. We shall try to show that this is the case in a moment. In the meantime, it is clear that the possibility of training motives might have a very great importance for industry, for education, and for every other phase of human activity. It may be that motives of one type are not helpful to an industry or to economic and political problems If there is a chance that motives may be changed, either by increasing their effectiveness, on the one hand, or by eliminating them altogether, on the other, society would have a very serviceable instrument in its hands for its own guidance. The same considerations hold true in the regulation of one's own personal behavior.

2. *The Instinct Theory of Motivation.*—The older doctrine that there is a will or a power of determination rested upon the assumption that the mind must possess these traits as a part of its intrinsic nature. In other words, will power was not something that could be gained through training or even related in more significant ways to some types of objects than to others. It was simply a part of the original

[2] Hudgins, C V, "Conditioning and the voluntary control of the pupillary light reflex," *J Gen Psychol*, 1933, *8*, 3-51 Other literature bearing on this same problem is as follows Hamel, I A, "A study and analysis of the conditioned reflex," *Psychol Monog*, 1919, *27* (No 118), Hilgard, E R, "Conditioned eyelid reactions to a light stimulus based on the reflex wink to sound," *Psychol Monog*, 1931, *41* (No 194), Hunter, W S, and Hudgins, C V, "Voluntary activity from the standpoint of behaviorism," *Proc and Papers, Tenth Int Cong Psychol*, Copenhagen, 1932, Copeland, M A, "Desire, choice, and purpose from a natural-evolutionary standpoint," *Psychol Rev*, 1926, 33, 245-267, Wells, H M, "The phenomenology of acts of choice an analysis of volitional consciousness," *Brit J Psychol.* (Monog Suppl), 1927, *11*, pp 157 ff, Williams, G W, "A comparative study of voluntary and hypnotic catalepsy," *Amer J Psychol*, 1930, *43*, 83-95

nature of human beings. This appeal to original nature has been made much use of in the field of motivation, for it is often said that, even though one may not find direct experimental evidence of will power, there are, nevertheless, groups of instincts which serve the same purpose One person has gone so far in this direction as to suppose that all psychological conduct is essentially dynamic or motivated conduct. The argument says that the soul is to be thought of as a kind of force or agent which is always working toward some goal It is clear that, if the mind is by nature purposive, that is, if it is always striving toward some goal, the mind probably names its own goals and decides upon the instruments it shall use in order to attain these goals.[3] In short, motivated conduct is essentially instinctive and purposeful in its origin and development.

Among the specific instincts which have been named as the basis of purposeful action, there are the instincts of competition, of emulation, and of rivalry The instincts of secondary importance are the anger instincts, the fighting instincts, the desire for possession, the collecting instinct, and so on.[4] As we shall try to show in Chapter Thirty-Seven, the activities named by these words are often called instinctive because no one has taken the trouble to find out just how and where they had their origin. To be sure, there is no place in the system of formal education where one will find definite courses or definite methods of teaching which will lead to skill in activities of the type named above, and since society has usually paid little attention to the outcomes of informal education, it has been easy to suppose that original nature must play a very large part in giving to a person those traits and dispositions which are known to have no counterpart in a formal curriculum.

It is now believed that our whole attitude toward the original nature of man must be changed. This is not to say that there are no such entities as native traits but merely to say that no kinds of action or attitude should be called native until it has been shown that training cannot account for them As we have said, some of the experimental material bearing upon this problem will be considered later. If the reader finds that this material is convincing, he will see at once that motives cannot be explained in terms of instincts.[5]

[3] McDougall, W., *Outlines of Psychology*, N. Y., Scribner's, 1923, pp. 1 ff.

[4] Cf. for example Wallas, G., *The Great Society*, N. Y., Macmillan, 1914. McDougall, W., *Social Psychology*, Boston, John W. Luce, 1910, Chaps. III and IV.

[5] Cf. Bernard, L. L., "The misuse of instinct in the social sciences," *Psychol. Rev.*, 1921, *28*, 96–110. Dunlap, K., "Are there any instincts?" *J. Abnorm. and Soc. Psychol.*, 1919, *14*, 307–311.

As a single example, we may take the instinct to compete against or to emulate another person. We call this kind of activity an instinct because it is asserted that the nervous system is so organized at birth that, given a certain kind of social situation in which someone else has reached a high level of skill, the one person will automatically and inevitably bend his energies toward a superior performance.[6] It is known, of course, that activity is one of the native properties of living tissue. We can no more think of a motionless form of life than we can think of a matterless form of matter. All living tissue is characterized by such properties as irritability, conduction, contraction, reproduction, and growth. These words describe properties of living material in the same sense that conductivity describes one of the properties of a copper wire. One might, of course, say that living tissue has the instinct to be active, but nothing is added to the facts by using the word in this connection.

If we may begin, then, with the almost ceaseless activity of a small infant, it is easy to see how various types of learning situation can be brought to bear upon the task of guiding and promoting activity. Now it happens that many of these learning situations are social in character,—that is, they involve the presence of other active persons. To be more specific, they involve the presence of parents and of other relatives who are, from the very first moment, jealous of their offspring. This means that parents,—and teachers, as well,—are constantly organizing learning situations so as to motivate the growing child toward higher and higher levels of achievement. Even the problems of eating, of sleeping, and of taking care of the body are motivated in this way. If a child does not take its food quickly, it is invited to compete against some other child or against its parents. From the cradle, then, and through the schoolroom, the child is always being rewarded for superior achievements and punished in one way or another for inferior achievements. It very rarely happens that any mode of performance is set into a situation that will place emphasis upon the intrinsic pleasure of good performance or upon its inherent worth.[7]

In view of the intense way in which the desire for competition or rivalry is sought for during the educational process, it is no wonder that most human beings grow up in possession of certain traits, at-

[6] These problems will be discussed in more detail in Chapter Eight.

[7] Cf. Murphy, G., and Murphy, L. B., *Experimental Social Psychology*, N. Y., Harper, 1931, pp. 447–486, 493–494, and *passim*.

titudes, and skills which are, so to speak, second nature. There is, however, a difference between second nature and first nature. If it can be shown that the desire for competition is really first nature, it must follow that certain forms of social organization and the use of competition as a primary motive in industry are not only justified, but that they are almost inevitable If, however, we should find out that competition may be, in large part, a product of early training, we shall have asserted also that it can be placed under a certain amount of control. The question then becomes the practical question of asking whether competition as a prevailing motive in social affairs or in industry is worth while. If it could be shown that intense competition is more or less fruitless, then some change ought to be made in the teaching program. If, however, it can be shown that competition is worth while, our present educational system seems very adequate in its method of control [8]

3. *The Nature of Motives.*—So far as has been established at the present time, all human action is a more or less direct consequence of some form of stimulation. In the lower animals, the response to a stimulus must take place almost immediately upon the presentation of the stimulus. In the higher animals, however, the nervous system has provided a way in which long delays may occur between any given stimulus and a response which represents, so to speak, a consummation of that stimulus. In adult life, a very large part of the stimuli which become effective in regulating behavior have their origin outside the body. At the beginning of life, however, most of these stimuli are internal to the body itself. It has been shown, for example, that a large part of the behavior of a new-born child is initiated by sources of stimulation in the alimentary canal of the infant.[9]

Among the internal sources of stimulation which are thought to be most effective we may name hunger, thirst, sex, the need for activity or change, and the need for rest. Hunger is a product of periodic movements that take place in the walls of the stomach.[10] These movements give rise to sources of stimulation which, in turn, bring about restlessness on the part of the infant. As the child grows older, this

[8] A further study of this matter will be made in Chapter Eleven

[9] Irwin, O C, "The amount and nature of activities of newborn infants under constant external stimulating conditions during the first ten days of life," *Genet Psychol Monog*, 1930, *8*, 1–92

[10] Canon, W B, "Hunger and thirst," in *Foundations of Experimental Psychology* (ed. C. Murchison), Worcester, Mass, Clark Univ. Press, 1929

restlessness takes the form of more definite searching movements. Moreover, this whole series of events becomes associated through the learning process with a tremendous variety of objects and situations. These objects and situations need not be the sight of food or anything connected directly with food. They may go as far afield as a long period of study in preparation for greater earning power. At first sight, of course, it looks as though a wide gap separated such stimuli as contractions in the walls of the stomach, on the one hand, and close and detailed study of law, psychology, physics, or art, on the other. It is not possible, as yet, to build all of the spans of the bridge which may tie these two events together, but enough is already known to suggest rather strongly that, given such a fundamental urge as is named by the word hunger, one may tie this urge to almost any object or situation, no matter how remote from hunger it lies.

The same facts hold true of thirst, of sex, and of other types of tissue need. In the case of sex, for example, the development of the sex glands means the secretion into the blood stream of one of the substances known as the hormones.[11] These substances have not only a physiological value in determining the nature of what are called the secondary sex characteristics, but a psychological value as well, for they tune the individual to a reception of some kinds of stimulus situations rather than others. Moreover, they induce the same sort of restlessness or searching movements as may be induced by hunger. Through the processes of education these movements become highly changed and modified so as to make them acceptable to the social group and they become related, also, to a tremendous variety of objects and events which, prior to learning, could have had no significant relation to them.

In view of the fact that almost any object or situation can come to serve as a motive, it has not been possible to establish an adequate method of describing different classes of motives. One may list, however, rather loosely, the following. First, there are economic motives. These motives have had a long history in social theory and they have been tied up with almost every kind of instinct.[12] The desire for the possession of goods, for example, may be taken as an economic motive In the second place, one might speak of social motives. Every child is the member of a family to begin with, and of some other type

[11] Cf Harvey O L., "The scientific study of human sexual behavior," *J Soc Psychol*, 1932, 3, 101-148

[12] Rice, A S (ed), *Methods in Social Science*, Chicago, Univ. of Chicago Press, 1931

of social group later on. In every phase of his education, therefore, his own needs and desires become related to situations and factors which are held to be desirable by the group. Of these factors, there are two which have played a very large part in the history of the race, viz., religious or idealistic motives and moral motives. One of the most perplexing types of motivation is described by the word "hedonism." This word has had a long history in philosophy and in social theory. It names the doctrine that all human behavior is related more or less directly to the gaining of individual pleasure.[13] In addition to these major classes of motives,—which we may call more or less normal,—there are a vast number of special incentives to action which are pathological in character. Of first importance among these pathological incentives are such devices as compensation, rationalization, and the like. These devices play so important a part in the life of men that they will merit a whole chapter (Chapter Twenty).

4. *The Acquisition of Motives.*—It has been fairly easy to pass, as we have just done, rather quickly from primary tissue needs to economic, religious, ethical, and other types of motives. Clearly, we must see how it is that transitions of this kind can be made. The transition is based, first of all, upon the assumption that all human behavior is related more or less closely to a precise stimulus situation.[14] The fact that, early in life, many of these stimulus situations are internal to the body must not confuse the issue. It is one thing to say that movement in the walls of the stomach, to take only a single instance, may form a set of effective types of stimulation to further action, and quite another to say that the nervous system, on the one hand, or a mind, on the other, can produce action by some sort of spontaneous initiative.

The clew to the process by which large numbers of external situations and events may come to direct human behavior is found in that kind of learning known as conditioning. Since we shall describe this method of learning in more detail in Chapter Thirty-Eight we shall give only the barest outlines of it at the present time. In general, learning by conditioning means that, if two stimulus situations are presented to a subject at one and the same moment, one of them will

[13] Troland, L. T. *Fundamentals of Human Motivation*. N. Y., Van Nostrand, 1928.

[14] This proposition has a very large controversial literature behind it. See Hunter, W. S., "The sensory control of the maze habit in the white rat," *J. Genet. Psychol.*, 1929, 36, 505–537. "A consideration of Lashley's theory of the equipotentiality of cerebral action," *J. Gen. Psychol.*, 1930, 3, 455–468. Lashley, K. S., "Cerebral control versus reflexology," *J. Gen. Psychol.*, 1931, 5, 3–20, etc.

quickly come to call forth the response that was formerly produced only by the other.[15] As an example, we may say that the initial stimulus to restless activity or to searching movements consists of contractions in the walls of the stomach. It is easy to see, however, that such a source of stimulus is always accompanied by a vast number of other stimulus situations such as the sight of the nurse, the sight of the objects which bring food, the room in which food is usually secured, and the like. Later on, a great many other objects may be added to this list. Moreover, there are odors of food and the gradual development of time habits for the taking of food. The principle of conditioning would say that some of these stimuli which, at first, may have been more or less irrelevant, so far as bringing searching movements to an end, acquire a functional value along with the original stimulus. They may even replace the original or unconditioned stimulus.

The ordinary processes of education quickly see to it that the processes of conditioning proceed much further than this The acts of getting food and of consuming it are speedily caught up in a whole series of approvable types of conduct, known as etiquette. Moreover, a desire for food may come to be almost wholly obscured by seemingly remote means of guaranteeing that food shall be available at regular intervals. All of the professions, for example, depend in the last analysis upon the fact that they bring in the means which make living possible. As we have said, it may be a far cry from the pursuit of information in a laboratory to such a fundamental tissue need as hunger, but in view of the fact that one object after another may be conditioned to an original tissue need, learning by conditioning is commonly held to furnish an adequate way of passing from one level to the other.[16]

There is one feature of motivation which still remains somewhat obscure. Adult modes of action are often modified by those attitudes or dispositions commonly known as sentiments. The word "sentiment" includes all of the attitudes, concepts, or objects which are liberally tinged with pleasure or with other feeling-tones and which may stand as a steady source of stimulus to action, even in spite of more fundamental tissue needs. As an example, we may take such a sentiment as patriotism. A flag, a picture of the President of the

[15] The authoritative place for data on conditioning is Pavlov, I P, *Conditioned Reflexes*, Oxford, Oxford Univ Press, 1927 (trans by G V Anrep)

[16] Dashiell, J F, *Fundamentals of Objective Psychology*, Boston, Houghton Mifflin, 1928, pp 238–259

United States, a song, or even certain types of gestures may serve as an adequate stimulus for modes of behavior which may predominate for long periods of time over the so-called biological urges Human beings will, for example, face death by burning as a result of ethical or religious sentiments. They will go without food and even commit wholesale murder because of their patriotic impulses.

As we have said, it has been more or less difficult to trace the exact origin of sentiments, but most persons are inclined to attribute their origin and development to the same processes which lead to the socialization of primary motives It has been held for a long time that human beings naturally prefer those behavior patterns which are accompanied by or lead to pleasure and satisfaction. Conversely, it is held that most persons will tend to avoid modes of behavior which lead consistently to unpleasantness These facts have been caught up in what has commonly been known as the hedonistic theory of behavior Aside from theory, it is an experimental fact that certain kinds of objects and events lead to actions which are saturated with pleasure whereas other objects and events consistently lead to actions that are saturated with unpleasantness or annoyance.[17]

If we may take this fact as a starting point, one might say that actions tinted with feeling can be and are conditioned in the same way that the primary tissue needs are conditioned. In social life, for example, it is one of the functions of government to promote and guarantee the happiness of each person This happiness may be related to the primary tissue needs or to any of the motives which are generated out of these needs Any of the objects that represent the government might then, through the process of conditioning, acquire that pleasantly toned affective coloring which would give them a sentimental value In other words, the flag would come to be an object which represents a very large number of governmental actions, a large number of common social attitudes, and a distinct feeling of pleasure or satisfaction. In the same way, such words as "beauty," "justice," "sacrifice," and "honesty" could achieve a sentimental value. They would represent actions and attitudes which are clothed with a distinctly pleasurable feeling.[18]

5. *Experimental Studies in Motivation.*—It is clear from what has been said up to this point that the subject of motivation should com-

[17] Shand, A F, *The Foundations of Character*, London, Macmillan, 1922. McDougall, W., *op cit* Chap XVII

[18] Some of these sentiments, and especially aesthetic sentiments, will be described in Chapter Twenty-Four.

prise something more than a single chapter in the whole field of applied psychology There is, perhaps, no phase of the practical art of human control which is not touched by motivation. We have already seen this to be true in the preceding chapters where we have spoken of the effect of the intent to learn upon study methods, the indifference which often hinders the attainment of proper skill in driving an automobile, and of the effects of confidence and of morale upon athletic performance. Further references to motivation will occur in almost every one of the subsequent chapters. In view of this fact, it will be helpful if we take a quick glance at some of the ways in which motives can be brought under experimental control. We do this, in part, in order to make the student realize that his achievement in the study of applied psychology will depend upon the strength of his intention to learn, in part, in order to show him how dependent all of his actions are upon proper incentives to work and, in part, in order to lay out a general picture of this field of research.

As we have said, the problems of motivation have long been tied up with the phrase "the will to learn." Students in the schoolroom frequently hear such phrases as "intense effort educates," "genius is one-tenth ability and nine-tenths application," "success depends upon the desire to succeed," and the like. One of the first experiments upon the so-called "will to learn" made use of 124 college juniors and seniors. The subjects were divided into two groups, the one group being asked to count the score after each practice period and to know at all times what results were being achieved. The experimenter increased the motivation of this group by urging them to do better, by inviting them to be alert for the discovery of any procedure that would hasten learning, and by giving them special instructions at various times during the experiment. The other group worked in ignorance of its scores, although it was urged to do its best. Both groups worked on four tasks, viz , writing the letter "A" as accurately and as quickly as possible, locating and crossing out certain letters in lists of disconnected Spanish words, translating the digits of five-place numbers into letters according to a key at the top of the page, and multiplying two-place numbers. The experimental situation continued in this way through thirty practice periods. During this entire time the specially motivated group was superior to the unmotivated group At the beginning of the thirty-first trial the instructions to the two groups were exactly reversed. The control group now became the specially motivated group and the specially motivated

group now became the control group. When this happened, the performances of the two groups were likewise reversed. The persons who formerly had been inferior now became superior.[19]

More recent experiments have broken this general concept of a will to learn into a number of special incentives. One of the most common of these special incentives is, of course, punishment. In laboratory studies, punishment is inflicted by moderate electric shocks, by the removal of food, or by any one of the various modes of reproving a person. Society too depends largely on punishment in connection with crime and in view of this fact we shall postpone our major discussion of the problems of punishment to a later chapter (Chapter Eighteen). In the meantime, we may cite only a single experiment on the effects of punishment on a simple type of maze learning. A group of forty students was asked to learn a maze where an electric shock was received whenever the subject moved into a wrong alley. A similar group of forty subjects learned the same maze under the ordinary instruction to learn it as fast as they could. The results of this experiment showed that punishment decreased the number of trials required to learn the maze by about fifty per cent. Moreover, the time required for learning was reduced by about thirty per cent. As compared with the unpunished group, the experimental group showed less variability in both the total number of trials and the total time required. There was some evidence, however, that members of the punishment group were made more cautious, for the time that they took on any single trial was greater than that taken by the control group. Finally, it was clear that punishment would decrease the total number of errors of all types.[20] Other experiments in this field show that punishment will aid learning only when it stands in an optimal relation to the difficulty of the task. If the learning task is simple, severe punishment may interfere with rather than aid learning.[21]

A second type of motivation which is known to have high value for a great many different kinds of performance is the presence of other

[19] Book, W. F., and Norvell, L., "The will to learn an experimental study of incentives in learning," *Ped Sem.*, 1922, *29*, 305–362

[20] Bunch, M. E., "The effect of electric shock as punishment for errors in human maze learning," *J Comp Psychol.*, 1928; *8*, 343–359

[21] Yerkes, R. M., and Dodson, J. D., "The relation of strength of stimulus to rapidity of habit formation," *J Comp Neurol and Psychol.*, 1908, *18*, 459–482 See also Cole, L. W., "The relation of strength of stimulus to rate of learning in the chick," *J Anim Behav.*, 1911, *1*, 111–124 Vaughn, J., and Diserens, C. N., "The relative effects of various intensities of punishment on learning and efficiency," *J Comp Psychol.*, 1930, *10*, 55–66.

persons. This is to say that the performance of a person working alone may not be so great as the performance of the same person when he is in a group situation. This topic, too, belongs more appropriately to another chapter (see Chapter Nine) and a single experiment, therefore, will serve to familiarize us with methods of procedure. In this experiment two groups of ninth-grade pupils were equated in terms of age and intelligence quotients. The eleven subjects in each group were personally instructed by the experimenter in some of the main principles of algebra. Immediately before the experiment, the subjects were given three days of special training in problem-solving. The experiment proper lasted four days during which time one of the groups worked as a unit while the members of the other group worked on individual assignments. Although the two groups had been almost equal in performance until the beginning of the experiment, they differed from each other markedly afterwards, the persons belonging to the discussion group being superior to those who had worked alone [22] The results of this experiment are plain enough, but, as we shall see, the situation is by no means so simple as it appears to be in this case.

Almost all of the experiments that have been done on the effect of knowledge of results on performance show that learning proceeds much faster under these conditions than where there is no knowledge. One of the typical experiments in this field was done in the following way. The subjects were asked to perform a very simple motor skill, viz., make tallies, that is, draw four vertical lines and cross them with a fifth, diagonal line. Three groups of equated subjects were used, the first group having full information about its scores on the previous day, and a table of scores for the group placed in view during the working period. The second group worked with partial information in the sense that it was told which persons were above and which were below the average, and the third received no information at all about its progress. The score was based upon the quantity of work done. The results indicated that the three groups were equally skillful during the first part of the training period but as practice continued the group which had complete knowledge of its results began to improve more rapidly and it remained consistently ahead of the other two groups throughout the course of the experiment. The second and third groups remained alike for a longer period of time, but by

[22] Barton, W A, "The effect of group activity on individual effort in developing ability to solve problems in first-year algebra," *Educ Admin and Supervis*, 1926, *12*, 512–518.

the seventh and tenth practice periods the group working under partial knowledge gained slightly over the third group [23]

It is generally recognized in experiments on motivation that aside from the infliction of pain no object is inherently a reward or a punishment To the contrary, any stimulus situation may be used as a reward or as a source of punishment, depending upon the way in which it is presented to the subject In one experiment, for example, a group of subjects was asked to estimate a space in comparison with another standard space The subjects could move a bar to the right or to the left until the distance on one side of the vertical line was equal to the distance on the other. The subjects were divided into six different groups, the first receiving no special motivation, the second group receiving "punishment" by being told that a bell would ring if its judgments were wrong, a third group receiving a reward by being told that a bell would ring if its judgments were right, a fourth group being handled in the same way as the second group save that it was required to guess the direction of its errors, a fifth group being handled in the same way as the second group except that it was told the direction of its errors, and a sixth receiving instruction after each trial as to whether it was wrong and what the character of the error was. The results indicated that the control group made no improvement To the contrary, the evidence showed that they became careless in their work. All of the other groups showed a marked reduction in average error. The punishment and the reward groups, that is, groups two, three, four, and five, did better than the sixth group—that is, the group that had the most knowledge about its performance The inference is that reward and punishment were more effective than knowledge. The differences between the reward and the punishment groups were not significantly great [24]

Praise and reproof, encouragement and discouragement, and similar inflections placed upon a learning situation are known to have a pronounced effect upon rate of learning In one study in this field, for example, a large number of children were given the Otis Test and the National Intelligence Test. On the basis of these tests, these children were divided into three groups of equal ability, there being

[23] Ross, C C, "An experiment in motivation," *J Educ Psychol*, 1927, *18*, 337–346 See also Arps, G F, "A preliminary report on 'work with knowledge *versus* work without knowledge of results,'" *Psychol Rev*, 1917, *24*, 449–455 Judd, C H., "Practice without knowledge of results," *Psychol Monog*, 1905, *7* (No 1)

[24] Hamilton H C "The effect of incentives on the accuracy of discrimination measured on the Galton bar," *Arch Psychol*, 1929, *10* (No 103)

136 subjects in each group. At a second meeting of the groups, another form of the same tests was given. One group was praised for its work on the previous test, a second group equal in ability and size to the first was reproved for its performances on the first test, the third group, likewise equal in ability and size to the first two, repeated its performance without any special instructions. It was clear from the results that praise and reproof are equally effective in raising test scores The control group which received no special instruction was fifty-two per cent better on the second than on the first occasion. Praise, however, increased the performance of the first group by seventy-nine per cent Reproof brought about an increase of eighty per cent. The experiment showed, among other things, that older children respond more quickly to praise and reproof than do younger children Boys made greater gains than girls, both for praise and for reproof In the control group, however, the girls raised their scores more than the boys did Bright children were more influenced by the special incentives of praise and reproof than were the dull ones Negro children scattered through the several groups responded more favorably to praise than to reproof [25] It does not follow, however, that praise and reproof are equally effective over long periods of time On the contrary, reproof given day after day quickly loses its motivating power [26] Results of this same kind have come from experiments on the effect of encouragement and discouragement.[27]

It is clear, then, that proper motives do contribute to excellence in all kinds of performance [28] This means that no student can hope to meet difficult or perplexing situations simply by "making up his mind" to do so. The new-born infant begins life with urges to action which originate for the most part in its alimentary canal These original or native urges to action are quickly transferred to all kinds of objects and situations. The experimental study of motivation has

[25] Hurlock, E B, "The value of praise and reproof as incentives for children," *Arch Psychol*, 1924, *11* (No 71)

[26] Hurlock, E B, "The evaluation of certain incentives used in school work," *J Educ. Psychol*, 1925, *16*, 145–159

[27] Gates, G S, and Rissland L Q, "The effect of encouragement and discouragement upon performance," *J Educ Psychol*, 1923, *14*, 21–26

[28] This conclusion is so important that the student can well afford to consult other experiments in the field See, for example, Briggs, T H, "Praise and censure as incentives," *School and Soc*, 1927, *26*, 596–598 Freeman, G L, "The influence of attitude on learning," *J Gen Psychol*, 1930, *3*, 98–112 Myers, G C, "Learning against time," *J Educ Psychol*, 1915, *6*, 115–116 Sanderson, S, "Intention in motor learning," *J Exper Psychol*, 1920, *12*, 463–489 Chapman, J C, and Feder, R B, "The effect of external incentives on improvement," *J Edu Psychol*, 1917, *8*, 469–474 Symonds, P M, and Chase, D H, "Practice *versus* motivation," *J Educ Psychol*, 1929, *20*, 19–35

shown how this process takes place and how derived or secondary sources of incentive can be used to keep effort at a high level. We appear now to leave this topic, but as we do so the student should remember, first, that it will appear again in almost every one of the chapters that are to follow and, second, that an understanding of the principles of motivation ought to be one of the major results of a study of applied psychology.

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CHAPTER FIVE

THE PROBLEMS OF VOCATIONAL GUIDANCE

1. *Introduction.*—There is no time, perhaps, when the possible applications of psychology to the reader himself will seem any more important than when he first begins his search for an answer to such questions as the following, viz., What should I choose as my life task? What can the student of human nature tell me about my abilities? What can he say about my future as a productive member of society? How can the study of applied psychology guide me in my preparation for one of the professions? Is there any truth in the statement that some kinds of psychological talent are more useful in one profession rather than in another?

The complete study of the whole group of problems raised by these questions would require not only the whole of this book but the whole of the science of psychology as well. We can, therefore, write out only a few of the more important facts and suggest to the reader that he continue his study of this topic by making use of the references at the end of the chapter. If he is minded to proceed further than this chapter can carry him, he should remember that his questions are very difficult to answer, that the science of psychology is still rather young, and that this particular group of problems has not received the same amount of careful attention that has been given to other problems.

In general, the problems of vocational guidance are suggested by three important facts. In the first place, the normal processes of education, especially in the grade schools and in the high schools, do not prepare the student to enter one profession rather than another. To be sure, the student may now choose any one of a large number of specialized curricula (commercial courses, pre-legal courses, pre-medical courses, and the like), but it still holds true that education serves the more general purpose of training the student in traits and skills that furnish a background for the task of earning a living rather than for traits and skills which have an immediate economic value. In the second place, many students, especially at the high school level, have not chosen a vocation and those that do so have a scanty com-

prehension of the nature of the vocation selected.[1] In the third place, there is the fact that not every kind of work can be done with high competence by every person.[2] There are some tasks that demand excellence in some traits, whereas other tasks will demand excellence in quite other traits. We have already seen that this is true in driving a car. It is clear that a man with slow reaction time and poor coordination would be unfitted to become a dependable taxi driver. In other words, then, vocational guidance means that the psychologist must find out something about the excellencies of every particular individual and that he must know, in general, what psychological traits are most useful in any particular job or profession.

It is sometimes said that the whole answer to the problem of putting the right man in the right place is a matter of training. This means that every person should receive a maximal amount of guidance in his earlier years. It is likewise said that the whole answer to this problem lies in finding out what the native dispositions of each person are.[3] We have been led to believe that there are five-talent men, two-talent men, and one-talent men, not only with respect to actual quantity but with respect to quality or kind of performance as well. We shall not be able to discuss in detail the relations between native abilities and acquired abilities until we come to Chapter Thirty-Seven, but in the meantime we may say that this problem stands at the very center of any discussion of vocational guidance or selection. If it should turn out that some men are born to be leaders, statesmen, bankers, or salesmen, while others are born to be hewers of wood and drawers of water, the psychologist must find out what these native factors are before he can wisely turn a person in one direction rather than another. In general, however, there is much reason to suppose that right training can go a very long way toward preparing a man for any given vocation. In other words, it is one of the functions of education to promote and guide the growth of a more or less plastic child so that the proper traits will have been raised to a mature level before it is his turn to become a wage earner.

One inference we may draw from this proposition is that all education is a kind of guidance. During the early days of infancy, the person who is being guided has nothing at all to say about the traits, disposi-

[1] See Cohen, J. D., *Principles and Practices of Vocational Guidance*, N. Y., Century, 1929, pp. 471 ff.

[2] This fact is abundantly borne out by Viteles, M. S., *Industrial Psychology*, N. Y., Norton, 1932, Sect. II.

[3] Consult Jones, A. J., *Principles of Guidance*, N. Y., McGraw-Hill, 1930, *passim*.

tions, emotional attitudes, and other types of psychological equipment which will be given to him The same helplessness before the wishes of society persists through the grades and into the high school Moreover, in view of the fact that emotional development, the growth of incentives to action, and the development of a great many personality traits are left to the processes of informal education, we may say that an average college student has been guided into his present disposition by chance factors rather than by an intelligent perspective on his future. This statement means just what it says, for most teachers and parents do not realize that they themselves have been vocational counselors both in and out of the schoolroom The teacher takes credit for the guidance that is exercised in the schoolroom (which is limited rather to intellectual traits) but both teachers and parents are inclined to say that the guidance they give outside of the schoolroom is not really effective for, as a rule, they attribute the traits which develop under these conditions to original nature and to instinct rather than to training In any case, vocational guidance differs from all types of education only in the sense that, at some time during the late high school years or in college, a specific attempt is made to help students find themselves. It is obvious from what we have just said, and it will become much more obvious in Chapter Thirty-Seven, that the vocational counselor starts too late [1]

2. *Physique and Character* —One of the oldest methods of directing men into the right profession is based upon the assumption that there are several bodily features which denote the general intellectual quality and character of a man. There is, for example, the so-called science of phrenology which asserts that mental and moral traits reveal themselves in the shape of the head or in special areas of the skull. The so-called science of physiognomy asserts that the same kind of traits reveal themselves in the form of the face or in some of its characteristic modes of expression. Palmistry finds not only the present character of a person but his future, as well, betrayed in the shape of the hand and especially in the lines of the palmar surface.

It is now known that the relation between various psychological functions and physical traits of this sort is meager indeed. Phrenology was based upon the assumption that elevations and depressions in the skull must be the result of special growth in the nerve tissue below. Local growth in nerve tissue, in turn, was a product of the general doctrine that each of the different psychological functions and each

[1] Consult Brewer, J M , *Education as Guidance*, N Y , Macmillan, 1932

phase of these functions had a special brain area as its bodily instrument. If, for example, there is such a trait as foresightedness, then this trait must have an identifiable sign on the skull whenever it is exceptionally prominent in the behavior of a person. One might, then, make a complete chart of the skull noting all of the protuberances and relating them to such traits as love of approbation, combativeness, distinct abilities in various kinds of perception such as time, number, and the like.[5]

Aside from the chance relationships upon which systems of phrenology are based, the most serious objection to them lies in the fact that the brain does not function as the system demands. For a time it looked as though specific functions must be carried out by specific areas in the brain and this matter is not wholly settled even as yet; but it seems fairly clear that the brain, like the body, is essentially a single functional unit. For certain purposes and under certain conditions, it may be possible to modify a given function more directly at one place than another, but different sections of the brain appear to have great powers of vicarious operation. This fact is easily suggested by the readiness with which different parts of the body may take over the behavioral functions of other parts.[6]

The objections against palmistry are even more convincing. The folds of the palm of the hand are obviously dependent upon the amount of tissue beneath the skin and upon the distribution of the tendons and other connective structures which keep the skin from being torn away from the flesh and bones. There is, as a matter of fact, just about as much reason why the lines of the hand should reveal intellect and character as there is to suppose that the stars in their courses have something to say on the matter. If, then, one wishes to find out something about his character or his aptitude for a given vocation he may be entertained by having his hand, his head, and his star read, but he will not be greatly enlightened.[7]

The study of the relation between psychological functions and general bodily stature has been taken a little more seriously. Two

[5] There is, of course, no foundation for these systems See, for example, Adams, H F., "Psychological gold bricks," *Scribner's Mag*, 1921, *70*, 94–101 "The mythology and science of character analysis," *Scribner's Mag*, 1921, *69*, 569–575 Dunlap, K., "The reading of character from external signs," *Scientific Mo*, 1922, *15*, 153–165

[6] Lashley, K S, *Brain Mechanisms and Intelligence*, Chicago, Univ. of Chicago Press, 1929, *passim*

[7] The most elaborate system of character reading based upon alleged relations between character and anatomical features is Blackford, K M H, *Reading Character at Sight*, N Y., Independent Corp, 1918 See also Blackford, K M H, and Newcomb, A, *The Right Job—How to Choose, Prepare for, and Succeed in It*, N Y, Review of Reviews Corp, 1924

major attempts have been carried out in this field. The first makes use of the morphologic index, that is, the ratio of the length of the two limbs to the volume of the trunk. Since there are tall thin men and short heavy men it is clear that this ratio could be expressed in two extremes. On the one hand, there are the microsplanchnics, that is, the men with small trunks as compared with the limbs, and on the other hand, there are the macrosplanchnics, that is, the men with large trunks as compared with the limbs. Men of the former type would be long and thin whereas men of the latter type would be short and stout. When the morphologic index is gained, one may attempt to find out whether it stands related in any way to major types of function. Differences in temperament have been used most frequently, for a long thin man might be said to use his energy in action whereas the short stout man would be apt to store up his energy in his own body. The comparisons that have been made show at the best only a slight relationship between the morphologic index and temperament. There is, however, some evidence to show that tall men are more apt to occupy positions of leadership than short men. That is, size is positively correlated with sociability, leadership, and general aggressiveness.[8]

A second major attack on this problem has divided men into four types, viz., the asthenic who is of average height but relatively tall for his weight, the athletic who is much more rugged in all of his dimensions than the asthenic, the pyknic who is exceptionally stout in all of his bodily proportions, and the dysplastic which includes other deviations from the normal, the most of which are the result of glandular difficulties. Each of these types has been said to stand in close correlation with variations in temperament. The nature of the relationship is suggested by two types of functional insanity. On the one hand, there are the cycloids (having a cyclothymic temperament) who wear, so to speak, their emotions on their sleeves. They move quickly from joy and excitement to moody depression. The cycloid is usually friendly, cheerful, genial, good-natured and sociable, but he may also be quiet or even easily depressed. The schizoid, on the other hand, is reserved, serious, unsociable and, at times, even eccentric. Under some circumstances he will be timid, shy, sensitive, and quite ready to reveal his deepest feelings; but at other times he will be phlegmatic,

[8] Naccarati, S., "The morphologic basis of the psychoneuroses," *Amer J Psychiat*, 1924, *3*, 527–545. Naccarati, S., and Garrett, H. E., "The influence of constitutional factors on behavior," *J. Exper Psychol*, 1923, *6*, 445–465.

dull, silent, or even indifferent. The asthenic and athletic types are more apt to be schizoid in their temperaments, whereas the pyknic most frequently presents a cycloid temperament.[9]

It still remains to be seen how far these relationships can be carried out. It is clear that the descriptions offered of various personality types are in general terms only Before one can say that correlations between physique and temperament have been established, one must be prepared to say in exact terms what a temperament is and how one temperament may differ from another. Then, too, the question of correlation cannot be answered correctly in terms of types Almost any study of biological or psychological traits gives data which fall into a normal probability curve. One may say that a type is described by the median of such a curve, but obviously most of the persons in a given distribution are not on the median. They stand above or below the central tendency [10]

A more specific attempt to correlate physical traits with psychological traits makes use of facial characteristics. A great many studies have been made, therefore, on the character traits expressed in photographs or in a direct inspection of facial characteristics. Most of this evidence is negative Clearly, one might be able to say something about such a trait as beauty and there is some evidence that snobbishness may be inferred from facial expression, but negative evidence lies behind such traits as neatness, conceit, sociability, humor, likability, refinement, and possibly vulgarity. The evidence regarding intelligence is doubtful. The correlations in some of the studies are moderately high, but when they are checked against other measures of intelligence the relationship disappears.[11]

The diagnosis of handwriting stands on a little different basis than the other types of relationship discussed. Handwriting, of course, is a kind of psychological activity rather than a physical organ. In any case, elaborate claims have been made about this function When the lines slope upward, for example, the writer is said to possess either ambition or pride. Heavy lines or heavily crossed t's are indicative of forcefulness. Perseverance is said to be

[9] Kretschmer, E., *Physique and Character*, N Y., Harcourt Brace, 1925 See also Mohr, G J., and Gundlach, R H., "The relation between physique and performance," *J Exper. Psychol*, 1927, *10*, 117–157

[10] These facts will be discussed in later chapters

[11] Cleeton, G U., and Knight, F B., "Validity of character judgments based on external criteria" *J Appl Psychol*, 1924, *8*, 215–231 Dunlap, K., "Fact and fable in character analysis," *Ann Amer Acad Pol and Soc Sci*, 1923, *110*, 74–80 Dunlap, K., "The reading of character from external signs," *Scient Mo*, 1922, *15*, 153–165

revealed by long bars on the t's and reserve by closed a's and o's. Back of alleged evidence of this type there is a fairly long record of famous graphologists who have been able correctly to diagnose handwriting to as much as 79 per cent of the cases, where the sex of the writer was under question.[12]

The more serious experimental studies that have been made of handwriting do not support these assertions. A group of seventeen students, for example, was asked to copy in a natural and uniform way a passage that had been chosen for it. Exact measures were made of the slope of the lines, their thickness, the thickness and length of the bars on the t's, and the number of closed a's and o's. The traits to be correlated with these measures were ambition, pride, bashfulness, force, perseverance, and reserve. The average correlation was slightly less than zero. In only one case did a positive correlation appear, viz., between bashfulness and lateral narrowness of m's and n's. It looks, then, as though the student in search of evidence for his given vocation could not get much helpful advice from a study of his bodily characteristics [13]

3. *Factors in Vocational Guidance.*—When two persons sit down for intimate counsel with each other over the vexing question of a life work, there are a number of factors which each of them must keep firmly in mind. Among these we may mention physique, sex, race, age, education and previous experience, a variety of social and economic factors, the need for additional people in any given field, and the intelligence, the chief personality traits, and the interests of the person who is seeking guidance. Physique is important because, in spite of some of our prejudices to the contrary, it makes a difference in the acceptability of a man in certain fields. We shall see in a later chapter, for example, that leaders in almost all professions are better than the average in physique. On the other hand, it is important that persons who have physical defects find a position in which their defect will not be a handicap. In times past the social mores have largely determined the distribution of the sexes

[12] Hull, C L, and Montgomery, R B, "An experimental investigation of certain alleged relations between character and handwriting," *Psychol Rev*, 1910, *20*, 63–74 Downey, J E, "Judgments on the sex of handwriting," *Psychol Rev*, 1910, *17*, 205–216 Newhall, S M, "Sex differences in handwriting," *J Appl Psychol*, 1926, *10*, 151–161 Kinder, J S, "A new investigation of judgments on the sex of handwriting," *J. Educ Psychol*, 1926, *17*, 341–344

[13] Binet, A, *Les révélations de l'écriture d'après un contrôle scientifique*, Paris, Alcan, 1906. Hull, C L, and Montgomery, R B, "An experimental investigation of certain alleged relations between character and handwriting," *Psychol Rev*, 1910, *20*, 63–75 Young, P. T. "Sex differences in handwriting," *J Appl Psychol*, 1931, *15*, 486–498.

in various occupations. Even though these mores are now in process of rapid change, it is still true that men are in a better position to enter some vocations than women are. The same considerations hold true of race differences The age factor makes a difference, partly because of social pressure and partly because there are measurable differences in the way in which young people and old people go about various tasks. Some of these differences will appear in our study of industry and of other phases of applied psychology. No one would argue against the proposition that suitable training and an adequate period of apprenticeship should have an important bearing upon the choice of a vocation As a matter of fact, it is partly for these reasons that the art of vocational guidance has been developed. If a person can find out in advance of actual apprenticeship what he wishes to do or what he is most qualified to do, his educational training can be more intelligently directed. Social factors enter into vocational guidance because some professions demand that kind of poise and gentility which are often described as "bred in the bone." It is an unfortunate fact that all professions are now overcrowded and this makes the problem of vocational guidance difficult indeed; but even in normal times, the person who is seeking to place himself must have proper regard for the distribution of workers in the professions and in industry. The point is that much greater effort may be demanded of a person at one time if he is to enter a given position than might be demanded of him at another time.

The most important factors in vocational guidance are, however, personality traits, intelligence, and interest. It may be that these factors are called more important because experimental psychology knows more about them at the present time. In any case, it is fast becoming possible to measure these factors and it will be helpful if we run over quickly some of the work that has been done. We shall leave for a later chapter a more direct statement of the nature of personality. In the meantime we may say that this word includes two features of the whole person. On the one hand, a long-time view of the stream of behavior shows the presence of insistent and persistent habit systems which appear to be uniquely characteristic of one person as opposed to another. On the other hand, it is sometimes possible, after long acquaintance with a friend, to create for one's self a picture of the average quality of the friend in a large number of given situations. Of these two ways of defining personality, it is

the former rather than the latter which makes measurement possible.[14] It must not be assumed, however, that measurements of personality traits are always accurate, for more often than not our judgments of the character of another person are as dependent upon the character of the judge as they are on the traits of the person judged.[15]

A pair of traits that have been much studied are known as introversion and extroversion. The introvert is said to be interested in ideas, solves his own problems, is prone to hurt another person's feelings, is shy and ill at ease with strangers, talks little about himself, worries much and is moody, blushes easily, and is self-conscious, is suspicious, radical, conscientious, persistent, detailed, and meticulous. The extrovert prefers working with others, seeks advice, is careful about hurting another person's feelings, makes friends easily, is often boastful and carefree, trusts other people readily, is conservative, gives up easily, and is less careful of his personal appearance.[16] There is some evidence to suggest that executives and foremen are more apt to be extroverts than office clerks and those whose duties demand careful attention to details.[17] As a result of studies on ascendance-submission, it is suggested that persons of the former type might take up to better advantage such tasks as selling, executive work, factory management, law, politics, and other positions calling for the organization and direction of work, whereas persons of the latter type should teach, become architects or artists, farmers, bookkeepers, bankers, dentists, editors, writers, musicians, and secretaries.[18] Some efforts have been made to find out in how far maladjustments may hinder success in a chosen vocation. These efforts depend upon the use of scales for discovering neurotic tendencies among workers.[19] Since, however, nervousness is a condition which lends itself readily to treatment, the taking of a neurotic in-

[14] Cf May, M A, "The foundations of personality," in Achilles, P. S, *Psychology at Work* N Y, McGraw-Hill, 1932, Chap IV

[15] Vernon, P E, "The biosocial nature of the personality trait," *Psychol Rev*, 1933, *40*, 533–548

[16] Allport, G W, "A test for ascendance-submission," *J Abnorm and Soc Psychol*, 1928, *23*, 118–136, Laird, D A, "A mental hygiene and vocational guidance test," *J Educ. Psychol*, 1925, *16*, 419–422

[17] Laird, D A, "How personalities are found in industry," *Indust Psychol*, 1926, *1*, 654–662 See also Davenport, M, "The contrasting personalities of inspectors and foremen," *Indust Psychol*, 1927, *2*, 253–264.

[18] Allport, G W, *op cit*, *passim* See also Bender, I E, "Ascendance-submission in relation to certain other factors of personality," *J Abnorm and Soc Psychol*, 1928, *23*, 137–143.

[19] Thurstone, L L, and Thurstone, T. G, "A neurotic inventory," *J. Soc Psychol*, 1930, *1*, 3–30.

ventory will often serve as a therapeutic measure rather than as a way of giving vocational counsel

Social attitudes and dispositions appear to have some bearing on success. In one study of this situation it was found that executives, college graduates, teachers, superior secretaries, and salesmen scored higher on a test of social intelligence than high school students, nurses, policemen, sales clerks, and low-grade industrial workers.[20] If success can be measured by income, it appears that there is a higher correlation between income and some personality traits than there is between income and other traits Among the traits which appear to have a high correlation with income are accuracy, originality, address, social and civic interest, enthusiasm, aggressiveness, and popularity Traits which are not highly correlated with income are industry, reliability, neatness, sincerity, and moral habits.[21] Another study has indicated that the following traits are of greatest value in business success, viz, personal impressiveness, initiative, thoroughness, observation, concentration, constructive imagination, decision, adaptability, leadership, organizing ability, expression, and knowledge.[22]

We may take these studies only as a general indication of the efforts that are being made to show how personality traits enter into vocational counseling It must be remembered that a personality trait is not some specific and accurately measurable feature of a person Moreover, many persons who are not successful in a given vocation may have all of the traits mentioned above in goodly measure. In other words, the thing that counts toward success is not the presence or absence of a particular trait but that whole configuration of traits which makes a really effective instrument out of a person [23]

In general, it is believed that personality traits have a greater bearing upon success than intelligence. It still remains true, however, that, other things being equal, the more intelligent a person is the more successful one may expect him to become. This conclusion is suggested by a distribution of scores on the Army Alpha test

[20] Moss, F A, *Applications of Psychology*, Boston, Houghton Mifflin, 1920, pp 212–215. See also Moss, F A, and Hunt, T, "Ability to get along with others," *Indust Psychol*, 1926, *1*, 170–178.

[21] Brandenburg, G C, "Personality and vocational adjustment," *J Appl Psychol*, 1925, *9*, 130–155, 281–292

[22] Hoopingarner, N L, *Personality and Business Ability Analysis*, Chicago, Shaw, 1927.

[23] Dashiell, J F, "Personality traits and the different professions," *J Appl Psychol*, 1930, *14*, 197–201

according to occupation,[24] and by studies which show the intelligence of students registered in different schools. In one such study, for example, it was shown that high scores in tests of intelligence were gained by students in the humanities and in a variety of engineering courses. Low scores were obtained by students registered in home economics, physical education, agriculture, and pharmacy.[25] Intelligence tests are, of course, not much more reliable than personality tests but they do give a general picture of comparative abilities. No vocational counselor should expect, then, to be able to give competent advice until he has made some attempt to find out where the person he is advising stands in a distribution of intelligence scores.[26]

It seems natural to suppose that the vocation into which a person shall enter ought to be chosen, in part, in terms of his dominant interests. We must pass over for the time being the question as to the origin of interests. There are those who say that a marked interest must be the product of native dispositions, whereas others will argue that all interests are acquired during the pre-school and early school years. In either case, one may, by asking a large number of questions about objects and events, get some general indication as to where the main interests of a person lie. Such a set of questions is called an interest test.[27] In general, it looks as though interests are fairly stable over a period of years. That is, the major interest of a high school student will probably be his major interest in college.[28] It is easy to suppose that one's major interests ought to be correlated either with ability or with the urge to do better work in the fields suggested by an interest, but the evidence on this point is still doubtful.[29] It still remains to be seen how closely scores on tests of interests are corre-

[24] Yerkes, R. M. (ed.), *Army Alpha Results Memoirs of the Nat. Acad. of Sciences*, 1921, Vol. XV.

[25] Henmon, V. A. C., and Holt, F. O., *A Report on the Administration of Scholastic Aptitude Tests of 34,000 High School Students in Wisconsin in 1929 and 1930*, Bureau of Guidance and Records of the University of Wisconsin, 1931.

[26] Beckham, A. S., "Minimum intelligence levels for several occupations," *Person. J.*, 1930, *9*, 309–313. Bills, M. A., "Relation of mental alertness test scores to positions and permanency in company," *J. Appl. Psychol.*, 1923, *7*, 154–156. Bingham, W. V., and Davis, W. T., "Intelligence test scores in business success," *J. Appl. Psychol.*, 1924, *8*, 1–22. Yoakum, C. S., "Basic experiments in vocational guidance," *J. Person. Res.*, 1922, *1*, 18–34.

[27] Cf. Strong, E. K., *Change of Interests with Age*, Palo Alto, Stanford Univ. Press, 1931. Fryer, D., "The psychological examination of interests for guidance," *Psychol. Clin.*, 1930, *19*, 34–47.

[28] Thorndike, E. L., "Early interests: their permanence and relation to abilities," *School and Soc.*, 1917, *5*, 178–179. See also Strong, E. K., *op. cit.*

[29] Thorndike, E. L., "The correlation between interests and abilities in college courses," *Psychol. Rev.*, 1921, *28*, 374–376.

lated with actual success in a vocation. The evidence that is now in suggests some measure of correlation where the interest score stands above a certain level.[30] We may infer, then, that a vocational counselor can well afford to get some picture of the general likes and dislikes of the persons being counseled.

4. *When to Choose a Vocation*—A great many of the books which give practical hints and suggestions on how to live try to argue that truly great men have chosen a vocation early in life and have stuck to this vocation not only through their whole period of training but through their adult years as well. It is inferred, therefore, that a wise man will find out what he wants to do as soon as he can and then bend all of his energies in this one direction. It is a plain fact, of course, that almost every vocation is, as a matter of fact, chosen early in life. This does not say, however, that all vocations have been intelligently chosen. On the contrary, it is almost certain that many people have been entirely witless about their choices. As a rule, the choice of a vocation will depend upon the special interests and the special skills which have been precipitated out of early periods of training, and upon the fortuitous circumstances that give a man his first gainful occupation. As an example, let us say that a football player has, during his college career, an ambition to become a star player. To be sure, there may have been temporary periods during boyhood when he has had this same ambition, but it very rarely happens that anyone directs the education of such a lad so as to guarantee the development of a great player. On some occasions, however, such persons will have practiced during boyhood precisely those traits and skills which will serve them to best advantage when they join the college football squad. Likewise, some particular lad may have occasional interests in medicine as a profession, but it does not very often happen that a teacher or a parent deliberately sets about it to train such a lad in the specific skills which may be necessary to him in the medical profession. If, however, his formal and informal training has been of such a nature as to favor the development of his powers of observation, his interest in anatomy and physiology, and skill in the use of his fingers, a part of the ground will have been prepared for his entrance into the medical profession.

We mean to say, then, that the problems of vocational guidance

[30] Cowdery, K. M., "The interest inventory in college vocational guidance," *Psychol Clin.*, 1930, *19*, 59–62. Also, "Measurement of professional attitudes differences between lawyers, physicians, and engineers," *J. Person Res.*, 1927, *5*, 131–141.

are really the problems of education. We may say this in spite of the fact that dominant interests and special aptitudes are often attributed to heredity. As we have remarked before, it is now no longer fruitful to say that any feature of human nature is hereditary until it has been definitely shown that it cannot be attributed to training. In some cases, this fact is clearly recognized. It is now a matter of common opinion that great musicians have usually begun their piano or violin at a tender age. On the other hand, there are not many great artists who began their musical careers late in life. In general, then, we may say that vocations are, as a matter of fact, chosen early although neither the child himself nor his teachers and parents have been wholly intelligent in the matter. The inference is that, if there is to be a reputable science of vocational guidance, it must be a genetic science as well as a science of tests and measurements. The chances are that, within a few years, it will be possible to place a person in any given occupation with a fairly high degree of wisdom. The real problems of vocational guidance, however, do not arise when one attempts to place a mature person in a particular profession or occupation. The real problem is to make that kind of genetic analysis of traits and skills as will enable the teacher and the parent to be more intelligent about the growth process. It is one thing to analyze and properly to place a mature person and quite another to promote and guide the growth of a child so that he will have been as intelligently prepared for his adult responsibilities as iron and steel are prepared for use in the factory, in the locomotive, or in the automobile engine.

Even these considerations, however, do not bring us into the heart of the problem raised by the possibility of a vocational guidance that shall be really fruitful. From a theoretical point of view it is conceivable that a social group can say that one per cent of its oncoming members shall be physicians, three per cent teachers, twenty per cent hewers of wood and drawers of water, and so on. This theoretical possibility is based upon the proposition that most, if not all, training is specific in character. Another theoretical possibility can be stated as follows. If there is any such thing as general training, that is, if the various psychological functions of a person can be matured independently of that specific kind of maturation which leads to special technical skill, then the early years of development should be devoted more exclusively to general training than is the case at present. Education is now divided against itself on this proposition. On the one hand, it is suggested that trade schools, commercial schools, and other

types of technical training should be brought down not only to the high school level but perhaps even to the grade level The argument is that the educational system should turn out artisans who can earn their living just as quickly as possible On the other hand, the more classical idea of education still persists strongly in a good many quarters This classical ideal was based upon the assumption that the intense exercise of psychological functions leads not only to special skills but to general intellectual maturity as well. Given such intellectual maturity, together with a fairly adequate perspective on social life, each person ought to be able to select with considerable wisdom his actual contribution to the life of the whole group. Upon a background furnished by his general training, he could then move toward the development of whatever special skills or special kinds of information he might need in his chosen occupation or profession. This situation marks an important feature of the problems of vocational guidance and we shall return to it, therefore, in Chapter Twenty-Seven.

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CHAPTER SIX

HOW TO STUDY

1. *Introduction*—We have now fulfilled our promise to begin our survey of the field of applied psychology with some of the daily experiences of the student himself The time, both of the author and of the reader, however, will have been wasted if these first few chapters have not been applied in an intimate way to daily conduct and experience. This fact is even more true of the subject matter of the present chapter, viz , the art of study A book on the applications of psychology to the personal, the professional, and the social life of human beings is before the student. This book is to be studied. It may be studied poorly or it may be studied well In the latter case, we do not imply that the reader will be more of a machine than he would be in the former case. We do imply, however, that good study habits will require greater efficiency in the use of certain psychological functions. This same point of view will be maintained until the book has been finished

The average student will be inclined to say, upon his first thought, that the art of study is one of the topics about which he knows enough as it is, and yet anywhere from seven to ten per cent of the persons to whom this book is assigned will be unable to get a passing grade in an examination based upon it A much larger per cent will earn a grade barely sufficient to keep them eligible for graduation or for their extra-curricular activities. Only a few will know enough about the contents of this and of the chapters which follow so that they will have aided their election to some one of the honorary societies because of superior attainments.[1] Obviously, there must be a large number of persons who know very little of what it means to study in an effective manner.

In spite of these facts, it will still be said that knowledge about proper study habits is fairly common. One might argue, for example,

[1] The situation is scarcely so simple as this It is true, of course, that measurements in psychology, as in biology, often take what is called a normal probability curve In tests of performance, any serious departure from a normal probability curve is taken to mean,—say, in the answering of examination papers,—that the questions were too hard or too easy. This matter will be studied in more detail in Chapter Thirty-Nine

that the great fault lies not in our ignorance of the best methods of study but in our unwillingness to apply ourselves to tasks of the academic sort. Of this we may easily become convinced as we have seen from our study of motivation in Chapter Four; but there is another side to this problem. Through many generations, students have supposed that there was only one principle to follow in the art of study, viz., to gird up one's intellectual loins and set to it. This same principle has been applied to almost every one of the activities selected for discussion in this book. In the preceding chapters of this first part, for example, we have spoken of driving an automobile, of playing a game, of methods of gaining rest, and of methods of establishing strong incentives. In each of these activities and in others that might be named, it has been supposed that really effective action depends only upon the determination to make action effective.

We shall see, in a moment, that this is not the case. In the meantime, we may point out another aspect of the attitude which most of us take toward our own behavior. We are willing enough to find out how the study hours may be made more effective, how automobile driving may be made much safer, how rest may be secured without loss of time, and the like, but we always find these things out with regard to other persons. It is always someone else who should study more effectively It is always someone else who drives so that he becomes a hazard on the highway. None of the facts we have reviewed in the preceding chapters seem to apply to one's own case. They are either interesting facts or examples of foresight that concern other persons, they rarely are taken to heart by the student himself.

In other words, one of the great problems in education, as in all other attempts to guide and control human beings, has been the problem of how to convert knowledge into action. No one could have read the facts in the first chapter about the various psychological ways in which automobile accidents are caused, without knowing in his own heart that drivers could, if they would, greatly decrease the hazards of the open road. And yet, knowing better, they continue to do worse. They will do worse because they cannot see themselves as the proper subjects of a psychological examination.[2]

There is no place, perhaps, where this trait appears to better ad-

[2] An attitude which is just the contrary of this will be described in Chapter Thirty-Two where we shall find that salesmanship has long been subject to the "egocentric predicament" This predicament means that our psychological operations frequently work from within outwards It is as though the events that were going on for us were more important and more real than the events that might be going on for someone else.

vantage than in the art of study. From early childhood on, each reader of this book has been reminded, in one way or another, of some of the devices and practices that can be used to make the study hours more effective and yet, in spite of all of this knowledge, warning, and exhortation, he will continue to do poor work. In the art of study, to be sure, there may be some excuse for so wide a gap between knowledge and action, for a large part of the admonition we have received from parents and teachers is based upon a type of psychology which does not fit into the modern picture. As we have just said, it used to be thought that the "mind" was a kind of self-determining agent and that any person could study if only he would set his mind to it. Students were asked, therefore, to exercise their will power in concentrating on their material, as though the will were an agent that could be used effectively no matter how the conditions surrounding the study hour were arranged. If a student did not choose to exercise his will power, then he was accused of a moral fault. In other words, an appeal to lax moral integrity was taken as a substitute for the ignorance which the teacher might display concerning the best conditions for learning It was taken as a substitute also for the student's own lack of information about the learning process and about the conditions under which it could lead most quickly to skill and to knowledge

It is the purpose of this chapter, then, to review some of the facts that have to do with the study hour. We wish to find out whether the getting of knowledge and the acquisition of skill are subject to any general principles which can be used in order to save energy and time and in order to promote most effectively the proper growth of human nature on the psychological side.

2. *The Value of Study.*—It is now generally conceded that good study habits stand very high among the factors which have to do with achievement and yet it is important that the learner know something more about study than he will get from a few simple rules of efficient learning. For example, it has been shown that good study habits may sometimes be used even by those who do not make a success of their high school or college education.[3] On the other hand, students who attain considerable success sometimes use what the books would call "undesirable study habits." In some cases, success may depend upon the judgment and skill of the learner in using his study habits

[3] Webb, L W, "Students' methods of studying a certain subject—psychology," *J. Educ. Psychol*, 1920, *11*, 193–206

rather than upon any formal rules of learning [1] We may infer, then, that the picture we shall draw is not as simple as it appears at first sight

Among the factors that have been analyzed out of the total complex which makes up actual success in school work we may mention (i) the amount of previous preparation, (ii) the intelligence of the learner, (iii) the character of his study habits, (iv) his ability to evaluate or pass proper judgment upon the material that is presented to him as opposed to the mere learning of such material without evaluating it, and (v) his degree of perseverance or of motivation. The amount of previous preparation would depend, in part, upon the extent to which good study habits and other favorable attitudes toward academic work had been used in advance of any particular period of experimental examination For example, the reader's success in getting into the field of applied psychology with the aid of this book will depend, in part, upon his general study habits and, in part, upon his previously acquired knowledge of psychology.

The relations between the various factors mentioned above are such as to show that good study habits are about as influential as intelligence, but not quite so influential as the last two factors, viz., good judgment and motivation In other words, the experiments show that some students should pay attention to other things than the organization of the study hour or the use of the principles of effective learning [5] They should inspect their ability to judge, compare, and correlate different sets of facts and they should also increase the incentives which sustain their working habits.

There is another phase of the art of study which deserves a brief statement. It is often said nowadays that much study during the high school and college years is not directly related to achievement in adult life. This may mean either that the studies which one may pursue in high school and in college are irrelevant to adult activities or that youthful negligence does not mean that a person will be negligent in everything that he does when he becomes an adult. There are a good many statistical surveys of this general problem For example, a study has been made of the alumni of Wesleyan University

[4] Ross, C C, and Kleise, N M, "Study methods of college students in relation to intelligence and achievement" *Educ Admin and Supervis*, 1927, *13*, 551–562

[5] Herriott, M E, "Attitudes as factors of college success," *Univ of Ill Bull*, 1920, *27* (No 2) Woodring, M N, and Flemming, C W, "Diagnosis as a basis for the direction of study," *Teachers College Rec*, 1928, *30*, 46–64, 134–147 Also Butterweck, J S, "The problem of teaching high school students how to study," Teachers College, *Columbia Univ. Contrib to Educ*, 1926 (No 257)

for the period from 1860 to 1889 This study brought out the fact that fifty per cent of the men who had graduated with honors from this University were listed in *Who's Who* while only ten per cent of the men who had graduated without honors were so listed.[6] This is not to say, of course, that good study habits made the difference between failure and success in after-life but only to recognize the fact that men with good training are more apt to achieve distinction than are men with poor training.

3. *Favorable Conditions for Study.*—It is clear that the first step in the development of good study habits is taken whenever the student himself is in the best of physical condition. The word "condition" should be understood to include not only general bodily health but suitable study postures and adequate vision. He must possess, also, proper incentives, and a favorable attitude or disposition toward scholarly work Moreover, the study hour is apt to be effective in direct proportion as one makes one's environment favorable to study. We have already tried to argue that very few students can say to themselves, "Go to, now, I will study," and then proceed to act studiously with the aid of their alleged powers of volition. As we shall see before we have gone very far, there is really only one effective method of controlling one's own behavior or the behavior of any other person, viz , to surround one's self with those objects and events which will continuously and persistently act as sources of stimuli toward the right types of behavior. It is not easy to carry out any activity in an environment in which there is absolutely no stimulus or external incentive pointing toward desirable action.

It is sometimes said that the study room should be fairly quiet. As we shall see later on, conditions may be named under which mild distractions will aid rather than hinder both physical and mental work[7] They do this by increasing and focalizing the motives of the learner himself It still holds true, however, that excessive distractions are not conducive to favorable levels of psychological effort The study room should be a place where one may assemble books, pictures, papers, and other sources of stimulation pointing toward scholastic

[6] Nicholson, F W , "Success in college and in after life," *School and Soc* , 1915, *2*, 229–232

[7] Morgan, J J B , "The overcoming of distraction and other resistance," *Arch Psychol* , 1916, *5* (No 35) Tinker, M A , "A study of the relations of distracted motor performance to performance in an intelligence test," *Amer J Psychol* , 1922, *33*, 578–583 Evans, J E , "The effect of distraction on reaction time with special reference to practice and transfer of training," *Arch Psychol* , 1916, *5* (No 37) Cassell, E E , and Dallenbach, K M , "The effect of auditory distraction upon the sensory reaction," *Amer J Psychol* , 1918, *29*, 129–143

activities rather than toward indolence. It has been shown, for example, that too great an amount of relaxation does not form an effective background either for physical or for mental work. In other words, nerves and muscles which are already in a moderately high state of tonus prepare the way most advantageously for the initiation and continuation of physical and psychological effort.[8]

There is one aspect of the study hour which is commonly overlooked by most students. As a rule, we take the act of studying very much as we take the act of sleeping. That is, we suppose that, whenever we get around to it, we can either take up a book and do effective work or get into bed and gain effective rest. In both of these cases, achievement depends upon the development of regular habits through practice. If, for example, a student has arranged his whole daily schedule so that certain hours are religiously set aside for the completion of a given amount of work, these hours and the very objects with which one may be surrounded will become sufficient stimuli toward setting off the activities which have been practiced at that particular time. In other words, learning how to study means acquiring the habit of beginning a study period at a certain time and continuing it as the schedule demands. Just as a person can scarcely fall asleep before his regular sleeping period arrives unless he is highly fatigued, so a student cannot expect to do effective work until working periods have become habitual with him.

Since the study hour is very largely an hour given over to learning, it would seem to follow that the principles of effective learning should occupy an important place in the art of study. Experimental psychology has been able to discover a great many of these principles and we shall now proceed to describe some of them as briefly as we can.

4. *The Principle of Unity.*—From some points of view learning is to be identified with growth.[9] The main outlines of our psychological operations are created, perhaps, pretty largely by heredity; but the final forms and functions of a person are dependent to a very great, even though unknown, extent upon the promoting and guiding in-

[8] Golla, F L, and Antonovitch, S, "The relationship of muscular tonus and the patellar reflex to mental work," *J Ment Sci*, 1929, *75*, 234–241 Travis, R C, "A study in the measurement of muscle tonus and its relation to fatigue," *J Exper Psychol*, 1924, *7*, 201–212 Bills, A G, and Brown, C, "The quantitative set," *J Exper Psychol*, 1929, *12*, 301–323

[9] Wheeler, R H, and Perkins, F T, *Principles of Mental Development*, N Y, Crowell, 1930, *passim* Also Ariens Kappers, C U., "The logetic character of growth," *J. Comp. Neurol*, 1919, *31*, 51–67

fluence of learning situations. That is, we grow into a pattern which is furnished by the environment. It seems to follow, then, that the learner or, so to speak, the grower, should take advantage of everything that is known about the principles of effective learning.

The first of these principles may be called the principle of unity. This principle means that, for a great many different types of material and for a great many subjects, growth takes place more rapidly when the learning situation is a unified and meaningful whole than it does when the learning situation is divided into parts.[10]

Let us suppose that we have been asked to learn a poem consisting of twenty four-line stanzas. Most persons would try to learn this material by memorizing first each of the twenty parts. Some persons would even go further than this. They would learn the poem line by line, then try to put the lines together into stanzas, and finally bring all the stanzas together into a completed whole. Some times, skills of various types are taught in the same way. In learning to swim, for example, one might first learn how to breathe, then how to make a flutter movement with the legs, and then how to move the arms in the proper way. He would finally bring all of these part-skills into a single unified skill. This and other motor skills have been studied in detail and the results, for the most part, favor the whole method over the part method. There is some evidence, however, which seems to indicate that a modified whole-part method, sometimes called the progressive-part method, may have certain advantages under certain conditions.[11]

From these and a great many other studies that have been made, a few general principles about whole versus part learning are beginning to emerge. In general, it is believed that, the more meaningful the material to be learned, the more fruitful the principle of unity. This fact often appears in studies which make use of poetry, on the one hand, and of nonsense syllables, on the other. That is, poetry which

[10] There is a vast literature on this phase of economy in learning Much of it has been reviewed by McGeoch, G O, "The whole-part problem general review and summary," *Psychol Bull*, 1931, *28*, 713–739 See also McGeoch, J A, "Experimental studies in memory," in *Readings in General Psychology* (ed Robinson and Robinson), Chicago, Univ of Chicago Press, 1929, pp 360–412

[11] Some of the relevant experimental material is as follows Barton, J. W, "Smaller versus larger units in learning the maze," *J Exper Psychol*, 1921, *4*, 418–429 Beeby, C E, "An experimental investigation into the simultaneous constituents in an act of skill," *Brit J. Psychol*, 1930, *20*, 330–353 Brown, R W, "Comparison of the 'whole,' 'part,' and 'combination' methods of learning piano music," *J Exper Psychol*, 1928, *11*, 235–247 Pechstein, L A, "Whole versus part methods in motor learning, a comparative study," *Psychol Monog*, 1927, *23* (No 99).

is usually full of meaning can be memorized much more quickly than an identical amount of nonsense material.[12] The difference between these materials is related, as we shall see, to the total size of the units that can be used most effectively and to the extent to which the learner can get a comprehensive view of the task that is set before him.

In the second place, there are some reasons to think that the principle of unity increases in value in direct proportion to the intelligence of the learner.[13] As we have just intimated, this result might be expected because of the influence of meaningful material upon speed of learning Other things being equal, the more intelligent the learner the more apt he will be to see the significance of larger units of material To say the same thing in another way, the more intelligent the learner the more certain it is that he will find as many meanings or associations as he can in even the most meaningless of nonsense syllables.

It is easy to see that the principle of unity might have a practical application to a great many learning periods Where the material is already meaningful, as in history, economics, psychology, or literature, the application is simple enough. Such material should be learned as a unit wherever the unit does not go beyond one's comprehension. In case the units are too large, a sort of part-progressive method can be used effectively The situation is a little different where new vocabularies in some one of the foreign languages have to be memorized. Since there are not a great many meaningful associations between successive pairs of English-French or English-German words, there is no way in which the principle of unity could be used to advantage. During the early stages in the study of a foreign language, learning by wholes rather than by parts would be almost like learning a set of nonsense syllables. It would seem to follow that the principle of unity cannot become really effective at this stage in the game. Later on, however, when a greater number of meaningful associations have been created the principle can be used to increasing advantage [14]

The other side of the picture is somewhat more complicated. In

[12] McGeoch, J A., "The influence of associative value upon the difficulty of nonsense syllable lists," *J Genet Psychol*, 1930, *37*, 421–426

[13] McGeoch, G O., "The intelligence quotient as a factor in the whole-part problem," *J Exper Psychol*, 1931, *14*, 333–358

[14] Libby, W., "An experiment in learning a foreign language," *Ped Sem* 1910, *17*, 81–96. Smith, S., and Powers, F F., "The relative value of vocabulary and sentence practice for language learning," *J Soc Psychol*, 1930, *1*, 451–461.

general, we have said that the principle of unity is of more value to alert students than it is to poor students One way to get around this fact runs as follows. It might be possible to simplify the learning situation placed before the poor student so that it would not be made up of too many different items That is, an alert student might be able to read through a poem of twenty four-line stanzas and still let his perspective on the whole poem help him in the actual task of memorizing it The less alert student, however, would not be able to get and keep his perspective on the whole situation, although he might find it easy enough to get and keep a perspective on a single stanza or upon a group of two or three stanzas [15]

In short, then, the principle of unity is a relative principle. It means that learning will proceed most quickly when a person practices upon situations which have some unity or coherence to him. In other words, unity is not some objective feature of learning situations that holds true no matter who the student is or what the material is We may draw the inference that the student should examine his learning methods with the patience necessary to the discovery of a serviceable method.

5. *The Principle of Distributed Effort*—In the normal growth of a plant or a seed we may suppose that a stimulus toward growth is being supplied constantly by sun, soil, and water. We ought to expect, therefore, that the plant should continue to grow in direct proportion to its resources for growth Within limits, this is true, and within limits it is also true of that type of growth we have called learning. It is not necessary, however, that learning situations should be present throughout the entire period of growth from the moment they are first presented until the learner has attained all of the maturity in skill or knowledge that he wishes to attain As a matter of fact, just the contrary is the case, for it has been shown that learning proceeds most rapidly when learning situations are presented periodically rather than consecutively.

In general, it is known that, other things being equal, the more liberally practice periods can be distributed over a long period of time, the more efficient the learning process will be. As a single experimental example, we may take the following. Lists of nonsense syllables were given to a group of subjects in the following order. Some of the subjects attempted to learn the lists in a single period, others in two

[15] Davis, A J, and Meenes, M, "Factors determining the relative efficacy of the whole and part methods of learning," *J Exper Psychol*, 1932. *15*, 716–727

periods, still others in four periods, and the remainder in eight periods. The intervals between the periods were one, two, three, and four days in length. In other words, the number of repetitions allowed to the lists of nonsense syllables and the intervals between them were presented in sixteen different combinations. The results showed clearly enough that one reading of the nonsense syllables on each successive day until sixteen days had passed was the most economical type of learning where learning was measured by the number of nonsense syllables that could be recalled after a two weeks' interval. At this time the subjects were able to recall seventy-nine per cent of the syllables. Two readings of the lists on each of eight days gave a retention value of only forty-three per cent while eight readings a day for two days gave a retention value of only nine per cent. In other words, when the total time devoted to learning was held relatively constant, shorter periods of work separated by twenty-four hour intervals seemed to be most advantageous.[16]

It is clear that the principle of distributed effort must stand in close relation to the principle of unity. It is easy to see, for example, that distributed effort would not be helpful if the material to be learned was so large in amount or so obtuse in meaning that one could not readily grasp it at a single reading. If, then, one were to learn the material by wholes rather than by parts one would have to give it more than a single repetition during a single sitting. A part-progressive method might serve better in this case. The situation is further complicated by the fact that it is not possible to say, as yet, how far one can profitably go in distributing practice. In general, it looks as though once a day furnishes an optimal interval.[17] To use an illustration from animal psychology, four groups of subjects were given one, three, and five trials at a sitting, the limit of the interpolated intervals varying from six hours to three days. A twelve-hour interval was shown to be the most favorable for learning, no matter whether the interval occurred after one, three, or five consecutive trials. It was clear, however, from other considerations, that one trial at a

[16] Peterson, J., "Intelligence in learning," *Psychol Rev*, 1922, *29*, 366–389. Wilson, F. T., "A comparison of difficulty and accuracy in the learning of bright and dull children in a motor-memory task," *J Educ Psychol*, 1930, *21*, 507–511.

[17] Perkins, N. L., "The value of distributed repetitions in rote learning," *Brit J Psychol*, 1914, *7*, 253–261. As in the case of whole versus part learning, so here a vast number of studies have been made. Some of the most important run as follows: Gordon, K., "Class results with spaced and unspaced memorizing," *J Exper Psychol*, 1925, *8*, 337–343. Pyle, W. H., "Concentrated versus distributed practice," *J Educ Psychol*, 1914, *5*, 247–258. Robinson, E. S., "The relative efficiency of distributed and concentrated study in memorizing," *J Exper Psychol*, 1921, *4*, 327–343.

time offered the most advantages.[18] It may be that intervals so short as twelve hours are more profitable during the early stages of a learning process than they will be later. After skills of various kinds have been partly learned, or are being overlearned, repetitions every two or three days may be just as effective as more closely spaced repetitions.

The practical consequences of these facts are plain to be seen. Every bit of evidence that we have from this phase of learning seems to say that the common practice of massing learning effort within a shorter period of time is an exceedingly wasteful method. It is true, of course, that cramming, which consists of an intensive review of material that has already been learned or partially learned, serves to organize this material and bring it freshly to recall, but cramming periods devoted to wholly new material are utterly wasteful so far as their permanent effects are concerned Some of the material may be recalled easily because of the operation of a factor known as the principle of recency, but, as we shall see in the next section, the favorable influence of this factor may be offset by interference and forgetting.

A number of theories have been devised looking toward an explanation of the greater value of distributed as opposed to massed effort in learning. Of one thing we may be fairly certain The continuous exercise of any psychological function means the rapid development of fatigue for that function. This feature of consecutive learning and of consecutive work will be studied in greater detail in a later chapter. Another possibility lies in the observation that, when learning efforts are concentrated, one may have a tendency to repeat errors that should not be repeated.[19] Even if this were not the case, it is well known that consecutive work quickly produces loss of interest or the development of an unfavorable disposition known as monotony. This factor, too, we shall consider in a later chapter.

6. *Forgetting and Interference.*—It was once supposed that every single act of learning made use of a single set of cells in the nervous system. From a theoretical point of view, then, it could be asserted that one might learn as many different things as there were sets of cells remaining to be used. Since a brain contains approximately eleven billions of these cells, there could be no reasonable limit placed

[18] Warden, C J., "Distribution of practice in animal learning," *Comp Psychol Monog.*, 1923, *1* (No 3)

[19] Lashley, K S., "A control factor in the relation of the distribution of practice to the rate of learning," *J Anim Behav*, 1917, *7*, 139–144.

upon the facts and skills that any student might acquire.[20] It is now thought, however, that any given act of learning may involve very large areas in the brain and that these areas must be used, therefore, in a great many different ways.[21] It would seem to follow that the use of a brain field in one way might interfere with its use in another way. It is this general fact which is described by the word "forgetting." In more detail, forgetting may mean the existence of specific inhibitions at various places in a learning process. If, for example, learning how to use the hand in one way can be shown to interfere with a manual skill that has just been acquired, such an effect is called retroactive inhibition. If the attempt to learn two skills simultaneously means that the one will interfere with the other, this fact is described by the phrase "mutual inhibition." A good many other types of inhibition or of interference have been described.[22]

Let us suppose, for example, that a student has practiced, for some time, the act of multiplying four-place numbers. Let us suppose, further, that, between successive periods of practice in this skill, the subject is asked to learn (i) nonsense syllables, (ii) memorize a series of twenty consecutive numbers, (iii) memorize some poetry, (iv) multiply other sets of four-place numbers, or (v) read simple prose. Save in the case of (iv) which is identical with the initial task, it is not easy to say just how similar or dissimilar this material may be to the original task, but in any case it can be shown that the amount of interference varies according to the type of material that is interpolated between practice periods. In an actual experiment, it was found that reading simple prose had practically no effect upon learning to multiply four-place numbers. Other types of interpolated activity did have such an effect.[23]

It has been shown that if an initial skill has been barely learned and is then followed by some other type of work, forgetting of the initial skill may take place very rapidly. On the contrary, if the initial skill is highly learned, that is to say, overlearned, the amount of interference created by turning to another task becomes much smaller.

[20] Herrick, C. J., *Brains of Rats and Men*, Chicago, Univ. of Chicago Press, 1928, Chap. I and *passim*.

[21] Lashley, K. S., *Brain Mechanisms and Intelligence*, Chicago, Univ. of Chicago Press, 1930, *passim*.

[22] Skaggs, E. B., *The Major Forms of Inhibition in Man*, Chicago, Univ. of Chicago Press, 1931.

[23] Robinson, E. S., "The relative efficiencies of distributed and concentrated study in memorizing," *J. Exper. Psychol.*, 1921, *4*, 327–343, "Some factors determining the degree of retroactive inhibition," *Psychol. Monog.*, 1920, *28*, No. 128.

Moreover, the rate of forgetting for the initial task varies with the quickness with which a subsequent task is begun [24]

If we look at these specific facts in a more general way, we shall get the following picture Any human being lives through a period of time If at any moment during this period he could acquire a skill and then keep on living without having to acquire any further skill, there is no reason to suppose that the skill that had just been gained would ever be forgotten. In advance of actual death, however, we must all keep on living This means that we must keep on learning or growing Anything that is learned at the present moment makes its influence felt in two directions. It works on what has been learned in such a way as to bring about forgetting and it works on what is to be learned in the future in such a way as to make future learning more difficult [25]

The great problem, then, in the art of learning how to study effectively is to find out how one may pass from one situation to another so that the amount of interference between the two will stand at a minimal level Save when one falls asleep at night, it is not possible to separate two learning periods by absolute and complete relaxation—that is, absolute and complete non-learning. Even during sleep, however, a certain amount of neural action is constantly under way. There must always be, therefore, a certain amount of interference and, in the long run, it may be this interference which causes a person to forget what has been learned [26]

As we have said, it is not possible to say exactly what type of material will be wholly like or wholly unlike another type of material. We may, however, use plain common sense in this matter and so arrange the study periods of the whole day that material to be learned is not only properly distributed but that the intervals between "similar" learning periods are filled with tasks which are as irrelevant to one another as possible The student must remember, however, that rote learning is one thing and reflection, the search for meanings, the manufacture of sound judgments, and the solving of problems are

[24] McGeoch, J A, "The influence of degree of learning upon retroactive inhibition," *Amer J Psychol*, 1920, *41*, 252–262, "The influence of degree of interpolated learning upon retroactive inhibition," *Amer J Psychol*, 1932, *44*, 595–708

[25] Jones E, "The theory of repression and its relation to memory," *Brit J Psychol*, 1915, *8*, 33–47 See also *Brit J Psychol*, 1914, *7*, 130–140, 147–153, 154–160, 101–105

[26] Some of the other studies on various aspects of inhibition are as follows Dashiell, J F, "A comparison of complete versus alternate methods of learning two habits," *Psychol Rev*, 1920, *27*, 112–135 Gengerelli, J A, "Mutual interference in the evolution of concepts," *Amer J Psychol*, 1927, *38*, 630–640 Skaggs, E B, "The major descriptive categories of inhibition in psychology," *J Abnorm and Soc Psychol*, 1929, *24*, 310–317

quite another. It has not been shown that interference operates in these fields in the same way that it does in pure verbal memorizing or in the acquisition of a motor skill.

7. *Learning and Action.*—We have already said that learning cannot be really effective unless the student actively responds to the learning situation. He may respond either by writing out what has been presented, by saying it out, or by using some of the other muscles of his body in overt action. In the schoolroom, for example, one of the most frequent ways of getting action is to ask the student to recite the material aloud. To carry the illustration further, we might have this sort of experimental situation. Let us ask some subjects merely to read and reread nonsense syllables or poetry until they are satisfied that the material has been learned. Another group may be asked to recite the material out loud whenever it wishes. In both cases, it is proposed to keep an accurate account of the amount of time spent in learning. In general, it will be discovered that the more often the material is recited the more quickly it will be learned.[27] This fact holds true not only for the time actually spent in learning but for the amount of material that may be recalled after any given interval as well.

As a rule, economy in learning will increase in direct proportion to an increase in the amount of active recitation. The value of a recitation, however, depends a little upon how meaningful the material is. Skills such as an athlete seeks to gain certainly must be practiced if the athlete expects to make any progress That is, movement of some part of the body is essential in such tasks. In the schoolroom, however, there may be a great many tasks where the amount of bodily action is very small. It may be limited even to such slight movements in the vocal apparatus as accompany reflective thinking about logical material. Even here, however, the learner profits most greatly when he is continuously active with respect to his material.[28]

Sometimes learning situations are so arranged that the performance of the student can be guided by a model or by some other person rather than by the stimulus situation itself. A child, for example, may be asked to learn how to write by copying through transparent

[27] Gates, A I, "Recitation as a factor in memorizing," *Arch Psychol*, 1917, *6* (No 40).

[28] Skaggs, E. B, "The relative value of group and interspersed recitation," *J. Exper. Psychol*, 1920, *3*, 424–426 Thorndike, E L, "Repetition versus recall in memorizing vocabularies," *J Educ Psychol*, 1914, *5*, 596–597 Trow, W C, "Recall versus repetition in the learning of rote and meaningful material," *Amer J Psychol*, 1928, *40*, 112–116 Barlow, M C, "The rôle of articulation in memorizing," *J Exper Psychol*, 1928, *11*, 306–312. Judd, C H, "Reduction of articulation," *Amer J Psychol*, 1927, *39*, 313–322.

papers the letters and words printed upon a master sheet. An athlete may be asked to learn a given skill while the coach moves the various parts of the athlete's body in the way that they should be moved. It has been shown quite clearly that guidance of this sort does not contribute very much to speed of learning. That is, the movements of the learner must be an intimate and natural consequence of the stimulus situation before learning can take place to best advantage [29]

There are a great many other principles of learning which the person who is seriously concerned about his study habits should take into account. Among the factors which we have not mentioned in this chapter are the effect of motivation or the intent to learn upon rate of learning, the relation between a specific learning task and the general context in which it is placed, the effect of the time of day upon speed of learning, the influence of fatigue and of other bodily conditions, the development of individual modes of attack, the dependence of learning upon such features of the material as the length of the problem, the amount of material, and the form in which it is presented and, finally, the influence of different modes of presentation and of different ways of organizing the material Of these several factors some will be discussed in later chapters. The topic of motivation, for example, is so important that the whole of Chapter Four was devoted to a consideration of it. The beneficial and harmful effects of punishment will be studied in Chapter Eighteen. Most of the other factors we have just mentioned will be considered in Chapter Thirty-Eight.

In addition to all of the facts which have to do with the learning process itself, there is a vast amount of information about the conditions which favor the retention of learned material over long periods of time Moreover, a good many facts about the circumstances which aid quick and accurate recall can also be had for the asking [30]

When the student arrives at these several chapters, he should make every effort to relate what is said in them to the problems discussed above. We lay emphasis upon this point because we wish to convince the student that he will have missed one of the primary functions of

[29] Carr, H , "The influence of visual guidance in maze learning," *J Exper Psychol* , 1921, *4*, 390–417 Gates, A I , and Taylor, G A , "The acquisition of motor control in writing by pre-school children," *Teachers College Rec* , 1923, *24*, 459–468 Koch, H L , "The influence of mechanical guidance upon maze learning," *Psychol Monog* , 1923, *33* (No 148) Waters, R H , "The influence of tuition upon ideational learning," *J Gen Psychol* , 1928, *1*, 534–547; "The influence of large amounts of manual guidance upon human maze learning," *J Gen. Psychol* , 1930, *4*, 213–227

[30] A major bibliography of the experimental material in the field of learning has been prepared by McGeoch See McGeoch, J. A., "The psychology of human learning a bibliography," *Psychol. Bull* , 1933, *30*, 1–62.

this book if he has not learned to make a more effective psychological instrument out of himself As has been said above, it is rather surprising that a generous measure of intelligence should have been brought to bear upon the physical and biological aspects of our contemporary culture, whereas almost no attention has been paid to the psychological aspects. We mean to argue, therefore, that a precise meaning can be given to the phrase "human engineering" This is not to say that human nature can be handled as one might handle an automobile, but only to assert that applied psychology is always applied *psychology* and not a mere matter of mechanics

8 *Learning and Thinking.*—Persons who devote a large amount of their time to reflective thought often hold that inferences and conclusions will become most fruitful only after a long, intense, and thoroughly continuous period of effort. It does not usually happen, for example, that a problem-solver finds it fruitful to spend a few minutes here and a few minutes there on some perplexing situation. In other words, the thinker seems to use methods which differ from the mere learner.

There are two things to be said about this situation. In the first place, there is a marked difference between learning and thinking. Learning, being a kind of growth, is a way of becoming more and more fixed in types of action, both verbal and manual The more completely a skill is learned, the more automatic and unchanging the skill. Likewise, the more perfect any given bit of information is learned, the more automatically may the information be used. Problem-solving, however, takes place most frequently when a person cannot react to a given situation by making automatic use of some previously acquired habit In other words, it is characteristic of problematic situations that they call forth a great many possible types of action with respect to which some sort of choice must be made. Moreover, before the difficulty is actually resolved, it may be necessary to refashion the stimulus pattern, on the one hand, and previously acquired modes of response, on the other [31] It seems to follow from these considerations that thinking cannot be done unless the student has something to think with. In short, then, learning is a way of providing a person with the materials of thinking whereas thinking itself describes unique ways of using these materials

It now happens that a large part of teaching is arranged so as to

[31] Kohler W *Gestalt Psychology* N Y Liveright 1929 Chap X See also Buermeyer, L, *et al*, *An Introduction to Reflective Thinking*, Boston, Houghton Mifflin, 1923

lay emphasis upon learning rather than upon problem-solving. That is, students are asked to take the results of someone else's thinking and learn these results "by heart." Simply to learn by heart what someone else has found out is not a way of learning how to find these things out for one's self. We may say, then, that a student could make his study hours more effective if he would take learning only as the beginning of his education. Instead of remaining satisfied with a mere verbatim reproduction of what someone else has said or written he should try to relate his learning to other facts that have been learned. In short, he should always seek to recreate experience by taking every fact out of the particular setting in which it has been placed and try it in some new setting. He should attempt to play a game with facts just as he plays a game with chess pieces or with football players [32] This feature of the study hour is so important that we shall come back to it frequently in later chapters.

9. *Practical Applications*—We have now mentioned only a few of the problems that are connected with efficiency in learning Were we to discuss all of the information that is available, we should have to write almost a whole book on this topic alone. In general, however, it is clear that the experiments that have been made bear out, for the most part, what good common sense would say. If learning is a kind of growth, it is reasonable to suppose that the growth processes should be surrounded by factors that will promote it This means that the learner must keep himself constantly in the presence of such factors No one should expect to use the study periods well if he uses them as a plant would were it to expose itself to sunlight only once during its entire growth period. Sunlight, moisture, and good soil are more or less permanent features of a plant's context It would seem to follow that learning situations of various sorts should form an almost constant part of the context of any student. This statement is to be taken, not as a denial of the principle of distributed effort, but only as a way of emphasizing the need for constant and effective invitations to personal growth

It is clear, however, that the learner himself must do something about the context in which he is placed. That is, he must allow stimulus situations to become effective in moving him to action., If he is looking for skills of the athletic sort, he must use these skills over and over again. If he is looking for information and knowledge, he must give verbal expression to this information and knowledge as often

[32] Cf Dewey, J , *How We Think* (rev ed), N Y , Heath, 1933

as he can. It is for this reason that discussions with other students may be looked upon with high favor.

The student must remember that, in spite of popular opinion to the contrary, his learning mechanisms are not exactly infinite in number. Since every person is always a learner (or, so to speak, a grower), those measures of learning which have once taken place will interfere not only with previous learning but with learning that is yet to be accomplished In other words, human beings will always be forgetful because forgetting is occasioned, in part, by continued learning. It looks as though there are three primary methods of escape from forgetting. In the first place, periods of intense practice on any given material must be distributed as widely as possible That is, one must not allow one's self to become unduly fatigued in any given activity. In the second place, when practice periods are distributed, the intervals should be filled with material which is as unlike the former material as possible. In the third place, the student must remember that learning is a long-time process and that he can well afford, therefore, to come back over and over again to previously learned material. This is one of the chief functions of reviews, notes, and other aids to the study period.

We may now attempt to apply the various principles described in this chapter to the actual process of studying this book. In the first place, no student need be unnecessarily alarmed if he finds himself in a large rather than in a small class. The experiments that have been made on class size seem to indicate clearly that large classes do as well as smaller classes in all measurable functions, but the implication is clear that the work which is done depends more upon the initiative of the student himself than upon the size of his class.[33] In the second place, the student is again on his own initiative with respect to the lecture method versus individualized methods of instruction. The experimental evidence is a little doubtful on this score, but there can be no doubt about the part which the student himself must play in the results.[34]

[33] Jensen, M B., "The influence of class size upon pupil accomplishment in high school algebra," *J Educ Res*, 1930, *21*, 120–137, 337–350 Huddelson, E, "Class size, conditions, and trends at the college level," *School and Soc*, 1929, *30*, 98–102 Huddelson, E, *Class Size*, Minneapolis, Univ of Minnesota Press, 1928 Longstaff, H P, "Analysis of some factors conditioning learning in general psychology," *J Appl Psychol*, 1932, *16*, 9–48, 131–166

[34] Greene, E B, "The relative effectiveness of lecture and individual reading as methods of college training," *Genet Psychol Monog*, 1928, *4*, 463–560 Taylor, H R, "Teacher influence on class achievement a study of the relationship of estimated teaching ability to pupil achievement in reading and arithmetic," *Genet Psychol Monog*, 1930, *7*, 81–175. Hullfish, H G, "A problem in college teaching," *J High Educ*, 1930, *1*, 261–268

The chances are that this book will be studied by assigning one chapter after another. After each assignment, the student should find for himself as quickly as possible suitable study quarters. That is, he should be quiet and have objects around him that favor study rather than distraction. It is helpful to read through a single chapter rather quickly in order to get a total picture of the facts it contains. This should be done as long in advance of the recitation period as possible. At another sitting the chapter should be read more carefully and those statements which seem to carry the most meaning should be underlined. It goes without saying that all unfamiliar words should be looked up in the dictionary. It would be a great help also if the student would think of himself as the subject of the various investigations reported. After each chapter has been studied more thoroughly on the second or third occasion, it should be discussed with some fellow-student in order that information and opinion which has remained more or less implicit may be made explicit. The student should undertake to formulate his own questions and even to outline possible experiments which might solve doubtful points. A week after a given lesson has been assigned, the learner ought intensively to review his summaries of previous chapters. That is, he should try to make the learning process cumulative.

At the time of the first general examination, the student can profitably conduct an experiment upon himself and upon his fellows. If he can get at the study habits of those who have done well on the examination as compared with those who have done poorly, he will find that the good students have often worked and studied alone, avoided distractions, taken frequent short rest periods, worked by definite assignment, kept fairly complete notes, maintained a high level of concentration even on uninteresting material, and crammed only for the sake of general review.[35] In contrast to the good student, the poor student will merely read each chapter as casually as he can; he will cram desperately at the end of a semester, he will work according to no plan or purpose, he will learn by parts rather than by meaningful wholes, he will be very apt to take his text as a kind of gospel which should never be subject to criticism or to difference of opinion;

[35] Some of the general experiments run as follows Weinland, J D, "How successful college students study," *J Educ Psychol*, 1930, *21*, 521–526 Pressey, S L, *Research Adventures in University Teaching*, Bloomington, Public Schools Pub Co, 1927 Smeltzer, C H, "A method for determining what students consider their own difficulties," *School and Soc*, 1930, *32*, 709–710 Good, C V, *The Supplementary Reading Assignment*, Baltimore, Warwick and York, 1927 Pressey, L C, "College students and reading," *J High Educ.*, 1931, *2*. 30–34.

and he will often use odd hours or hours when he is most fatigued for the purpose of study.

At the end of his course, a student will be expected to pass a final examination This examination may be of two types, either the traditional essay type or the newer objective type In either case, the student may take it for granted that, whether he realizes it or not, the announcement of an examination period will serve as a motivation to better study [36] If the student writes an essay type of examination, he may expect the scoring of his answers to be subject to a high degree of variability Even the same teacher grading the papers on two different occasions will not agree with his previous scores.[37] The students must remember, however, that examinations are a form of expression A part of the variability in grading such papers depends upon the fact that the student himself has not learned to express himself concisely and accurately

If the objective type of examination is given, the grade of the student will depend, in part, upon his own knowledge, in part, upon the way in which the questions have been phrased,[38] and, in part, upon the number of times such words as "all," "always," "never," "no," "only," "most," "some," and "often" are used in the examination [39] It must be clear, even to the student himself, that the objective type of examination, asking as it does only for a check mark or the writing of the words "right" or "wrong," is scarcely a way of training him in the overt expression of his information. Moreover, the objective type of examination does not lend itself easily to the asking of those questions which will stimulate the examinee to problem-solving [40] In other words, then, the nature of an examination depends, in part, upon what one says about the nature of study and the purpose of an education If education has no other function than to promote rote learning, the student should be examined on what he has learned. On the contrary, if education should promote adeptness in expression and the development of good judgment in the use

[36] Pease, G R, "Should teachers give warning of tests and examinations?" *J Educ. Psychol*, 1930, *21*, 274–277

[37] Eells, W C, "Reliability of repeated grading of essay type examinations," *J. Educ. Psychol*, 1930, *21*, 48–52

[38] Lee, B, "Some faults common in informational objective tests made by high school teachers," *Educ Admin and Supervis*, 1928, *14*, 105–113

[39] Brinkmeier, I H, "Minor studies on objective examination methods," *J Educ Res.*, 1930, *22*, 110–118, 203–205

[40] The experimental literature bearing on the objective test has been summarized by Kinney, L B, and Eurich, A C, "Studies of the true-false examination" *Psychol Bull.*, 1933, *30*, 505–517

of information, the student should be examined for these abilities. At the present time, it looks as though excessive emphasis was being placed upon rote learning.

GENERAL READINGS

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PART TWO

PSYCHOLOGY AND SOCIAL PROBLEMS

CHAPTER SEVEN

THE NATURE OF SOCIAL PROBLEMS

1. *Introduction* —The whole of Part One was given over to the study of a few of the typical activities of a single person, viz , the reader himself. Several times in the last six chapters, however, we have met the fact that it is not possible to talk about isolated persons without, at the same time, talking about groups of persons It will not be difficult to show, perhaps, that the person, some of whose daily affairs we have been describing, is nothing more than a fiction. Instead of being an individual, he is an individual-in-a-group, and it is this fact about human beings that leads to this and the following seven chapters.

That no one of us can get away from our membership-in character is borne out by the very traits that identify us as single entities. We have said, for example, that each person has certain traits which he can bring to the art of driving an automobile, playing a game, or studying this book. He has secured these traits, not because there was something intrinsic to his own being which manufactured them for him but because, throughout his period of growth, he has been surrounded by older persons who have shaped him by shaping the learning situations in which he has been placed From one point of view, then, his membership character is a product of his social group. Furthermore, the very car that he drives, the game that he plays, or the book that he studies implies someone to avoid on the highway, someone to compete against, or someone who can write books, that is, someone whose ideas shall be considered and then retained or rejected.[1]

These considerations present, however, only one side of the picture. We may look at the group from the point of view of a single person or we may look at a person from the point of view of the group. When we do this, we see that every unit in the group is encompassed about by a vast structure made up of customs, traditions, legal practices, religions, ceremonies, beliefs, histories, languages, and institutions of many other types Just as one person may war against another, so these products of group living appear to war against one another.

[1] For a discussion of the problems raised by the concepts "individual" and "social," see Cooley, C H , *Human Nature and the Social Order*, N Y , Henry Holt, 1902, Chaps I, IV, and X Also Kunkel, B W , "Members one of another," *Scient Mo* , 1917, 4, 534–543

The customs and traditions of the far east, for example, do not seem to be compatible with the customs and traditions of the west. It takes judges of exceptional experience and training to decide between variations in legal practice and between the judgments of other members of the bench Religions have always been at war with one another and with what is called the secular point of view. Just at present, the whole world is divided into national groups with their own histories, their own languages, their own socio-economic systems, and their own political beliefs. At various places, these groups have come sharply into conflict with one another. A single example is to be found in the bitter struggle between capitalism and socialism. Still another example is to be found in the current fight between democracy and dictatorship.

As a matter of fact, problems of this type seem to be more serious now than they have ever been before. If it is true, as some believe, that the World War and its aftermath mark the end of an epoch, vast problems of social import await those who must manufacture the new day.[2] Our own interest in these matters is suggested by the question: What part may experimental psychology be expected to play in this field? How may the facts of the laboratory be used to solve such problems as these?

2. *The Individual and the Group*—One of the first questions that may come to us as we contemplate the membership side of human nature is the following, viz., is it possible to describe a human being independently of his context, that is, independently of the social group within which he is embedded? To ask this question in another way, must one always take each person and his whole context as well into the laboratory, or are the social sciences committed to "field" experiments? As we shall see, this is not an easy question to answer. Moreover, it concerns much that can be said about a science of human nature and it lies at the foundation of politics, of economic systems, of group action, and of individual responsibility.[3]

We have already seen that, for certain purposes, it is sometimes fruitful to think of the individual apart from the group. The various problems of psychology, for example, which will be listed in Chapter Thirty-Six, seem to depend in no way upon the existence of other persons. From one point of view it would make no difference to the subject of an experiment were he alone in the world so far as his

[2] No student of the applications of psychology to social problems should fail to read the relevant articles in the contemporary journals Then there are such monumental works as Spengler, O, *The Decline of the West* (2 vols), N Y, Knopf, 1926 (trans by A F Atkinson).

[3] Consult Rice, S A, *Methods in Social Science*, Chicago, Univ of Chicago Press, 1931.

reactions to objects and events are concerned. The facts of action, of perception, of attention, of mood and emotion, of reflective thinking, of motivation (at least at a primary level), of memory and learning, and of a total patterning of behavior would hold true in any case. In spite of this fact, there are few actions that do not have social import. There are many objects and events which are completely social in character. Emotional behavior gains a large part of its human significance from the fact that other persons are almost always involved. The fruits of thinking make up a part of what we call our social heritage. Most of the derived forms of motivation have been precipitated out of the primary motives under the influence of social factors. And selfhood or personality is, from many points of view, an empty concept, unless we think of one person *and* another.[4]

Let us suppose that it were possible to take out of our world as we know it everything that has been put there because of the membership character of individual living. We should, first, have to lay aside all types of government, all political systems and beliefs, all traditions and customs, all ceremonies, all religions, all economic systems and theories, and a vast section of history as well It is problematical whether there would even be a language or any of the things which language has made possible. We should find the individual himself stripped of a great many of his most valued types of action, for it may be doubted whether he could know the meaning of such actions and postures as are named by the words honesty, unselfishness, devotion, loyalty, courage, friendliness, humility, faithfulness, and sacrifice, were he forever deprived of human fellowship.

It is scarcely necessary to write further in order to show that a whole group of vexing problems arise whenever we think of the individual as contrasted with the group. Some of these problems will be treated briefly in this chapter, but first we may name one that pervades everything else that might be said. This problem is suggested by the following question, viz., in any given action, whose interest should be served, the interest of the individual or the interest of the group to which each person belongs? Even the most obtuse observer of human affairs could guess that this question has been asked anew with each generation and he will know, too, that a satisfactory answer for it is hard to find.

[4] Some psychologists hold that the problems even of psychology itself derive their unique status because of the membership character of all human life See, for example, Weiss, A P, *A Theoretical Basis of Human Behavior*, Columbus, Ohio, Adams, 1925 Hunter, W. S, "The psychological study of behavior," *Psychol Rev*, 1932, *39*, 1–24

Fortunately it is not the province of applied psychology to supply an answer On the contrary, the student of human nature must devote himself to an investigation of the modes of action out of which an answer may be fabricated. This is to say that the behavior of the individual in the group situation is just as much a part of his domain as is the behavior of the individual when he is not in a group situation, for any group may act as stimulus situation to an individual, just as an ordered collection of physical events serves the same function. We have no sooner said this, however, than trouble brews, for physical situations themselves are often too complex to be brought under adequate experimental control. The addition of other persons to any stimulus-situation magnifies the difficulty of experimentation almost beyond the patience, to say nothing of the intelligence, of men Nevertheless, the problem has been attacked from a great many sources and we shall now try to suggest some of the main types of work that are being done [5]

3 *Factors Favoring Socialization* —First, we may ask a question which seems to be wholly obvious and needless, viz , How does it happen that persons live in groups? A quick and facetious answer is that they cannot get away from one another, but a more serious answer is based upon hard thought and much experiment. The traditional reply is that human beings are possessed of a special social instinct called gregariousness [6] When alone, a man, like many of the animals below him, is said to experience feelings of uneasiness and to behave in a restless manner. The moment he sees one of his own kind, these modes of action disappear. It is clear, however, that almost all human beings are conditioned to the presence of others from the moment of birth onwards. The long period of physical dependence which is so characteristic of the human infant makes this inevitable [7] Psychologists are inclined to infer, therefore, that sociability must be explained on other grounds than instinct

They are also inclined to doubt the presence of what has sometimes been described as the intellectual factor in group living The argument is that, in prehistoric times, human beings simply agreed that individual existence could be promoted to better advantage by the co-

[5] The extent to which experimental differs from non-experimental social psychology can be seen by comparing Murphy, G , and Murphy, L B *Experimental Social Psychology*, N Y , Harper, 1931, with McDougall, W , *Social Psychology*, Boston, John W Luce, 1916.

[6] See Trotter, W , *Instincts of the Herd in Peace and War*, London, Unwin, 1916 Cason, H., "Gregariousness considered as a common habit," *J Abnorm and Soc Psychol*, 1924, *19*, 90–105

[7] Fiske, J , *The Meaning of Infancy*, Boston, Houghton Mifflin, 1909

operation of many. Where there is weakness in one, there might be strength in the group. It would follow, then, that all types of social grouping stand as a consequence of an initial, intelligent, and purposeful social contract.[8] Clearly, however, this way of explaining social life attributes too much intelligence to the very primitive men among whom communal living began. Furthermore, the history of various social groups suggests that they are more nearly a product of trial and error learning than of thoughtful planning.[9]

We do not need to go outside of the individual, however, in order to find occasions which might prompt communal living. Two of the fundamental tissue needs of the body would bring animals together, viz., hunger and sex. Since food does not grow abundantly over all parts of the surface of the earth, most animals would inevitably gravitate toward regions in which food was most abundant. As a matter of fact, that is where they would have had their origin. Moreover, they would tend to collect in places where different varieties of food might be found. In the same way, the exercise of the sex functions would demand the presence of at least one other individual. The moment such a demand is satisfied among human beings, the family has taken its original form and thus we may say that communal living finds one of its most important forerunners in the creation of the family group. This matter will be discussed more fully in the next chapter.

Food is only one of the physical conditions which might have favored the early development of communal living. A great deal of evidence has been produced to show that temperature, humidity, rivers, favorable combinations of sea and land, harbors and other physical and geographical factors have played their part. There is not only a relation here between physical or climatic features and communal living but a relation, also, between such features and the general level of culture attained by a given group.[10] One student of such matters has pointed out, for example, that a group of Englishmen, having behind them a long tradition of energy and achievement, chose to settle in the semi-torrid climate of the Bahamas. It is now pointed out that these colonists have come out, after several generations, scarcely better than the natives around them. They are to be compared, therefore,

[8] The "social contract" theory has had a long and respectable history. See Giddings, F. H., *The Principles of Sociology*, N. Y., Macmillan, 1913, Chap. I and *passim*.

[9] Read Keller, A. G. *Man's Rough Road*, New Haven, Yale Univ. Press, 1932.

[10] Huntington, E., *Civilization and Climate*, New Haven, Yale Univ. Press, 1915. See also Sauer, C. O., "Geography of the Pennyroyal," *Kentucky Geological Survey*, 1927, *23* (6th ser.).

with colonists of similar tradition who now give to Canada a part of its distinctive cultural quality [11]

In addition to these factors which are said to favor socialization, there are such factors as emotional action and, principally, fear. The earliest men did not have the advantages for protecting themselves against attack from wild animals and from nature which is now common equipment. It is reasonable to suppose, therefore, that they might have found comfort and assurance when in the presence of their fellows. While hunting, for example, there was certainly strength in numbers and a group can compete more effectively against certain types of climatic disaster than the individual can.[12] In so far as emotional action is instinctive, the development of fear might be said to furnish an instinctive basis for communal living and acting, but this places fear on the same foundation as the sex and parental functions. We shall see in some of the chapters which follow that most fears are acquired.

4. *The Group Mind.*—It is probably a mistake to suppose that any single factor can account for group rather than individual living The main point is that men, like most of the lower animals, do live together. With this fact before us, it becomes pertinent to ask whether group life makes any changes in the psychological functions of the individual. To say the same thing in another way, we may ask whether group living gives rise to problems which are not raised when single persons are under examination.

This question has been answered both in the affirmative and in the negative. There is nothing about the action of a group of persons, for example, that furnishes more perplexities to the psychologist than the fact that the group will, as a group, carry out actions which single members of the group might not countenance. As a possible instance, we may take our common-sense knowledge about the behavior of a mob. In a later discussion of this type of group performance, it will be said that mobs, say, a lynching party, will carry on in a way that is almost, if not quite, beyond both the power and the disposition of a single person. The mob is, however, a collection of persons. If certain acts are done, they are done by the individuals in the group. How is it possible that a person both can and cannot do the same thing? The same question may be asked about a worthy type of action. During

[11] Huntington, E., *op cit*, pp 27 ff The student must be reminded, however, that correlations between culture and climate are easily subject to misinterpretation

[12] Read, C, *The Origin of Man*, Cambridge, Univ of Cambridge Press, 1920, *passim*. Trotter, W., *Instincts of the Herd in Peace and War*, London, Unwin, 1916.

the stress of war or during some other emergency a group of people may rise to a level of devotion and sacrifice that transcends, perhaps, anything any one of the persons in the group would have imagined.

One of the answers that has been made to the questions asked above runs as follows. It has been asserted that there must be, in or above a social group, a mind for that group which is superior to the minds of the members and legislative over them in their collective living. Just as a subject might bend his will to the will of his sovereign, so the individual may bend his will to the social will.[13]

One of the reasons for supposing that the social mind is a mind superimposed upon the mind of each member of the group lies in the fact that it is so easy to talk about the "social organism." Since there are many cells in the body and since there is a mind which is said to be superior to these bodily members, so a social group is made up of members who are welded into an integrated whole by the social mind. Some of these members, like a special organ in the body may have, as their particular task, some special socialized function. Other persons, on the contrary, may be assigned to some other task. Altogether, then, sub-groups of persons might make up a larger body called the social organism. It follows that the social mind might be related to this organism in much the same way that the individual mind is said to be related to the individual body.

Sometimes, of course, it is fruitful to reason by analogy; but this does not seem to be one of the most appropriate occasions. The word "mind," as it has commonly been understood in the history of psychology, stands in a definite relation to an organ, viz., the nervous system and its supporting structures. This organ is particularly adapted to sustain that relation. Individual human beings, however, when brought into a group, have none of the properties that make nervous systems the organs that they are. Moreover, even if there were a social mind analogous to the individual mind, we should still be in the same position with respect to the operations of that mind as we are in the case of the mind of the individual. As we have tried to say in several places, it is not the mind of an individual that is ever under investigation but only his behavior. Likewise, social psychology may study behavior.

The most convincing argument aginst the existence of a social mind is found in the recent development of what may be called ex-

[13] Cf McDougall, W., *op cit*, *passim*. Also Boodin, J E, "The existence of social minds," *Amer. J Psychol*, 1913, *19*, 1–47

perimental social psychology This is a type of social psychology which makes use of the apparatus and the methods of the experimental laboratory. Its experiments start, as do experiments on the individual, with a stimulus-situation. The experiments end, as do all experiments on the individual, with data about the modes of behavior of the individual The group situation is a part of the general stimulus-situation which the individual has to meet, and his behavior gains its social significance because of his membership character rather than because of his temporary subjection to a hypothetical mind.[14]

5 *Social Institutions*.—A view of the nature of social psychology which has a good many points in common with the one just described makes it appear that the word "society" names something which is superior to the members which make up the society. Likewise, there are such terms as social systems, social institutions, mores, and customs which have the same connotation. On the face of it, there cannot be much difference between a social mind and a social system or an institution when all of these terms mean nothing more nor less than an attempt to reify an abstraction.[15] For purposes of convenience in talking with one another, we may say that the persons we see around us live in a certain kind of social system which may differ from the social systems of other peoples. This is one thing, however, and it is quite another to suppose that, when we have thus used the term social system, we have named a definite and organized entity which is more than and superior to the individuals of whom we speak.

As an illustration of the way in which the phrase "social system" is often used, we may refer to some of the things that will be said in Chapter Nineteen about adjustment and maladjustment If a person is to be adjusted he must be adjusted to some thing. The "thing" most often used is the social system. It is as though the individual himself had always to be changed or to be moulded so that he would fit into a pattern which is not himself nor any one of the persons he knows. As we have remarked before, it is now being recognized that the social system must be adjusted to the individual just as often as the individual is brought into adjustment with the social system. That is, there are times when particular environmental situations may be changed more readily than the individual himself can be changed [16]

[14] Murphy, G., and Murphy, L. B., *op. cit.*, Chap. VI

[15] Cf. Allport, F. H., "Psychology in relation to social and political problems," in *Psychology at Work* (ed. P. S. Achilles), N. Y., McGraw-Hill, 1932, Chap. VII

[16] Cf. Dunlap, K., *Habits, Their Making and Unmaking*, N. Y., Liveright, 1932, Chap. IX.

6 *Socialized Individuals*—If, then, we are to reject both the idea of a social mind and of an objective social institution, or system, what shall we say of the distinctive subject matter of social psychology? One of the possible answers runs as follows Since individuals are actually found in groups and since this sort of membership must mean the development of membership activities, it ought to be possible to think of these membership activities as behavior patterns which deserve further study in their own right As one student of such matters has put it, "Instead of thinking of the social order as something which includes and is composed of individuals, we shall take the opposite viewpoint, namely, that individuals contain within their habits of behavior that system which we call the social order.[17]

In other words, if we consider the behavior of large numbers of single persons, we shall be able easily to find types of action which they all have in common and which are related in certain ways to the group situation There are, of course, a great many types of action which will be found common to all persons. All normal members of a group, for example, will wink an eyelid when an object appears suddenly in front of them. This is not a social act and neither does it make up what might be called an institution In short, it is not related to the membership side of behavior When, however, a considerable number of persons react to certain types of situations in an honest or a loyal way, this community of action is related to the fact of membership Such acts are, therefore, social acts Moreover, such actions can easily become systematized or institutionalized and thus give the appearance of somehow existing apart from the individuals concerned [18]

7 *The Problems of Social Psychology*—We shall, of course, consider some of these matters in more detail later on. With these preliminary statements, however, we are ready to see what some of the problems of a social psychology are and how the experimental facts of psychology can be used in a practical way in socialized action.

There is, first, perhaps, the question of the origin of common social institutions We may think at once of law, morals, religion, marriage, political systems, economic orders, and the like. Take law, for instance. We call legal practice and legal documents a social institution because they represent accumulated information about certain types of ac-

[17] Allport, F H, *op cit*, p 200

[18] Cf Bentley, M, "Studies in general and social psychology," *Psychol Monog*, 1916, *21* (No 92)

tion between one person and another on the membership side. Law is not something that exists independently of a community of persons. On the contrary, it stands for certain agreements that have been reached in what may be described as just practice.

In the second place, we may inquire about the types of action that may be expected of socialized persons because they are brought up to have a membership standing. Some of these types of action have been described above. Were there no such thing as membership, no person would develop the types of conduct which are described by the words "loyalty," "courage," "unselfishness," and the like. Neither would such actions as imitation, suggestion, and laughter have their extra-personal value

Closely related to this topic there is the general question of the motivating value toward individual performance gained from the placing of other persons in the total stimulus-situation We commonly think of learning, for example, as a function that will go forward more or less independently of the presence of other persons, and yet there are plenty of experiments which show that the presence of other persons, either as passive onlookers or as actual competitors, may bring about a great change in individual performance.

In the fourth place, we may consider the behavior of the individual when he assumes such membership relations as are suggested by the words audience, crowd, committee, mob, and the like We still mean to insist that the behavior of a mob can be exhaustively described when a description of the behavior of each of the members of the mob has been completed. Such a description must include, of course, the presence of other persons and their modes of reaction as a part of the total stimulus-situation, but for certain practical reasons it will be fruitful to take such groups as groups. One of these reasons lies in the fact that different types of social organization place emphasis upon different types of psychological functions.

In the fifth place, a total view of social organization reveals certain processes taking place which deserve special consideration On the one hand, it is obvious that there are strong tendencies on the part of a social group to remain more or less inert. A part of this inertness may be attributed to that kind of education and general informal training which indoctrinates the oncoming members of society into a *status quo*. Another part of it, however, is said to depend upon a particular type of psychological operation known as imitation. As a matter of fact, however, societies are not always stable. Usually, there

are slow movements of change which may, on occasion, be accelerated by a single person or by a single event. That is, the phenomena of leadership, of invention, and of discovery are sometimes described as distinctly social phenomena. We must, then, give some attention to these various matters.

Finally, the general problems of differential psychology find a special application in social psychology. Two types of difference between individuals have a special social significance, viz., the differences between different races and the differences between the two sexes. If it can be shown, for example, that the races actually differ from one another in fundamental psychological traits, a series of problems of no mean dimensions have been set for those nations which are polyglot in character. Moreover, problems of international cooperation may depend upon the nature of the differences that have to be taken into account before cooperative action can be secured. Similar problems arise out of possible sex differences These problems relate to the nature of education, to the possible place of women in industry, in the professions, and so on.

As we go about these several tasks, the reader should not let himself be drawn away from the practical issues involved in social psychology. One of the most important of these issues may be illustrated in the following way. A favorite topic of research among students of history is the nature of primitive social groups and of dead cultures. Researches in these two fields carry the investigator without fear or favor into the origin and development of such groups and into an analysis of the factors which may have promoted or destroyed them. Many of these studies have been completed without any of the knowledge that is now available regarding the nature of human nature.

The situation is different today. Experimental psychology has taken many long steps during the last generation One of the great problems before the social sciences, then, is the practical problem of asking how far one may go in the serious study of current social, economic, political, family, and religious problems. It would take no great amount of argument, perhaps, to convince the student that social movements are now under way which have greater import than has been the case for many decades. We may well ask, then, what part the science of psychology might normally play in the examination of current social trends? Moreover, can experimental facts drawn from a laboratory contribute anything to the intelligence with which social problems should be faced? With these questions before us, we may proceed to

study some of the more important phases of social psychology in so far as they reflect the possible application of experimental facts to them.

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CHAPTER EIGHT

THE ORIGIN OF SOCIAL BEHAVIOR

1. *Introduction.*—It is the purpose of this chapter to review in as brief a manner as possible the origin and development of some of the more common types of social behavior. This task could be accomplished in either of two ways. We might go to the many studies that have been made in the field of sociology where a close search has revealed the origin and development of the more common social institutions such as marriage, religion, types of social organization, language, and custom. On the other hand, we could take advantage of the experimental laboratory with its studies of the origin and development of social behavior among children Both types of investigation are highly important, but after only a brief mention of the former type we shall devote the remainder of the chapter to studies of the second type

The reader will remember, of course, that a social institution is not some objective fact or the product of some super-personal mind which is separate and distinct from the psychological functions of the members in a group [1] On the contrary, an institution is a more or less well-recognized cluster of the habits and practices of persons who stand in a group relationship to one another. We speak, therefore, of the family as an institution, or of a political system as an institution, not because political systems or families are physical and objective facts but because individual persons, sustaining membership relations to other persons, often behave in more or less habitual and predictable, but at the same time socialized, ways. Among the social institutions most commonly described are religion, morals, law, political systems, socio-economic systems, families, and languages.[2]

With respect to the origin of all of these clusters of social usage there are a number of theories Many of them have been attributed to an act of divine ordination From an older point of view, this act was highly specific in its character, for it has been said that, just as

[1] Consult Rice, S S (ed), *Methods in Social Science*, Chicago, Univ of Chicago Press, 1931, *passim*

[2] A delightful account of the evolution of social institutions can be found in Kellar, A G, *Man's Rough Road*, New Haven, Yale Univ Press, 1932

physical objects and events have been created by a special fiat, so it has been ordained that families should adhere together, that kings should rule, that religious and moral conduct should prevail over secular and immoral conduct, that language should be a means of communication, and so on. As a result of the theory of evolution and of subsequent studies upon the genetic history of the several institutions, this older view has been modified in such a way as to make it plain that social institutions have continued to create themselves. That is, modified creationism has made it possible to say that various types of social institutions are implicit in human nature and in gregarious living rather than specifically ordained in their mature form.

Closely related to such implicit factors is the so-called instinct theory of social institutions.[3] There is a theory, for example, which says that the origin and development of language is a natural expression of a special urge toward speech. Likewise, the development of religion has been attributed to a special religious instinct. Morals are often ascribed to an innate factor sometimes known as conscience. There is no reason to doubt, of course, the intimate dependence of all types of institutions upon human nature, but as we have seen in so many other places, one may take either of two extreme views of human nature On the one hand, it can be said that a large number of behavior systems, including those which lead directly to the more common social usages, are instinctive and, on the other hand, it is possible to say that most of the behavior systems which enter into common social usage have been acquired through training. It has been our argument that the appeal to training is more in line with current research than an appeal to innate or hereditary factors [4]

If we appeal to training, it may be that we have in mind only the way in which the immature members of contemporary social groups learn how to adhere to different types of social practice. In view of the organization of the American school system, it is almost inevitable that immature members of society shall acquire a preference for socio-economic systems of the capitalistic sort and for political systems of the democratic sort. From this point of view, then, it would be easy to say that adherence to social institutions is almost, if not quite wholly, a matter of training. If, however, we look at the total

[3] McDougall, W, *Social Psychology*, Boston, John W Luce, 1916 Compare this with Bernard, L L, *Instinct*, N Y, Henry Holt, 1924 See also Bernard, L L, "The misuse of instinct in the social sciences," *Psychol Rev*, 1921, *28*, 96–119

[4] Murphy, G, and Murphy, L B, *Experimental Social Psychology*, N. Y, Harper, 1931. See especially Part I

history of such institutions we may well wonder whether training or instinct was the more important. It is clear that, in a very primitive society, education could not fall back upon practices which were already established. On the contrary, we may imagine that the most primitive societies were usually in a process of manufacturing such institutions. Our question, then, has to do with the circumstances under which such manufacture could be made possible.

Most of the studies which have been made upon religion, morals, law, and the other social institutions say clearly enough that all such groups of common action have had a natural origin.[5] There is certainly no evidence that any of them have been ordained by divine fiat. When we say, however, that they have had a natural origin we still cannot mean that they are wholly a product of training. On the contrary, as we have seen in the last chapter, every type of socialized behavior must be related in one way or another to the nature of human nature. All human beings have certain tissue needs which are quickly modified by the environmental situations in which the person lives. It is clear that the presence of other persons in such situations easily makes for or against precise types of modification in the primary tissue needs. Up to this point, social institutions depend upon the existence of innate factors, but from this point onward it is possible not only to trace some of the general features of their growth or development but to tease out some of the specific factors which have led to specified kinds of change, as well.

Whenever it becomes possible to trace social practices of the institutionalized sort to their origin and to describe some of the factors which have brought them to their present form and function, the practical work of the psychologist and of the sociologist is tremendously increased. If all such institutions were the product of divine fiat, the exercise of intelligence with reference to social matters would be placed at a minimum. Each person would have either to conform or not to conform. As matters stand, however, research in social matters becomes not only possible but extremely desirable. This research must concern itself, in part, with the relation between human

[5] Some of the more important references on this phase of social psychology are as follows: Smith, G E, *Human History*, N Y, Norton, 1929 Westermarck, E A, *The History of Human Marriage*, N Y, Macmillan, 1921 (3 vols) Also *The Origin and Development of Moral Ideas*, N Y, Macmillan, 1906–1908 Hopkins, E W, *The Origin and Evolution of Religion*, New Haven, Yale Univ Press, 1923 Tylor, E B, *Primitive Culture*, London, J Murray, 1873 Marett, R R, *The Threshold of Religion*, London, Methuen, 1914 (2nd ed) Frazer, J G, *The Golden Bough*, N Y, Macmillan, 1923 Sumner, W. G, and Keller, A G, *The Science of Society*, New Haven, Yale Univ. Press, 1927 (4 vols).

nature, on the one hand, and various types of social practice, on the other, and, in part, with the factors which can be used in order to bring about changes and modifications of such usages [6]

2 *Genetic Studies of Social Behavior*—A great deal of information has been gathered concerning the social life of primitive peoples and a vast number of inferences have been drawn from this material, but during recent years the entire study of social psychology has been changed through the development of truly genetic studies of the origin of social behavior among children These studies have made possible, for the first time, a more or less genuine experimental approach to the problems of social psychology. To be sure, some students of the social sciences still adhere to the older ways of thinking about instinct, original nature, innate social traits, and the like, but the laboratory has placed an entirely different emphasis upon these problems [7]

There is, perhaps, no phase of child development which has greater importance for the applications of psychology to social affairs than genetic studies of development of social behavior. Even though one were to point out the long history of any given type of social grouping, such as the family, and even though one were to emphasize the truly genetic and man-made character of various types of social patterning, it would still hold true that these social patterns may be taken as more or less fixed and venerable on account of their history. In other words, it is quite easy for any social group to maintain its history through a type of education which indoctrinates the oncoming members of society in the historical background of the tribe

The experimental examination of behavior in very small children, however, and the study of the conditions under which such types of behavior can be changed or controlled now makes it clear that all of the social patterns and institutions of any particular group of people could probably be changed within two or three generations In the face of this fact, it is clear that the person who would apply the results of laboratory work to social problems must not only know the experimental material, but he must have some well-considered general principles upon which his social theories shall be established After all, it would be a fairly easy and a more or less mechanical matter to

[6] Cf *Recent Social Trends* Report of the President's Research Committee on Social Trends, N Y, McGraw-Hill, 1933

[7] Much of the experimental literature has been summarized by Buhler, C "The social behavior of children," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933, pp 375 ff

change the character of education so that prevailing types of social behavior might be changed. The question as to whether such types of behavior should be changed, however, is an entirely different question. This means that the educator is not simply a student of psychological facts On the contrary, education must be thought of as a super-science in which the teacher places specific genetic facts into a general background furnished by political, economic, social, and philosophical considerations If we may take these larger questions of policy for granted, we may proceed to an examination of some of the experimental studies on the origin and development of social behavior among children

3. *Smiling and Crying.*—We shall begin with a very simple type of social behavior, partly in order to see how such traits begin, and partly in order to see how quickly they may be modified by learning. From one point of view, the origin of smiling is really a question as to how early in life an infant may begin to react differentially to the presence of another human being Most of the reactions of small infants to various stimulus-situations are not specific to such situations; but from the second month onward, smiling becomes a specific type of response to the human voice[8] This reaction is at first more or less independent of the facial expression or tone of voice of the adult. This situation lasts until about the fifth month, whereupon the infant appears able, for the first time, to draw a distinction between friendly and unfriendly facial expressions or tones of voice. This distinction is shown by the fact that the infant may cry at a scolding voice or after a threatening gesture From the eighth month, the infant is able to draw a distinction between an actual threat in face or tone and a playful threat. In the latter case, after some hesitation, it will respond by smiling[9]

From some points of view, laughter is a more fundamental reaction than smiling but it appears somewhat later. The significant fact about both smiling and laughter, however, is the rapid way in which they may be associated with an immense variety of stimulus-situations. Very early in life, but subsequent to the appearance of smiling as a definite reaction to the mother or the nurse, the following situations stand out as the most frequent sources of such behavior, viz., being played with (involving such physical contacts as tickling),

[8] Murphy, G., and Murphy, L. B., *op. cit.*, pp. 77–78, 249–256

[9] Jones, M. C., "The development of early behavior patterns in young children," *Ped. Sem.*, 1926, *33*, 537–585.

running, chasing, and romping with other children, playing with toys (and particularly with a ball), teasing other children, watching other children at play, making attempts which result in success and making sounds either at the piano or with the mouth which are more or less musical The three most effective sources of laughter are (i) those activities related to a feeling of well-being, to tickling, and to playful handling, (ii) those situations which furnish a chance for self-assertion, as in teasing other children, and (iii) those situations where the child has been successful in overcoming difficulties, making noises and sounds, and the like [10]

In another study of the development of laughter, six groups of stimulus-situations were used, viz., (i) surprise-defeated expectation, (ii) superiority-degradation, (iii) incongruity and contrast, (iv) social smiling as a stimulus, (v) relief from strain, and (vi) play Fifty-four specific stimulus-situations were used. At the age of three the subjects laughed at a few of the stimulus-situations in each of the six groups The important fact, however, was the marked increase in the number of specific situations which came to be effective in causing laughter as the child grew older. There was no sign of a sudden development On the contrary, there was a gradual extension of the laughing reaction to all types of stimulus-situation.[11]

Somewhat the same facts have come out of studies on the relation between crying and various stimulus-situations. To begin with, crying is a part of the mass activity which results from almost any type of intense or unexpected stimulus-situation. Shortly, however, more localized situations, such as pain, strong sensory stimuli, quick changes in posture, fatigue, hunger, restriction of movement, loss of an object, and other similar situations become dominant At the age of three or four months, a social factor in crying makes its appearance for the absence of the parent or nurse may become an adequate stimulus to tears. All of the studies that have been made on the development of crying in social situations indicate that the variety and complexity of such situations increase very rapidly during the early period of development.[12]

4. *Early Social Behavior.*—It is almost necessary that the first social contact which an infant makes must take place between the infant and an adult. It has been shown that small infants, even in the

[10] Cf Buhler, C , *op cit* , references at end of this chapter

[11] Justin, F , "A genetic study of laughter-provoking stimuli," *Child Develop* , 1932, 3, 114-136

[12] Cf Buhler, C , *The First Year of Life*, N Y , Day, 1930, pp 16–43.

second or third month, may react differentially to a familiar face as opposed to a strange face. As a rule, however, definite reactions to other infants in the shape of a formal social contact do not take place until after the sixth month. Even four- and five-months-old babies do not become socially aware of one another when they are placed together. As soon as social contacts can be established, however, infants will begin to touch one another, interfere with one another's activities by taking away or offering toys, by warding off attacks, and by cooperating in play.[13]

Even in these tender months, differences in the polarization of social contact may appear. Those children who develop more rapidly or who are older quickly take the initiative in social situations Definite signs of superiority may appear as early as the fifteenth or eighteenth month and attitudes of inferiority may be clearly recognized by the end of the second year. During the first year, infants are not usually able to maintain contact with more than one other infant at a time. If, for example, three children are together, social contact will be maintained only between two of the three. By the middle of the second year, however, the social contacts may be three-directional. The size of such groups, that is, the number of social contacts that can be established simultaneously, increases in direct proportion as age increases.[14]

It is possible to say that, during the second half-year of life, infants may fall into three groups so far as social behavior is concerned. There is, first, the socially-blind individual who reacts to the presence of another child as if the other child were not present. He may look at another child without any specific social behavior but he will pay no attention to the other's movements, although he will take and use toys. In a second group, there are those children who may be described as socially-dependent. This means that marked changes in behavior may be brought about by the presence of other children. Such socially dependent children may be either inhibited by the presence of other children or over-stimulated by them. In the one case, they will remain passive and watchful, while in the other case they will participate intensively in whatever the situation suggests. The third group may be described as a socially-independent type. These children are aware of the presence of other children and more or less responsive to their

[13] Goodenough, F L, "Interrelationships in the behavior of young children," *Child Develop*, 1930, 1, 29–47

[14] Thomas, D S, "Some new techniques for measuring social behavior," *Child Develop. Monog*, 1929 (No 1)

behavior, but in no sense of the word are they dependent upon the others. Such children may carry out quite a variety of social actions such as consoling another child, encouraging him in his activities, defending him when necessary, or even becoming aggressive with respect to another and yet, during all of this action, they will remain thoroughly independent in their social attitudes.[15]

5. *Social Traits.*—Under the influence of learning situations, these early types of socialized behavior are quickly transformed into more specific and more durable social traits. This fact may be described either in terms of the bonds of union between the various members of a group or in terms of specific types of individual action. As an example of group relationships, it is possible to distinguish at a very early age such types as the protective child, the beloved or popular child, the leader, the despot, and the socially unsuccessful child. Some of these types, and especially the type known as the leader, will be discussed in Chapter Ten.

As an example of special social traits, we may take, first, that type of behavior described by the word "jealousy." One study of jealousy included seventy children. The behavior of these children was observed in connection with the birth of an additional member of the family. Jealous behavior manifested itself most frequently by direct bodily attacks on the younger sibling, although there were other manifestations of it such as ignoring the presence of the sibling and denying the possession of the sibling. In some cases, definite changes of personality trait may appear, such as an increase in temper, a negative disposition, an increase in daydreaming, the development of shyness, increased timidity, and the like. It did not appear from this study that previous preparation seriously changed the frequency with which jealous behavior developed.[16] In general, the appearance of jealousy seems to be directly related with age differences. This trait appeared most frequently between the ages of eighteen and forty-two months. The frequency with which jealousy appears decreases with each increase in the number of children in the family. There is some evidence which shows that jealousy is created by an over-solicitous attitude upon the part of the mother. Moreover, it is more frequent in family groups where maladjustments are present as, for example, an overprotective mother, an indifferent father, some form of marital discord, or in-

[15] Refer again to footnote 9 on page 127

[16] Sewell, M., "Some causes of jealousy in young children," *Smith College Studies in Social Work*, 1930 *1*, 6–22

consistency in discipline. It is known that jealousy appears more frequently among girls than among boys.[17]

Obstinacy is a more or less common feature of normal development. Some of the situations which provoke this reaction among pre-school children are neglect,—that is, ignoring the child for short periods of time,—forbidding certain types of action, and the like. Negative reactions to a forbidding command make their appearance as early as the second year. By the end of the second year such commands result in what may be called obstinacy in about sixty per cent of the cases. Boys are somewhat more inclined toward obstinacy than girls.[18]

Considerable attention has been paid to those behavior patterns known as introversion and extroversion. In a series of experiments designed to reveal such traits as the outward expression of emotional action, resistance to a stranger, degree of self-assertion, compliance and caution it was found that specific variations in behavior were already well developed in pre-school children. One such experiment, for example, ran as follows. As the subject came into the experimental room the experimenter showed him a toy duck floating in a shallow pan of water. The child was asked whether it would like to play a game with a great many such toys. The experimenter suggested that the child open a box containing other ducks. During the following three minutes the reactions of the child were recorded. Some children struggled through the whole period and thus scored low, others quickly gave up, and did not return to the task. Between these extremes, five grades of behavior were noted. So far as the development of social traits were concerned, it was quite clear from this study that variations in compliance, self-assertion, caution, interest, and the like, are a product of early training and in no sense dependent upon specific instincts.[19]

6. *Ethical Traits.*—It used to be thought that ethical and moral traits were subject to what might be called the all-or-none principle. That is, if a child were honest, it must be wholly honest rather than honest in some situations and dishonest in others. It is now quite clear, however, that such traits as honesty follow the same sort of normal distribution curve that other psychological and biological

[17] Foster, S., "A study of the personality make-up and social setting of fifty jealous children," *Ment Hygiene*, 1927, *11*, 53–77.

[18] Reynolds, M. M., "Negativism of preschool children," *Teachers College Contrib to Educ.*, 1928 (No. 288).

[19] Marston, L. R., "The emotions of young children an experimental study in introversion and extroversion," *Univ of Iowa Stud Studies in Child Welfare*, 1925, *3*, No. 3.

traits follow. If, for example, a large number of children are presented with a variety of situations in which cheating is possible, a very few will be found to react honestly in a large number of cases whereas a large number will turn in an average performance.[20] The same facts appear in studies of deceitfulness, helpfulness, selfishness, adherence to ideals, and other ethical and social traits The main problem, however, is not to find out how such traits are distributed in a group of people but what the factors are which make for or against such traits. Do some persons stand low in moral and ethical traits because they are born that way or are such traits a definite product of training? A number of attempts have been made to disentangle these perplexing matters. It has been shown, for example, that moral traits are apt to be more frequent among the more intelligent than they are among the unselected groups. This fact holds true, for example, of such traits as conscientiousness, truthfulness, sympathy, tenderness, will and perseverance, prudence, and forethought The subjects with high I Q 's exceeded the unselected group in every trait measured. It does not follow, of course, that gifted persons are free from moral faults but, on the average, they appear to gain high ratings in tests of such traits [21]

When these facts are stated, it must be remembered that moral traits cannot be measured with the same assurance that other types of psychological function can be measured. It is clear from all the studies that have been made in this field that the moral quality of behavior varies tremendously from one situation to another. One can never be sure, therefore, that the same type of moral attitude is being measured in two situations. If, for example, the conclusion stated above is reliable, it ought to follow that very low levels of intelligence should appear among delinquents. Experiments in this field indicate that feeblemindedness is apt to be more frequent among delinquents than among the population at large, but not enough so as to support the belief in a high correlation between intelligence and honesty. Feeblemindedness, however, is an extreme form of dullness and when slight rather than major deviations from the normal are taken account of, it still turns out that a larger number of dull persons are delinquents than is the case with the general population.[22]

[20] Slaght, W E, "On truthfulness in children its conditioning factors and its setting in child nature," *Univ of Iowa Stud Char*, 1928, 1, No 4

[21] Terman, L M, *et al*, *Genetic Studies of Genius* Vol I "Mental and physical traits of 1,000 gifted children," Palo Alto, Stanford Univ Press, 1925, pp 515 ff.

[22] Cf Murphy, G, and Murphy, L B, *op cit*, 389–402 Consult also the references listed at the end of this chapter

In general, there are no significant changes in moral traits as compared with changes in age. It might be expected that, given favorable training, the relative number of instances in which dishonesty, untruthfulness, and selfishness appear would decrease as the child grows older. Save in the case of persistence where slight increases follow along with an increase in age, moral conduct seems to keep fairly good pace with the standards that apply to adults. In short, one cannot say that the environment is, on the average, arranged in such a way as to promote the development of moral traits. It is to be remembered also that, as children grow older, the number of situations in which immoral behavior may be manifested increases tremendously In view of the fact that delinquency appears so much more frequently among boys than among girls, it might be argued that sex differences in moral behavior must be taken into consideration. Experimental studies do not support this inference, however, on the contrary, in individual cases such sex differences do appear. Delinquent girls, for example, offend most frequently in sex behavior, whereas boys offend most frequently in stealing [23]

It is quite clear from analyses of environmental situations that low scores in moral and ethical traits are closely correlated with variations in home life, with the character of childhood associations, with moving picture attendance, and with types of reading. One student, for example, assigned about ninety per cent of conduct disorders to poor training and discipline in the home.[24] Broken homes stand very high among the situations which conduce to faulty moral behavior.[25] If a child gains the impression that he is not wanted by his parents or if there are maladjustments between one child and another, inadequate moral traits are almost a certain product. It does not appear that variations in moral traits are in any way correlated with changes in economic situation. The character of a child's playmates, however, is found to stand in high correlation with moral traits.[26]

The difference in moral character between groups of children known to attend Sunday school versus groups known not to attend is quite

[23] Macauley, E., and Watkins, S H., "An investigation into the development of the moral conceptions of children," *Forum Education*, 1926, *4*, 13–331, 92–108 McGrath, M C., "A study of the moral development of children," *Psychol Monog*, 1923 *32* (No 149)

[24] Paynter, H., and Blanchard, P., *Educational Achievement of Children with Personality and Behavior Difficulties*, N Y, Commonwealth Fund, 1928

[25] Cf Thomas, W I, and Thomas, D S, *The Child in America*, N Y, Knopf, 1928, *passim.*

[26] Wellman, B L., "The school child's choice of companions," *J Educ Res*, 1926, *14*, 126–132 Levy, J., "A quantitative study of the relationship between intelligence and economic status as factors in the etiology of children's behavior problems," *Amer J Orthopsychiat.*, 1931, *1*, 152–162

small. What difference there is favors the group attending Sunday school but it is not clear whether the Sunday school itself is the effective agent or whether such children come from homes where better standards are maintained than is the case with other children. There is no evidence to show that regular day schools lead to a consistent increase in moral development.[27] There is one environmental situation which is often said to have a marked influence upon moral behavior, viz, the moving picture. A number of studies have been made in this field and although the seeing of certain types of pictures may increase the "immoral" character of make-believe play, there is no evidence that children are actually stimulated to actual immoral behavior. As we shall see, however, there is a certain amount of evidence to show that attitudes of children or specific problems may be greatly modified by certain types of pictures.[28]

7. *The Development of Competition.*—There is no place, perhaps, where the genetic method holds more significance for vexing social problems than in a study of the origin and development of the behavior patterns variously described as competition, rivalry, emulation, love of praise, and desire for prestige. It is often pointed out that a large part of our modern social life is based upon the premise that human beings possess a native desire to compete with one another and to display themselves as superior to one another. The phrase "rugged individualism" is only one example of our common beliefs about the fundamental character of competition.[29]

It would take only a casual survey of the growth and development of the child to show that parents and teachers work creatively upon the competitive attitude in almost every conceivable way. As soon as infants are old enough to make any sort of social contact with other children or with the adults around them, the taking of food, the use of toys, and even such habits as going to sleep are set into a competitive framework. One child is invited to excel another child in kind of food eaten or in rate of eating and even to excel its parents. This method is particularly useful in getting children to eat foods that are disliked. As the child grows older, its work in the schoolroom is motivated by placing it in competition with other children where success is rewarded

[27] Goodenough, F. L., "The effect of certain family relationships upon the development of personality," *Ped. Sem.*, 1927, 34, 45–71.

[28] This whole field has now been examined with some care and the results published in a series of monographs by Charters, W. W., Stoddard, G. D., Ruckmick, C. A., etc., N. Y., Macmillan, 1933.

[29] See the discussion and references in Rice, A. S., *op. cit.*, pp. 489–501.

with grades or with such special marks of distinction as stars on the record book for good conduct or for exceptional performance. On the playground, special recognition always goes to the fastest runner or to the best sportsman. Merit badges have been made a prominent feature in the educational program of such organizations as the Boy Scouts, and even the Sunday schools have done their best to motivate ethical and moral behavior through the use of competition.

Obviously, one may take either of two attitudes toward the origin and development of this trait. It is usually taken for granted that the trait must be innate and that it should be the function of the parent or the teacher to capitalize upon the instinctive resources of the child as much as possible in order to hasten growth and otherwise favor the development of some traits rather than others. On the other hand, however, it is possible to argue that belief in the innate character of competition has been fostered by non-scientific considerations and that the very organization of methods of study and of playground activities has been of such a character as to produce by training a trait which is not a necessary component of human nature. Almost every healthy human infant is, of course, a self-motivating bundle of energy. As a result of stimuli in its own alimentary canal it is, during its waking hours, almost ceaselessly in activity. For the first few months, that is, before the infant has come to the place where it can recognize for the first time the presence of other persons, most of its actions are unimpeded. As we have seen earlier in this chapter, very young children playing together with the same materials do not often recognize the presence of one another as essential factors in the whole stimulus-situation. There comes a time, however, when another child does become a significant factor. This means, of course, that action with respect to certain toys may be thwarted and it is within this situation that competitive behavior arises. Since there is every reason to believe that parents and teachers do their best to create competition where competition may not be normal, we may well ask what the actual origins of competitive behavior are and how this social trait changes under the impact of learning situations.

This is, perhaps, one of the most important questions that can be asked in social psychology at the present time, for it touches the life of the whole group in such a way as to put a definite stamp upon the problem of motivation, upon many aspects of socio-economic life, and upon other fundamental types of social behavior as well. For example, if competition is one of the native traits of human nature, it must

follow that no amount of training could ever serve completely to eliminate the trait. In other words, it would follow that some form of competitive society and a competitive theory of industrial and economic organization are inevitable. On the other hand, if it can be shown that rivalry and emulation are a product of the way in which early learning situations of the social sort are set up and used in the development of small children, some of the most vexing of our contemporary social problems turn out to be problems of education rather than of instinctive nature.

It is clear that competitive behavior must have its natural predecessor in the recognition which every child makes sooner or later of the presence of other individuals. Some of the early stages of this kind of recognition have been traced in the earlier part of the chapter. From this point on, success in group action emerges out of a child's initial and non-social reactions to objects. As an example of the nature of competition in small children, we may take the following experiment. The subjects were brought together two at a time in a small room, each being seated opposite the other at a small table A pile of building blocks was placed upon the table in such a way that each child could take as many as it wished The subjects, who varied in age from two to seven years, were simply asked to go ahead and make something. The test was finished whenever either child said that it was through or when all of the blocks had been used After the trial, the experimenter invited each child to look at both constructions and say which of the two was the prettier. In other trials the children were especially motivated by asking them to see which one could make the prettier building or the bigger, and so on.

Very young children simply played with the blocks but as age increased, definite constructions increased. Likewise very young children rarely took the blocks from one another although in the older age groups this type of action became increasingly common. At no age level was there any tendency to work in cooperation with one another. In other words, the subjects passed from a simple level of stimulus-response behavior through a stage of definitely taking blocks from the other subject to a stage where the social aspects of the problem were recognized. This recognition revealed itself in definite requests for blocks that were needed.

The competitive attitude increased rapidly with age increases. Only a few of the children at the early age level revealed this attitude by such expressions as "Look! Isn't mine pretty?" "Look at mine!"

"Bigger, bigger!" and the like. At the seven-year level seventy per cent of the children revealed a definite competitive tendency. In general, the children were inclined to judge their own efforts as the prettier of the two. In addition to the evidence of competitiveness described above, there were a good many other gestures and attitudes looking in the same direction. The experimenter, for example, was able to record such behavior as hitting, pushing, teasing, glances of triumph, hiding blocks, stealing them, nagging the opponent, and even fighting directly with him.[30]

It was clear throughout this experiment that the subjects differed widely in their competitive zeal. This, of course, is the result that might be expected, for each of the subjects must have been influenced by a great many other factors than those actually used in the experimental situation. Sometimes, for example, children who were not skillful in handling the material or who recognized that their own work was inferior definitely withdrew from the experimental situation. This is a negative attitude which must have had its origin in some other factors aside from those created by the experimental situation. One girl at the oldest age level showed no signs of competitive behavior at all. It looks as though girls are much less apt to display a competitive spirit than boys. Obviously, then, competition is one of the products of social organization and, moreover, there are a great many other factors which may have a bearing upon it. The strength of this behavior pattern increases definitely as the child grows older.

Since we have already described some of the experimental data resulting from competition where it is used as an incentive or motive, we shall ask the reader to associate the problems of this chapter with the problems of Chapter Four. When he does so, he will certainly strengthen the impression we have tried to create, viz., that there is a psychological side to industry and to politics which is of the greatest importance. If, as we have said, competition is innate or instinctive, a definite foundation has been furnished for certain types of economic and political theory. On the contrary, if competition and all correlative traits are products of learning situations, the future character of social behavior and even of social institutions must rest, in part, upon an educative process.

[30] Baumgarten, F., "Eine Ehrgeizprobe," *Prakt. Psychol.*, 1922, *3* (No. 2). Greenberg, P. J., "Competition in children. an experimental study," *Amer. J. Psychol.*, 1932, *44*, 221–248.

The student will not realize the full import of this conclusion until he remembers that there was a time when men believed that kings ruled by divine right, that slavery was an institution sanctioned by religion, that a democratic form of government was insurrection against the authority of the State, that capitalism must be an inevitable outcome of human nature, and that education ought to preserve the *status quo* since that which is, is therefore right. To be sure there are some products of education that are relatively inevitable because it would be difficult indeed to change the whole social order; but such facts as have been suggested in this chapter open the way, for the first time, to a more intelligent appraisal of the social problems created by types of training.

GENERAL READINGS

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CHAPTER NINE

THE BEHAVIOR OF GROUPS

1. *Introduction.*—In the last two chapters it has been taken for granted that all manner of social problems can be studied from the point of view of a particular individual who has been placed in the group situation. Even if we were to say something about a very popular topic in social psychology, viz., the psychology of mob action, it would still be possible to think of the mob as made up of single persons whose conduct could be studied as though it were personal or individual conduct. In order to do this we would have to think of the other persons who make up the total group as a part of the stimulus-situation which is initiating and guiding the behavior of the person who is under examination.

It still remains to be seen whether all of the events which social psychology and sociology ought to describe can, as a matter of fact, be described in terms of the individual. In any case, the number of experiments based upon this premise is increasing rapidly. It is clear that a smiling child or a smiling group of children, on the one hand, and an enraged adult or a group of enraged adults, on the other hand, may become just as effective a form of stimulus for the behavior of one single person as any of the other objects or events around him. To be sure, such a situation presents a variety of factors which do not usually enter into the more formal types of laboratory experimentation; but there is no reason to suppose that these factors do more than make the situation more complex and hence less subject to experimental methods than would otherwise be the case.

Now, however, we shall look at group behavior from another point of view. For certain purposes it has been more or less fruitful to think of social events in a group-wise manner, that is, to think of the behavior of groups as groups rather than as collections of individuals. When, for example, we compare such membership patterns as are named by the words "crowd," "committee," "jury," "mob," "throng," "congregation," "audience," or "parliamentary body," we can see at once that these words imply differences in degree of organization or of patterning among the members of which they are composed. In some

of these cases, the nature of the organization is such as to promote discussion, judgment, reflection, and decision, whereas in other cases the organization is such as to promote emotional action, violence, excitement, or embarrassment. We shall make the assumption, then, that for certain purposes, it is fruitful to ask how a committee may differ from a mob or how an audience may differ from an ordinary crowd on the street. As we inquire after these differences, it must still be remembered that every group is still a group of individuals and that it would be possible to make a detailed study of each individual in every particular group situation or relation.[1]

The groups whose behavior has been most studied are as follows, namely, the committee-like group, such as the jury or any other small group of cooperating persons, the crowd, such as might be assembled at a football game or along the streets when election returns are being announced, the audience, such as may be found in a lecture hall while an address or an oration is being delivered, and the mob, such as a lynching party, a revolutionary group, or a group of soldiers fleeing from the scene of a military disaster. We shall consider briefly each of these different types of social patterning in order to see what some of the chief psychological characteristics of them are and in order to suggest practical means of adjusting one's self to the situations they represent.

2. *Types of Social Group.*—The terms that have just been used might be taken to mean that all social groups imply the physical togetherness of a number of individuals. It is easy to see, however, that this is not always the case. For one thing, a single person may find himself buried, so to speak, in a dense throng and yet display no signs of membership in the throng If, for example, such a person were deeply concerned with a mathematical problem or if he were attempting to recall whether or not he had locked the doors of his car upon leaving it, he might be numbered among the individuals that make up the throng but he would be, in no sense of the word, a socialized member of the group. In other words, mere physical contact with another person does not, on that account, make a social group out of a collection of individuals.

Then, too, it often happens that persons who are physically isolated from one another may think of themselves as directly and even inten-

[1] The questions here raised are subject to much dispute among psychologists and sociologists The teacher could well afford to make a special topic out of them. See Allport, F. H., *Social Psychology*, Boston, Houghton Mifflin, 1924, *passim*.

sively sharing their information and their attitudes with others. This would be the case, for example, were a nation at war and were an announcement to come over the radio telling of some unexpected victory for the nation's army. In this case, a simple perception of an announcement would almost surely be loaded with meanings and implications that would point to a wide variety of possible action. Some of these actions would be distinctively social rather than personal in character. In other words, then, it is possible to distinguish between two major types of social patterning, viz., the consociate group and the congregated group [2] The consociate group is made up of members who are not collected in one spot in a physical way but who are, nevertheless, fused into a unified whole by socialized attitudes and meanings. The congregate, on the other hand, implies direct physical proximity and takes such forms as we have mentioned above, viz., the committee, the crowd, the audience, or the mob.

The consociate group is frequently developed in conjunction with what may be called social institutions As we have seen, an institution is not an objective, physical fact On the contrary, it is a cluster of habits and attitudes which are more or less common to all members of a group. Strictly speaking, then, it would be wrong to say that a monarchical system is apt to be oppressive and that a democracy is apt to be liberal. One should say, instead, that the habit systems of some collections of persons make oppression easy whereas the habit systems of other collections make oppression difficult. Both of these types of government may be institutionalized but the word "institution" has no other meaning than that the persons included have tacitly agreed to abide by certain clusters of social, economic, and political usage.

In other words, after groups of persons have lived together through long periods of time, they naturally fall into agreement upon certain customs, procedures, or beliefs When these modes of personal behavior arrive at a more or less stable and systematized level, they may be called an institution. Even though one person remains separated from other persons, he may still display some of the qualities of socialized action simply because he realizes and acts upon institutionalized beliefs and practices. The decision of a young man, for example, to continue his education, may be arrived at in the privacy of his own room, but both the decision and his subse-

[2] Bentley, M., "Studies in general and social psychology from the University of Illinois," *Psychol Monog*, 1916, 21 (No 92)

quent actions are socialized in the sense that the getting of an education is one of the generally accepted policies of certain types of social organization.[3]

Congregates may vary from one another in compactness all the way from a very loose and desultory collection of curiosity seekers to a closely knit deliberative unit. On the one hand, there is that kind of unplanned congregation which we commonly describe by the word "crowd" Such chance groupings are often found upon the street, in the marketplace, in a park, or in conjunction with almost any unusual event. The persons of which they are composed may do nothing more than react to the same object, but the attention value which this object may have for them will probably be increased rather than decreased because of the presence of other persons Such an aggregate is not apt, however, to be very stable.[4] As a rule, the perceptual functions will be used more freely than other functions by the members of a crowd while the responses are often limited to simple postures and habitualized verbal comments. This is to say that crowds are rarely disposed to solve problems by collective action and neither will they give normal expression to some of their secondary or derived motives, desires, and purposes In other words, crowds can be easily moved to action by an impassioned orator and they may also be converted quickly into a more mobbish type through the presentation of situations calling for emotionalized action [5]

Beginning with the audience and ending with the committee, the jury, or some other small and selected deliberative group, the higher types of psychological function express themselves more adequately. An audience may, of course, lend itself readily to the suggestions and arguments offered by a speaker, but it is not often that a genuine audience can be converted into a mob. As a rule, smaller groups, such as the jury and the committee, tend to emphasize the deliberative functions in a way what will be described below.

3. *The Committee.*—It is clear from what has just been said that social groups of the congregate type are to be distinguished from one another for the most part in terms of the psychological functions which they may promote. As a typical example of the experimental

[3] Cf Hollingworth, H L, *Mental Growth and Decline*, N Y, Appleton, 1927 pp 282 ff See also Ellwood, C, *The Psychology of Human Society*, N. Y, Appleton, 1925, pp 124 ff

[4] Clark, H See Bentley, M, *op cit*, *passim*

[5] Scott, W D, *Psychology of Public Speaking*, Philadelphia, Pearson Bros, 1907, pp 175 ff

work which may be done in this field, we may take, first, one of the studies that has been made upon committees. In this study more than 1,000 students were divided into committees of from three to six members. Each committee was asked to come to a majority decision on four different types of problems. One of the groups was asked to name the emotion expressed in a given photograph; another group considered a variety of problems in the playing of bridge, still another passed judgment upon the merit of English compositions, and the fourth group was presented with what have come to be known as multiple choice problems. The experimenter wished to know not only how quickly a majority decision could be reached but how accurate, with respect to the standard that had been laid down, these judgments might be. In general, it was found that smaller groups worked much more effectively than larger groups, save in the case of the fourth type of problem. In this case, discussion among the members of the committees was much freer and the larger groups seemed to have some considerable advantage both in speed and in accuracy. Committees made up of both sexes were somewhat less efficient than committees made up of the same sex.[6]

Another experiment in this field runs somewhat as follows. The persons who served as subjects were asked to give strict attention to an object which was presented to them for fifteen seconds. At the end of this period each person was asked to write down such details about the object as he had happened to notice. The reports were classified according to their contents and related to the sex, age, education, and visual acuity of the subjects. After these data had been obtained the experimenter asked for a group discussion on all of the items which had been noticed by a particular individual. A record was made of this discussion and later on a group decision was reached with reference to the stimulus objects. Finally, each of the individuals was asked to write out a statement of the way in which his own opinions differed from those reached by the group.[7]

One of the objects used in this experiment was a locomotive. Forty-one details about this locomotive were reported by the various members of the group. Twenty-nine details were wrong. After group discussion the number of correct details added to those

[6] South, E B, "Some aspects of committee work," *J Appl Psychol*, 1927, *11*, 348–368, 437–464

[7] Bechterew, W, and Lange, A, "Die Ergebnisse des Experiments auf dem Gebiete der kollectiven Reflexologie," *Zsch f angew Psychol.*, 1924, *24*, 224–254.

already reported was 118. There were also seventeen wrong details added. In other words, it turned out that group discussion seemed somewhat to improve the accuracy of judgment about an object seen.

In still another experiment a group of subjects was asked to form words out of a given set of individual letters. The subjects worked in committees of from three to ten. In experiments of this type, it is almost inevitable that the total number of words formed by the whole group shall be a sum of the words formed by each of the persons in the group. In other words, it does not appear that working together brings into play any types of intellectual function other than those possessed by each of the members of the group. In still another experiment by this same author, a group of sixty-eight graduate students, working sometimes as isolated individuals and sometimes in the form of committees of from three to ten members and then again as isolated individuals, was asked to work on ten different kinds of problems Only nine of these problems turned out to be significant. It appeared from the results that group performance was a little better, on the average, than individual performance, for every one of the tests. Those tests which could easily make use of inter-stimulation among the individuals gave a very much higher value for group performance than for individual performance. One of the tests, for example, called for the decoding of a cipher. In such a task, there might be much more inter-individual stimulation than would be true of word-building out of letters. When the scores were computed for this experiment it was found that the efficiency of the average group could be represented by the value 96 per cent, whereas the score for the average person working alone was 64 per cent. In general, then, the performance of a group in certain types of activities is better than the performance of the best individual in the group.[8]

There is, of course, a vast amount of work yet to be done on problems of this kind. For our purposes, the most significant thing is that a group of the deliberating type can be experimented upon under conditions that make for accuracy in the measurement of performance. That there are a great many variable factors becomes clear when we recall that the product of group action may depend upon sex differences, upon the intelligence of the individual mem-

[8] Watson, G B, "Do groups think more efficiently than individuals?" *J Abnorm and Soc Psychol*, 1928, *23*, 328–336

bers, upon the extent to which personality differences may be submerged in the interests of a common activity, and upon the extent to which some one person may take the lead in directing the activities of the group. In any case, experiments in this field are not impossible.

4. *Inter-Stimulation.*—It has long been known that other factors aside from sheer competition or even from the presence of other persons may modify the character of a performance. In one of the first studies of fatigue, for example, it was shown that so simple a movement as pulling a weight with the finger might be increased because of the presence of irrelevant stimuli. These other stimuli were thought to exert what has been called a dynamogenic effect on performance. In any case, this principle has become a general principle in the psychology of action.[9]

One form of the dynamogenic factor has been studied in the following way. The subjects were cyclists. They were asked (i) to race against time, (ii) to race against a pacing machine, and (iii) to work against a pacing machine but, at the same time, to compete against other cyclists The amount of work done increased with each of these conditions.[10] Further experiments were made by asking children (age range from eight to seventeen) to compete against one another by turning the handles of fishing reels. The lines on the reels carried a little flag along a four-meter course. As so often happens in experiments upon competition, some of the subjects did better when working against another subject, whereas some did more poorly. This difference in results is usually explained by noting that excessive stimulation during competition may interfere with, rather than aid, performance. Some subjects, for example, became excited rather than stimulated under competition. As is commonly known among athletes, excitement of this type may lead to actual cramping in various muscles.

The normal place in which to study one phase of competition is furnished by the average schoolroom. If work in the schoolroom is compared with work at home, one may measure the effect not of direct stimulation but of what may be called group inter-stimulation. In certain types of group situations, for example, spontaneous rivalry may appear. When this happens, it usually follows that

[9] Féré, C, *Sensation et mouvement*, Paris, F Alcan, 1887

[10] Triplett, N, "The dynamogenic factors in pacemaking and competition," *Amer J. Psychol*, 1898, *9*, 507–533 Tinker, M A, "A study of the relations of distracted motor performance to performance in an intelligence test," *Amer J Psychol*, 1922, *33*, 578–583.

both the speed and the quality of work done may be superior to the performance of the same persons while they are working in isolation.[11] These results have been confirmed by a great many other studies. In one case, for example, the experimenter read a series of one-syllable words and a series of two-place numbers to his subjects. In one series of readings the subjects were alone and they were asked to repeat orally as much of the material as they could remember. A test of recall was made on the following day. The same sort of material was given to the same children after they had been brought together in a group, and tests of recall were taken in the same way. In general, group work was better than individual work for both kinds of material. This fact held true not only for immediate but for delayed recall as well, the superiority of group work being much more significant, however, for delayed recall than for immediate recall.[12]

It has not been easy to distinguish between the dynamogenic factor in group performance as opposed to the competitive factor. An attempt, however, has been made to draw this distinction. In a typical experiment the subject was asked to place his arm in an apparatus which would allow the arm to move in any direction, the character of the movement being recorded on a blackened paper just below the apparatus. The subject was asked simply to watch the movements of the experimenter's arm. The tracings on the blackened paper showed clearly the influence of the experimenter as compared with movements made by the subject when the experimenter was not present It was clear that the subjects tended to imitate the movements of the experimenter. In a second experiment, two subjects were asked to make pencil dots on a sheet of paper, each following his own rhythm. There was a tendency for the subjects to follow one another's rhythm, although in some cases a negative attitude developed, in which case the rhythms became more divergent rather than more similar.

In still another experiment, thirteen subjects were asked to cross out letters in printed material, sometimes while working alone and sometimes as members of a group In general, more letters were crossed out during group activity but the number of mistakes made was invariably greater. Those who work more poorly while alone were

[11] Mayer, A., "Uber Einzel- und Gesamtleistung des Schulkindes," *Arch. f. ges Psychol.*, 1903, *1*, 276–416

[12] Elkine, D., "De l'influence du groupe sur les fonctions de la mémoire (On the influence of the group upon memory functions)," *J de psychol*, 1927, *24*, 827–830 Elkine also hazards the generalization that children with the best memories are most favorably influenced by the group This, lacking careful statistical treatment, can, of course, be taken only as a hypothesis for further work

speeded up during group performance, whereas some of those who did better while alone were slowed down in the group situation. Similar differences between isolated and group performances have been found in tests of learning ability, and in tests of speed of movement.[13]

5. *Group Rivalry.*—Thus we see that it is difficult to distinguish what may be called a dynamogenic effect from simple group stimulation and from actual group rivalry. Simple inter-stimulation should operate somewhat as a dynamogenic factor. In actual group rivalry, however, the subject may enjoy increased performance not merely because of the dynamogenic effect created by the presence of other persons but because of an actual desire for emulation. As an example of the experiments that may be done in this field, we shall select another of the whole group of experiments mentioned above. Two groups were asked to compete against each other in measures of grasping strength. Each group consisted of five subjects and for each group a leader was appointed. In general, it was found that the subjects who had been roughly equated, man for man, in total strength were greatly superior when working as teams. Each subject in each of the competing teams did better under the competitive situation than he did when working as an isolated individual.[14] There is some evidence, however, to show that groups which are not approximately equal in ability give different results. A superior group, for example, may do more poorly simply because it does not have a worthy opponent.

In another experiment, sixth-grade children were asked to compete against one another in arithmetical ability. The groups were, of course, equated in ability at the beginning of the experiment. Continuous pressure was brought to bear by the experimenter upon the competing groups. In every case, team performance was better than individual performance. Moreover, the team that took the lead seemed to secure additional advantage from this fact for its performance increased steadily during the experimental period.[15]

It does not always follow that groups which have been made up in this artificial way actually represent the best type of group performance. In certain kinds of behavior, for example, one may be motivated either to increase one's own individual component of the total group score or to sacrifice an individual score to the achievement

[13] Moede, W., *op cit*, pp 79–172.

[14] *Ibid*, pp 155–190

[15] Hurlock, E B, "The use of group rivalry as an incentive," *J. Abnorm and Soc Psychol.*, 1927, *22*, 278–290.

of the whole group. This factor has been studied in the following way. The situation was of such a character as to allow the subjects to contribute either to their own score or to that of the group to which they belonged When, for example, teams were organized by the subjects themselves, there was a greater tendency for each of the subjects to contribute to group performance than to an increase in their own individual performance. Likewise, partnerships of two children were more effective than random groupings. The experimenter in this case was able to arrange various types of group motivation in the following order, viz , (i) work for one's own sex, (ii) work for one's self, (iii) work for one's team, (iv) work for one's school class, and (v) work for an arbitrary group to which one was assigned by the teacher.[16]

6. *The Audience.*—The audience, as we have said, is a group the members of which have come together for the purpose of listening to a lecture, a concert, or to some other performance which has excited a common interest. In order to study the group behavior of audiences, however, it is almost necessary to take advantage of groups which are not aware that observations are being made upon them.

As an example of the sort of thing that may be done, we shall cite the following The experimenter attended four performances of a comedy entitled *Iolanthe*. It was the purpose of the observer to find out how many episodes would produce laughter on the part of the audiences during these four performances. It turned out that there were 137 such episodes. It turned out, also, that if any episode had produced a laugh in one of the audiences, it would also produce a laugh in the other three audiences. Furthermore, the laugh-durations for the different audiences were remarkably constant. Similar facts held true of other types of group behavior. That the similar performances of these four audiences was directly related to the high degree of constancy in the giving of the play itself was suggested by the fact that the behavior of the persons who witnessed the same play acted by amateurs was much more variable.[17]

Some attempts have been made to describe the general psychological organization of the audience. It has been said, for example, that the members of an audience, because of their preliminary tuning, are

[16] Maller, J B , "Cooperation and competition an experimental study in motivation," *Teach Coll Contrib Educ* , 1929 (No 384) See also Sorokin, P A , *et al* , 'An experimental study of efficiency of work under various specified conditions," *Amer J Sociol*, 1930, *35*, 705–782

[17] Lange, F E , *A Statistical Study of Crowd Laughter*, master's essay in Columbia Univ. Library, 1923

apt to be receptive and amiable, expectant and tolerant. When an audience is in the process of becoming assembled, a wide variety of objects and interests together with a great amount of variability in behavior may be present. As the speaker begins his address, however, or as the orchestra starts its program, these variable objects and modes of behavior begin to drop out. The members as a whole become polarized, as it were, toward one object, viz., the speaker or the orchestra.

As we have seen, the word "audience" refers to groups of persons who are actually in the physical presence of other persons. It is clear, however, that somewhat the same kind of psychological characteristics may be present even though the members of an audience are widely scattered One of the best examples of this sort of unassembled audience has been made possible by the development of radio. Although each of the persons in such an audience may be located in his own home, he will, nevertheless, be psychologically orientated towards some single point, viz., the person who is being heard or the objects which are being described.

It is doubtful whether enough experimental work has been done on the properties of an audience as to warrant many of the practical inferences which are used by public speakers. It is clear, of course, that the more nearly a speaker can cause his listeners to become polarized toward himself, the more effective he will be. The experimental problem, then, is to find out what actions on the part of the speaker will be most effective in securing polarization. Various speakers have used various means. The inference seems to be that the means that may be used depend on the nature of the topic to be discussed, on the stature and personal character of the speaker himself, and upon the general timeliness of the topic. If an audience assembles in a mood which will make it receptive to a given topic, polarization takes place rather easily.

There are a few facts which show that an audience may become so intimately polarized with reference to the speaker as to favor that kind of attitude known as suggestibility. One of the experiments on this problem was carried out in the following manner. The lecturer uncorked a bottle containing water before a group of 168 students. The intimation was that the bottle contained an odor, for the various members of the audience were asked to indicate by raising an arm the moment when the odor was detected. Naturally enough, the first positive responses came from the subjects who were seated in the first

row and the length of time required to gain the suggestion varied directly with the distance of the subject from the experimenter.[18] In a somewhat similar experiment, pairs of black cards upon which white dots had been placed were presented to a class of 400 students Each of the subjects was asked to decide whether the upper or the lower cards had the larger number of dots. In a subsequent trial, the same procedure was used save that the subjects were asked to show how they had voted on the first occasion, by raising their hands. In general, the number of correct judgments was increased as a result of the show of hands but this fact did not hold true of all of the subjects. On the contrary, only one-third of them displayed a tendency to adapt themselves to the judgment of the group.[19]

There is some indication that the performance of the members of a group may depend, in part, upon the spatial location of a member with respect to the center of the group. For example, the grades received by classes in several different courses have been plotted according to the seating arrangement of the members of the class. In general, it appeared that the best performances came from persons who were immediately in front of the speaker and who were toward the front center of the whole group. Persons sitting on the very first row did more poorly than those just behind them. Likewise persons sitting at the edge of the group were also likely to receive lower grades than the more centrally located students. Although these results are to be questioned because no attempt was made to ascertain the equivalence of the persons concerned, the inference is that the sense of membership-in-a-group and incentives to performance may stand at a higher level in the center of an audience than they do on its periphery. [20]

7. *Crowds and Mobs.*—There is, perhaps,, no place in social psychology where the imagination of students has run more freely than in connection with the psychological characteristics of crowds and mobs. Since a mob is so apt to indulge in performances which go almost beyond anything that any single member of it would tolerate, mob action has led some persons to argue that a super and highly emotionalized mind must seize the members of such a group and compel them

[18] Clark, H , "The crowd," *Psychol Monog* , 1916, *21* (No 92), 26–36.

[19] Munsterberg, H , *Grundzuge der Psychotechnique*, Leipzig, J A Barth, 1914, pp 266–271 See also Moore, H T , "The comparative influence of majority and expert opinion," *Amer J Psychol* , 1931, *32*, 16–20 Wheeler, D , and Jordan, H , "Changes of individual opinion to accord with group opinion," *J Abnorm and Soc Psychol* , 1929, *24*, 203–206.

[20] Griffith, C R , "A comment upon the psychology of the audience," *Psychol Monog* , 1921, *30* (No 136), pp 36–47 See also Farnsworth, P. R , "Seat preference in the classroom," *J Soc Psychol* , 1933, *4*, 373–376

to actions which are more or less abnormal in intensity. It seems to be fairly clear, however, that crowds and mobs do not differ greatly from other types of collections save in the fact that the action of a person caught up in a mob may be more intensely emotional than is his average action. Even when we say this, however, we must speak with due caution for a person who is caught alone in a dangerous or frightening situation will also act in an intensely emotional way. There is no reason to suppose that a single person who is in danger of being burned to death will be any less emotional than he would be if he were a member of a large group.

It is not easy, to be sure, to get experimental evidence about observations of this type. We may mention, perhaps, only one possible means of approach to the problem. There is, on the athletic field, a kind of intense emotionalized action called the "seventh inning rally." Sometimes the emotional actions of an audience at an athletic event may take the form known as razzing. In one experiment upon razzing the active members of a fraternity were asked by the experimenter to subject a number of fraternity pledges to an intensive session of scorn, biting comment, and ridicule. In advance of this "bull session" the subjects had already given a record of certain types of performance during free competition. The tests used were (i) speed of tapping, (ii) the three-hole steadiness test, (iii) steadiness in sitting, and (iv) steadiness in standing. The performances of many of the subjects were poorer under razzing than they were under normal conditions. The data is somewhat obscure as far as speed of tapping and steadiness in the three-hole test are concerned. Some of the subjects were able to move more quickly under razzing than under normal conditions.[21] This experiment touches the problem of mob action only in the sense that an attempt was made to disturb the subjects as much as possible. It is clear that the behavior of mobs is a subject that still remains wide open to investigation.

8. *Group Configurations.*—We ought not to bring this brief survey of the behavior of crowds to an end without reminding the reader of the fact that it is one thing to make experimental studies on group performance under conditions that, at the best, must remain more or less artificial, and quite another thing to give a significant description of groups as they actually appear, so to speak, in "nature." During

[21] Laird, D A, "Changes in motor control and individual variations under the influence of 'razzing,'" *J. Exper Psychol*, 1923, *6*, 236–246 See also Kellog, W N, "The effect of emotional excitement upon muscular steadiness," *J. Exper. Psychol*, 1932, *15*, 142–166.

the last few years, however, the description of group behavior has entered into a new phase through the development of that type of psychology known as configurational psychology. As we shall see in a later chapter, configurational psychology is based upon the premise that the most significant things can be said about objects and events only when these objects and events are taken as natural wholes in their natural settings. The student will readily concede that it is one thing to study the human body by putting the dead cells of the body under the microscope and quite another to study the whole organism in actual operation in its total context. So, too, one may analyze a single person out of a whole group of persons and yet fail to make certain essential descriptions of the group as a group.

It still remains to be seen how far the description of whole patterns can be carried. At the present time, however, it has been possible to name some of the terms that should be used for this purpose We may, for example, think of a group of people as being more or less permeable after the analogy of a membrane. Let us say that after a dinner a small cluster of people have collected for the purpose of carrying on conversation which is of mutual interest to the party. It often happens that such a collection of persons will become so organized as to offer a certain amount of resistance to the intrusion of another member. To be sure, a newcomer may "crash the party," as the saying goes, but if the newcomer does not belong to the same socio-economic level as do those who are already present or if the topic of conversation is foreign to his own interests he may be physically a member of the group but psychologically an outsider,—that is, he will not actually have fused himself with the group.

Another characteristic of groups has already been suggested by the term "polarization." We may illustrate the phenomena of shifting polarization by supposing that, during a period of war, a crowd has collected outside the home or the office of a man whose sympathies are on the other side. To be sure, such a crowd will be polarized to an extent revealed by their congregation at this particular spot. If, however, during such congregation, news were to arrive announcing an unexpected shift in the fortunes of war favorable to the enemy, the entire crowd might polarize quickly and intensively toward this particular person. Were the crowd to lay hands on the person, the lines of polarization might be drawn inward toward the center of the crowd. If, perchance, the crowd becomes violent in its action,—that is, violent enough to result in a whipping, a stoning, or some other anti-social

act, the lines of polarization might become more much specific and be wholly directed outside the crowd itself.

The attempt of the configurationist in social psychology, then, is to try to describe a group of people as though it possessed some of the properties that are known to adhere to the concept of "fields" in physics or the concept of "organism" in biology. Up to the present time, descriptions of this type are apt to be full of loose analogies, but this fact need not diminish the theoretical and practical importance of making descriptions of configured units as units. Every whole must, of course, have properties which are distinctive of it as a whole. These properties are certainly worthy of distinction, especially in social psychology where there seems to be so much evidence of a difference between the behavior of a single person when he is alone as compared with his behavior when he is a member of the group. It must not be supposed, however, that the description of the properties of wholes can be taken as a complete substitute for a description of cooperating parts. In both of these cases, social psychology is able to escape from imaginative reflections about social minds.

GENERAL READINGS

Most of the general readings cited at the end of Chapter Seven may be consulted in connection with the problems discussed above See especially Murphy, G , and Murphy, L B , *Experimental Social Psychology*, N Y , Harper, 1931, Chaps VIII and IX.

CHAPTER TEN

LEADERSHIP

1. *Introduction.*—One of the most interesting events connected with the life of a group is the way in which one man will often rise in the attention and affection of the whole group by expressing for it in a vigorous way desires and hopes to which it might not otherwise have given expression. A person of this type is called a leader. He differs, then, from those persons who stand at the head of a group because they possess the power to do so. In our common language we say of a king that he is the leader in his dominions, but it usually happens that such a person has subordinates or subjects rather than followers. A true leader may also be distinguished from the mere agitator who draws upon the prejudices or fears of a group of persons in an emotional rather than in an intellectual way. In other words, the functions of a true leader are to be found wherever the conduct and support of the persons led is in no wise subject to coercion. A king may compel his subjects to action and an agitator may inflame them; but in neither case does that unique kind of social relationship arise which is found between a leader and his followers.

There is, perhaps, still another type of distinction that may be drawn. There are times when a group of persons, having come to some common judgment, will desire to have their judgment well expressed, either to the rulers or to the whole populace. For this purpose, they may elect or appoint a single person who will act, as it were, as the spokesman for the group. From one point of view, this man will be the leader of the group, but he does not approach the full stature of the kind of person we mean to describe in this chapter unless he has, in his own initiative, his manner of expression, his personal character, and in other traits, that level of excellence which will enable him to speak for the group even better than it could speak for itself. A true leader, then, is more than a representative or a spokesman. He is a man who puts the unexpressed hopes of a group of persons into compelling terms. The leader is a person who senses the community of opinion of large numbers of persons and who can clothe these opinions with the creative energy of his own rich personal quality. It may be

that the opinions or judgments of the members of a group are incoherent and poorly organized. They may be unrelated to some of the great values of social and individual living. The true leader has the knack of making obscure thoughts audible. He is often a person who has been deeply impressed by the more notable values of living and who puts these values into such a vigorous and convincing form that even the man on the street will suppose that his own lips have spoken.

2. *The Qualities of a Leader.*—It is natural that the sort of relation we have just described between one individual and a whole group has attracted the attention and interest of social psychology. There are two ways in which this interest has been manifested. On the one hand, the students of socialized conduct have sought to make an empirical survey of the personal qualities of the leader. That is, the social psychologist and the sociologist have gone to the biographies of certain types of great men or to an actual field study of contemporary leaders in order to find out how the dominant traits of such persons can be described. The experimental psychologist, on the other hand, has sought to make more direct studies of such persons, especially in their younger years, and in their spontaneous relations with groups of children of their own age.

Empirical studies of the leader all seem to agree that one of his first attributes is his exceptional physical appearance. It is said that he must be tall, of good strength, and of more than average personal appearance. This assertion is supported by the fact that most persons, through the ordinary experiences of childhood, are apt to be favorably conditioned toward persons of high physical prowess. In any case, there are statistical studies which seem to say that tall men are more often found in superior positions than are small men. The average height, for example, of 221,819 applicants for life insurance was 68.5 inches and their average weight was 166 pounds. Comparative data for 6,037 leading men or men in responsible positions was as follows: average height, 71.4 inches, and average weight, 181.1 pounds.[1] To stature, there may be added such traits as a ready tongue, an attractive and dynamic platform manner, and the like. Closely related with physical stature, there is the common concept of intellectual stature. There is some reason to believe that leaders must have more than an average intellectual rating and it is often said, too, that they

[1] Gowin, E. B., *The Executive and His Control of Men*, N. Y., Macmillan, 1915. A study of salesmen does not show that greater height parallels greater success. See Kitson, H. D., *The Psychology of Vocational Adjustment*, Philadelphia, Lippincott, 1925, pp. 92 ff.

must be as energetic in their psychological operations as they are in their bodies Some of the older social psychologies used to speak of the "focalization of psychic energy" as an example of this sort of stature.

It is natural, perhaps, that men who possess such physical and intellectual energies should also display considerable faith in themselves That is, they might easily be confident of their strength and ability and thus convey an impression of their own confidence to others It would not do to possess this sort of confidence in unseemly measure, for it looks as though the average person will not endure such traits save in those who possess standing through the exercise of power. Where there is the right sort of confidence and of assurance, there is very apt to be courage In any case, it is commonly agreed that the leader must be a courageous man, ready to speak of his judgments and decisions without fear or favor Where there is courage, there is also apt to be persistence. The leader will be moved to consistent actions by motives that are enduring

In addition to these traits, which are the ones most commonly described, there are a great many others listed less regularly. It is said, for example, that a leader must be sympathetic. That is, he must understand the opinions and ambitions of the persons around him He must have insight into their problems and look at the world as others look at it This will mean, perhaps, that he will have a keen sense of what is just or right. He will, in short, be a humanitarian, not in the sense of giving away his goods but in the sense of knowing what humanity is and how it feels. He must, of course, be honest. That is, he will be honest with himself and faithful to the group interests which he has aroused and will try to represent Still other terms that have been used to describe the leader run as follows, viz , he will be original, have soundness of judgment, be flexible in his intellectual operations, be foresighted, display some of the traits of a seer, and be able to organize and direct the activities of a large number of other persons Some of these terms refer indirectly to psychological traits and some of them refer to situations and attitudes which are made possible by the use of these traits. In any case, empirical observations of leaders in their social environments have succeeded in giving a picture of some of the traits that are commonly associated with such men.

It is one thing, however, to discover such relationships and quite another to suppose that any causal connection exists between them. That is, when we say that tall men are often found in superior posi-

tions we do not mean to argue that they have achieved their position because of their height. On the contrary, height must be taken as only one of a whole configuration of factors. It is this whole configuration which must be examined rather than any single feature of it. Moreover, it must not be supposed that any single part of the whole configuration is the cause of other parts, or is even significantly related to other parts. There is a common belief, for example, that certain types of psychological ability are intimately tied up with certain kinds of stature. This would mean that an experimenter could examine the stature of a man and then say something about his psychological talents, even to the extent of saying whether he would make a good leader. Since we shall make this question of the relation between physical traits and psychological traits the subject of another chapter (see Chapter Thirty-Six), nothing more need be said about it at this point.[2]

3. *Experimental Studies on Leadership.*—It is clear from the facts just described that the whole subject of leadership must be brought more nearly under experimental control before anyone can be very wise about it. A beginning in this direction has been made by asking groups of children and of adults to rate one another under conditions that might reveal spontaneous leadership. One of the first experiments of this type used the following situation. The subjects were divided into groups of four each. After pictures had been presented to each of the groups, the subjects were questioned about the objects in the pictures, some of the questions being pertinent and others being "catch" questions. The subjects were asked to answer as quickly as they could and they were told that the order of their answers would be noted. In a second series of observations, the subjects were reshuffled into groups of four, but in such a way that each group contained at least one of the subjects who had taken the initiative in the previous test. By taking account of the number of times a reply was given first, second, or third, and so on, by grading the originality of the reply, by noting how often some members of each group imitated others in giving answers, and by recording the number of times certain persons fell into the trap created by the catch questions, it was possible to get a liberal supply of data about those who actually played the rôle of a leader in the discussions.[3]

[2] See Paterson, D G, *Physique and Intellect*, N Y, Century, 1930.

[3] Terman, L M, "A preliminary study of the psychology and pedagogy of leadership," *Ped Sem*, 1904, *11*, 413–451

This was, of course, a fairly rough experiment, but it seemed to indicate that if a person took the initiative in one group he was apt to do so in another as well. Moreover, the results made it clear that the leader is more apt to be rated either first or last in such factors as dress, health, social status, quality of school work, boldness in behavior, fluency of speech, and the like. The non-leaders, on the contrary, were ranked about average in these respects. Moreover, it appeared that children who seemed to act as leaders in the experimental groups were chosen as ideals by their classmates about four and a half times more frequently than were the others. The teachers of these children mentioned the leaders about twice as often as they did the others.

Another experimenter asked each of five thousand children to name the persons he would like to have as a leader. It turned out that the votes were highly concentrated on two or three persons in each class and that ability and achievement were the traits most often required of juvenile leaders by their juvenile friends It has been shown, however, that children with extremely high intelligence quotients do not necessarily fit into this picture [4] Another study which followed this same procedure made use of the judgments of two thousand children. The subjects were asked to name the most capable leaders in their classes and to describe the traits which seemed to contribute to leadership. The traits most frequently mentioned were physical superiority, proper social attitudes, class spirit, intellectual superiority, dependability, ability to speak well, liveliness, and courage. In a closely related study by the same author, it was found that there might be distinct sex differences in the qualities thought most desirable. The girls seemed to have a preference for what was called democratic leadership, whereas the boys preferred a single dictator. The girls were more apt to express affection for the leader, whereas the boys laid emphasis upon obedience.[5]

There is some evidence to show that different types of leaders may have different kinds of traits.[6] Leadership in athletics, for example, does not depend upon scholastic achievement, whereas physical achievement is more necessary to a leader in athletics than to a leader

[4] Anon, *How Children Choose Friends*, Detroit Teachers College, 1929

[5] Leib, A, "Vorstellungen und Urteile von Schullern uber Fuhrer in der Schulklasse," *Zsch f angew Psychol*, 1928, *30*, 241–346 Broich, K., "Fuhreranforderungen in der Kindergruppe," *Zsch f angew Psychol*, 1929, *32*, 164–212

[6] Caldwell, O W, and Willman, B, "Characteristics of school leaders," *J. Educ. Res.*, 1926 *13* 1–13

in other activities. One of the traits still in question is that commonly known as extroversion. There is some evidence to show that leaders are more apt to be extroverts rather than introverts. In a certain sense, this fact runs contrary to the principles noted above, viz., that a leader in one group is very apt to be a leader in another. The evidence on this point is not clear. One of the studies made regarding it shows that students who engage in a large number of activities are apt to take them more seriously and more competently than do the persons who engage in a smaller number of activities

Further light is thrown on the nature of leadership by a study of the relation between achievement and temperament. The experimental group was made up of 125 students who ranked high in "points" in such extra-curricular activities as publications, dramatics, debating, politics, and student organizations. A control group was drawn at random from the university population and was equated with the experimental group in sex distribution, in the number of years spent in the university, in the curriculum followed, and in amount of continued residence. Each of the subjects was rated by himself and by two of his associates through the use of a scale which has been devised for just such purposes.[7] The results of this study show that excellence in college activities is clearly associated with social class. That is, more leaders come from the upper social classes than from unselected groups. Moreover, leaders are more apt to come from wealthy or near-wealthy families than is the case with unselected students. It was found that leaders in campus activities have a marked advantage over non-leaders in entrance examination scores and in college grades. Furthermore, it was clear that leaders in different types of activities differed from each other in scholarship, the debaters ranking first, and those engaged in dramatics, in publications, and in politics ranking lowest. It was not possible to compare the two groups in terms of introversion and extroversion because these temperamental differences varied so widely, depending upon the activity, that no general tendency could be found. There was some evidence, however, to show that differences in temperament were related to the nature of the activity. Campus editors, for example, could be described as bright, relatively unmotivated, unsocial, and self-confident. The debaters were more intellectualistic, while the campus politicians were mediocre in scholarship, strongly socialized, and in the case of women, lacking in self-assurance.

[7] Heidbreder, E. F., "Measuring introversion and extroversion," *J. Abnorm. and Soc. Psychol.*, 1926–27, *21*, 120–134.

A tendency toward extroversion was found to be more marked among leaders in women's organizations than elsewhere.[8]

4. *The Emergence of Leaders.*—The most difficult part of the study of leadership has to do with the various conditions which must be met before the leader can emerge from the crowd. The experimenter may take either of two points of view. On the one hand, it may be said that a leader will arise whenever an individual is born who has the right qualities mixed together in such proportion that he will inevitably stand head and shoulders above his fellows. On the other hand, it may be said that leaders are created through the compelling power of circumstance. That is, some persons believe that, given a great crisis in the life of a social group or given a progressively unendurable situation, a leader will be sure to arise. In brief, then, we may ask whether the emergence of a leader is to be explained by special processes of heredity or by unique combinations of environmental factors.[9]

Outside of the more general question of the relation between hereditary and environmental factors,—a question which is to be studied in more detail in a later chapter,—not much can be said about this problem. It is one thing, of course, to say that leadership depends upon the possession of distinctive qualities which would lead to social superiority and quite another to say that heredity must account for those personal and social traits which will make a man fit into the right situation at the right time. In one study of the origin and development of business leaders, that is, men who are sufficiently important to be mentioned in Poor's *Register of Directors*, it was found that the children of men who are already in business were more apt to become outstanding leaders than were the children of laborers or farmers. It seemed to be clear that special privilege was not a factor of much importance in the 7,000 cases studied In general, it was concluded that the business leaders studied owed their superiority to native endowment rather than to favorable opportunities or training, but it was remarked, at the same time, that such factors as the atmosphere surrounding a child in the home of the business man had not been taken account of.[10]

[8] Sward, K., "Temperament and direction of achievement," *J Soc Psychol*, 1933, *4*, 406–429. Witty, P A, and Lehman, H. C, "Nervous instability and genius," *J Abnorm. and Soc Psychol*, 1929, *24*, 77–90, 480–497

[9] A large amount of material looking toward the solution of this problem has been collected by Terman and his associates See Terman, L M, *et al., Genetic Studies of Genius*, Stanford Univ Press, 1925 (3 vols)

[10] Sorokin, P. A, "Leaders of labor and radical movements in the United States and foreign countries," *Amer J Sociol*, 1927, *33*, 382–411 Hooker, E R, "Leaders in village communities," *Soc Forces*, 1928, *6*, 605–614 Chapin, F S, "Measuring the volume of social stimuli a study in social psychology," *Soc Forces*, 1926, *4*, 470–495.

It goes without saying that possible differences in stature or other physical traits which might favor the leader must be hereditary rather than acquired. Since, however, the phenomena of leadership depend upon so many factors aside from those which are obviously physical, and since these other factors are highly subject to training, it seems fair to say that the tendency to attribute leadership either to heredity or to environment is probably another example of the misuse of these causal agents. Everything that we know about human nature would suggest that leadership must be a resultant of both factors. There must be an acute issue before a social group and there must be some person who can fit into this issue. There are plenty of cases in history of men who have lived, so to speak, either ahead of or behind their times. Moreover, there have been social, political, and economic crises during which no person emerged who could point the way out of difficulty. It seems to be almost certain, then, that any attempt to gain a hearing and a following where there is no pressure from the group itself will fail. That is, even though an individual has been equipped by heredity and by training to fulfill all of the functions of a leader, he cannot become a leader unless the social situation is of such a character as to allow him to emerge from the common level.

This fact has been identified in some of the studies that have been made on the nature of genius. In one such study, for example, the author has pointed out that there must be a difference between the genius and the talented person. In view of the studies that have been made on intelligence, one may define talent in terms of a higher I Q., and in so far as the I Q. is dependent upon heredity, one might say that talent is an inborn trait. The appearance of a genius, however, depends, in part, upon suitable recognition by other persons. One could not, then, speak of "unrecognized genius," for this would mean a contradiction in terms.[11] In other words, it could not be said that anyone is a born genius. On the contrary, geniuses are created by the social group and they describe, on that account, a sociological rather than a biological fact. It would follow from this work that almost any person, no matter how poorly equipped he might be in intellectual qualities, could be elevated to the rank of a genius simply because all of the stars were, so to speak, on his side.

There is another side of this picture which lends itself even more

[11] Lange-Eichbaum, W, *The Problem of Genius*, N Y, Macmillan 1932, pp 68 ff and *passim* Peck, E M, "A study of the personalities of five eminent men," *J Abnorm and Soc Psychol*, 1931, *26*, 37–57.

readily to experimental examination. As we have seen in an earlier chapter, social forms of behavior develop at a very early age. At about the sixth month an infant begins actively to establish contacts with other infants. It will try to touch another of its companions, make cooing sounds, or interfere with its activities.[12] The infant is not able, however, to maintain contacts with more than one other person until it is approximately a year and a half old. At this time a third child may be brought into the group, but successful contact with two other children is not even possible in all cases at two years of age. In short, groups of two are preferred by children up to the third year.[13] In the light of what has already been said about the development of social contacts, it must be clear that that sort of relation described by the word "leadership" can easily be established in early infancy.[14] In pairs of children, for example, the stronger, the more mature, or the more active child will almost certainly take the lead. This means that some children get practice in those traits which constitute leadership, whereas other children receive equal practice in following someone else. Some of the studies which have been made upon leadership at this level show that the same factors are operative which will be operative at a larger stage, viz., initiative, organizing ability, and conformity with the major tendencies expressed by the group. We mean to draw the inference, then, that there are times when the arts of leadership will issue out of the first social contacts which children make and that the qualities of a leader are qualities which may actually develop under training.

5. *Propaganda.*—It usually happens that leaders arise in connection with social movements that are opposed to the prevailing movement. That is, men who are interested in maintaining the *status quo* do not take the type of relation to the group as is expressed in the word leadership. Another way to say this is that any social group is put upon a fairly stable level whenever its institutions become more or less fixed and whenever its educational processes are such as to favor the continuance of these institutions. As a matter of fact, education may come to be so intimately dependent upon those persons and processes which favor inertia in society as to forbid that it shall be used as an instrument for changing the social order.

[12] Buhler, C., "The social behavior of children," in *Handbook of Child Psychology* (ed. C. Murchison), Worcester, Mass., Clark Univ. Press, 1933, pp. 376 ff.

[13] Buhler, C., "Die ersten sozialen Verhaltungsweisen des Kindes," *Quellen und Stud. des Jugendkunde*, 1927, *5*, 1–102

[14] Barker, M., "A technique for studying the social-material activities of young children," *Child Develop. Monog.*, 1930 (No. 3)

This fact is to be modified, of course, in the case of war. During a time of great need, the whole educational process may be reorientated as it was in all countries during the great war.[15] Then, too, there are certain social movements which may be the outcome of a long period of cumulative education. The history of prohibition in this country is a case in point. These instances are the exception, however, rather than the rule. It follows that, if a leader is to coordinate the thinking of a large group and if he is to make his program effective, he must resort to some other means aside from established institutions and established educational processes. He must resort to what is called propaganda. That is, propaganda is an educational device by which public opinion is influenced so that institutions that are already established may be changed, added to, or abolished. In other words, we are using the word to refer to a general feature of social control rather than to the special problems sometimes raised by agitators.

It is important that the student of applied psychology know something about the agents and methods that may be used in the art of propaganda, for he is almost certain to be the victim of it at almost every point where society touches him. As a matter of fact, he is surrounded by so much of it that the wonder is that anyone is ever able to think clearly about social, political, economic, religious, and moral questions. There are, of course, more physical aids to the spreading of propaganda than has ever been the case before. A few years ago one might hope, on occasion, to speak to a few thousand persons and to reach a few multiples of these thousands through the newspapers and journals, but now one may reach millions by direct voice. Moreover, no social group has ever used the press so intensively as it is now used.

But it is not of these mechanical aids to the spreading of propaganda that we wish mostly to speak. Of more significance are the psychological agents and methods. These have been summarized by one student of social psychology as follows.[16] There is, first, the matter of sheer repetition. Almost any bit of information, be it true or false, can be

[15] Dodge, R., "Psychology of propaganda," *Relig Educ*, 1920, *15*, 241–252. Strong, E. K., "The control of propaganda as a psychological problem," *Scient Mo*, 1922, *14*, 234–252. Bernays, E. L., *Crystallizing Public Opinion*, N. Y., Boni and Liveright, 1923. Ellwood, C. A., "The formation of public opinion," *Relig Educ*, 1920, *15*, 73–80. Larrabee, H. A., "The formation of public opinion through motion pictures," *Relig Educ*, 1920, *15*, 144–154. Lasswell, H. D., *Propaganda Technique in the World War*, N. Y., Knopf, 1927. Wuford, R. J. R. G., "Propaganda evil and good," *Nineteenth Cent*, 1923, *93*, 514–524.

[16] Dunlap, K., *Civilized Life*, Baltimore, Williams and Wilkins, 1934, Chap. XI. See also Lumley, F. E., "The essential aspects of propaganda," *Sociol and Soc Res*, 1932, *16*, 517–520.

made a part of the habit equipment of millions of people if it is printed enough, spoken enough, or acted out enough. There is scarcely a child who does not recognize well-worn advertising slogans or who is not able to trip lightly off the tongue some of the commonplaces about the present social and economic order.

In the second place, it is well recognized by most censors of the news that propaganda which appeals to sound argument is not apt to be effective This is true, in part, because the total number of people who are able to accept and handle an argument is not very great Successful propaganda usually requires that one shall not admit the other side to any question save to jest about it or to hold it up to ridicule. The one side should be presented so as to avoid reflection and to avoid the stirring up of any associations save those that are favorable to the case being presented

In the third place, it is helpful to bind the ideas in which one believes to the fundamental desires or to preexisting prejudices of the auditors. Most persons will listen to and believe that which they want to believe. In political campaigns, for example, it has been very easy to spread rumor and gossip about the private lives of outstanding men because a great many persons are willing to believe almost anything they hear regarding their political and economic foes. Somewhat the same thing holds true of advertising campaigns. As a rule, these campaigns are centered upon some human want or need and if the object to be sold does not have any such affiliations that are natural, an adroit reference to such a need or desire will do just as well

In general, then, propaganda implies a simple and direct approach to the fundamental desires of the group. If the approach can be made with the use of some slogan which can be interpreted without difficulty but which does not suggest the need for further reflection, so much the better. In all essential respects, propaganda is a form of education which is made intensive and simple enough to command the immediate attention and action of a group. If we have seemed, in this account, to imply that propaganda is not a very worthy type of social control, we have done so only because the best means of protection against vicious propaganda is knowledge of the methods that may be used. This fact has been borne out by one of the experiments cited above There are, to be sure, times when the methods of quick education are used for good purposes. In view of the tremendous progress that may be made even in a span of ten years in any one of the sciences, and in view of the fact that the adults of one generation may not keep abreast of such

progress, it is necessary that adults be kept informed One may use the principles of propaganda, therefore, in behalf of hygiene and medicine, but the excellence of the cause does not change the character of the methods used So, too, leaders of the type that have been described at the beginning of the chapter may stand for the most worthy changes in the social, economic, political, and moral customs of the group. The methods used, however, do not depart far from the kinds which have been described.

6. *Measures of Changed Attitude.*—The success which a leader actually achieves in making himself effective is one way in which the effects of propaganda may be measured. There are, however, a great many different types of quick education aside from that which is the peculiar function of the leader, and it is worth while to know, in these cases, just how effective a publicity campaign has been. Some of the influences that may be exerted have already been discussed in connection with the moving picture film The situation is so important, however, that we should devote further attention to it.

As everyone knows, there are certain precautions which may be taken in order to avoid illnesses, say, such an illness as tuberculosis. Let us suppose that a health agency or an insurance company wishes to make some of the facts about the prevention of tuberculosis a matter of special publicity One cannot, of course, study the entire population of the country, but one may easily take one or two counties, as has been done in the case we are now reporting. The investigator first assembled as much information as he could about the residents of two counties [17] This information had to do with changes in population, the percentage of the population living under urban rather than rural conditions, the per capita bank deposits as of a given year (1926), and similar data. The amount of anti-tuberculosis publicity in these two counties was measured by the number of seals sold, the frequency with which clinics were used, and similar items All kinds of agents were used in the publicity, such as the daily press, the moving picture, the school, special letters and circulars, tag days, exhibits of various kinds, including billboards, and so on. These various instruments of publicity were judged by physicians, organization workers, and other interested persons in terms of their adequacy, the degrees running all the way from "wholly inadequate" to "wholly adequate."

A considerable number of persons in each of the counties were then

[17] Carr, L J, "The measurement of efficiency of tuberculosis publicity," *Trans 24th Meeting of Nat Tuberculosis Assoc*, 1929, pp 385–400.

asked questions about tuberculosis, its lethal character, its symptoms, methods of avoiding its inception, and the like. When the results were compared with the data that had been gained previously and properly weighted for the variabilities in the two counties, it appeared that there was a wide difference in the results. Moreover, it was clear that different parts of the publicity material were differently effective. In general, the results seemed to show that publicity was more effective in direct proportion to the degree of organization behind it.

This same method can be used in a semi-experimental situation. Suppose, for example, that the reader were to get the opinions of all of his friends about a given situation and then to give to these persons some pamphlets containing the most vigorous propaganda he could find regarding the general situation under discussion. After this preparation, it might be possible to gain another expression of opinion in order to see what the effect of the propaganda has been.

This is just the method that was used in an elaborate study of this problem. A large number of subjects (350) were asked to give their opinions about the relations between the United States, on the one hand, and Japan, China, and the Philippine Islands, on the other. The subjects were then asked to study a series of pamphlets explaining the nature of propaganda and methods followed in making it effective. This material was studied for approximately three weeks, whereupon the subjects submitted to another attitudes test. Two weeks later, the same subjects were given another set of propaganda materials, a set which related to the various contacts which the United States had with the European nations. The subjects studied all of these materials in smaller groups and for every group involved in the experiment there was a control group which, while studying the same general topic, did not study the propaganda material.

In order to evaluate the effects of this procedure, it was necessary to find some way to measure susceptibility to propaganda. A measure was gained by asking twenty-four competent judges to offer their opinion on debatable issues. These judges differed from one another, of course, in their own opinions, but it was possible for them easily to recognize opinions which were largely emotional in character. By using this measure of susceptibility, it was found that the students in the experimental group were much less susceptible to propaganda after they had become acquainted with propaganda methods than were the subjects in the control groups who had not had this instruction.

Another semi-experimental approach to some of the problems of

propaganda may be stated as follows. It can be asked, for example, whether the order in which arguments are presented to a person will have any effect upon their general value to him. The experimenter in this case drew up a set of arguments for and against three propositions, one of which ran as follows: "Should all men have equal political rights?" These arguments were presented to six groups of students (twenty in each group). The affirmative arguments were presented to three of the groups before the negative arguments. In the case of the other three groups the order of presentation was just reversed. Each of the subjects was then asked to rate each of the arguments on a scale running from minus ten to plus ten. These ratings were made on the three propositions before reading the arguments, after one reading of the arguments, and after two readings. The whole experiment showed rather clearly that the arguments which had been read first exercised a great deal more influence on the subjects than those which were read later.[18]

The reader will rightly infer that only a beginning has been made in the study of such social phenomena as these. It is equally clear, however, that all of the opinions and judgments held by any group of persons must be a product either of their education or of the special publicity to which they have been subjected. As we have seen, the experimental study of attitudes is one of the most promising features of contemporary social psychology. These attitudes do not grow up spontaneously. They are precipitates out of the educative material which is constantly thrown around every growing person. In war time, when there is great need for haste in the art of education, in business where there is profit to be gained from education, and in leadership where the success or failure of a movement may depend upon effective publicity, a study of the nature of propaganda cannot help but come to some good use.

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[18] Lund, F H, "The psychology of belief," *J Abnorm and Soc Psychol*, 1925, *20*, 63–81, 174–196

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CHAPTER ELEVEN

INVENTION AND IMITATION

1. *Introduction* —A study of the traits of a leader and of his place in the social group takes us naturally to a study of the very perplexing problems of invention and discovery. In order to see how great these problems are we may let our imaginations build for us a world which has been stripped of all of the products of the inventive genius. That part of nature which we commonly call unspoiled would remain, but there would be no intentional control of fire, of seeds, of wheels, and of other mechanical tools. There would be no languages, no religions, no institutions, no social or political organizations, and no literature, art, or music That part of our present-day culture which we call technical would be no more. Methods of procedure for the discovery of facts in medicine, in education, and in all other human affairs would have to be left out of the picture. Altogether, then, that part of the environment of a modern man which is called social or cultural would be laid aside and we should find ourselves lower than some of the animals, for even they have managed to make a few cultural modifications of their environments.

Now that our imaginations have taken away all of the products of invention and discovery, let us bring them back again, not quickly with a sweep of the hand, but just as slowly as they have been acquired by the race. Some of them are older than the history of man, for none of them could have been written about until language itself had been invented. It must have been a great day in the history of the human race when the first man saw that an axle could be run between the centers of two round objects, thus making the first approach to a cart. It must have been a great day, also, when the first women found that seedtime and harvest could be used for human good. The invention of pottery and the discovery of fire were other landmarks in the long story of what is sometimes called man's conquest of nature These, however, are tools. We have said nothing of such items as the experimental method and neither have we taken account of social inventions and discoveries like the family, the clan, the state, and the nation.

It is sometimes said, in connection with the cultural and the social environments, that some parts of them stand out as true inventions while others have been discoveries. This distinction is based upon the notion that the word invent means to "see into" whereas the word discover means to "come upon." Thus a man might discover a new river or a new country but he must invent a wheel or a language. There are, of course, a great many discoveries in the sense that men have come upon new aspects or features of the natural order, and in these cases it would be difficult to say that something had been invented unless an explorer took advantage of information already at hand in order to project the possible existence of some hitherto unseen object Without any knowledge of geology but only with a desire to find riches, a prospector might stumble upon or discover a vein of gold. The prospector could not be called an inventor. Another man, however, with proper knowledge of geology and with topographic maps of a given region could infer that, if gold were present at all, it should be found in a given locality. This man could be called a discoverer, but he is also an inventor.

We mean to say, then, that the words invention and discovery imply a certain kind of psychological operation. The inventor is a problem-solver. So, too, is the discoverer if he has used his problem-solving functions. It would be a mistake, however, to suppose that the inventor is simply one who dawdles with accessories. On the contrary, it is convenient to think of inventions as falling into three types. We may place, in the first group, the sort of thing we have just mentioned, viz., technical improvements on tools and instruments. We should also place here the major intellectual tools and instruments; but most of the generative ideas out of which such things come were discovered long ago. We say that the steam engine is a modern invention; but the significant properties of steam have been known for a long time. In a second group, we may place the invention of methods. We may do this, partly, in order to emphasize the fact that ways of doing things have been just as important in the development of society as has been the discovery of things. The third group of inventions may be called social inventions. The development of language, of penal methods, of economic systems, and of types of government falls in this class. There are two things about these three classes of inventions that will gain most of our attention. The first concerns the psychological methods of the inventor. We shall wish to know what kind of a person he is and how he goes about

it to solve his problems. The second concerns the social factor in invention. This social factor manifests itself not only in the way it has made inventions possible but in the way in which inventions now react upon the actions of the group.

2. *Invention and Imitation.*—It takes only a casual glance at any social group to show that very few of its members are inventing anything. They use the language of their fathers and follow all of the customs of the tribe. New modes of expression are rare and it is not often that any individual ever undertakes to make any inventions with respect to his own personal character. What, then, in contrast to the inventor, are these persons doing? Social psychology gives two answers to this question. On the one hand, it is said that most persons have acquired a fairly complete set of habit patterns and that these are sufficient to carry them through most of the situations which make up a normal day. Where habits fail, there is a possibility of responding to a situation either by an appeal to problem-solving functions or by an appeal to emotionalized types of action. It looks as though most persons depend pretty heavily upon emotional reactions when their habit systems fail. The reader must understand, of course, that the word "habit" is being used here to cover not only overt or manual means of expression but judgments, opinions, attitudes, feelings, and sentiments, as well.

On the other hand, social psychology has argued that the non-inventor is moved largely to action by the process of imitation. Students of social behavior have turned, therefore, to the study of imitation much more intensively than they have to the study of learning. They have not, however, used the methods of experimental psychology in doing this. On the contrary, social psychology has taken the empirical method of observation. It has brought together a vast amount of material, some of which lends itself to systematic expression in the form of what are known as the laws of imitation.[1] In general, it has been held that imitation is a particular case of the universal law of repetition. The laws were of two types, viz., the logical laws based upon reason and deliberation and the extra-logical laws based upon feelings and emotions and upon the desire for prestige. It was imitation, then, which accounted for the spread of customs, fashions, education, new inventions, and other types of social pattern. Even invention was described as a type of imitation wherein conflicts between imitated acts or new combinations of them gave rise to new social patterns.

[1] Tarde, G., *Les lois de l'imitation*, Paris, F. Alcan, 1900 (3rd ed.)

Step by step, the processes of imitation have been brought into the laboratory and even though they still remain more or less obscure, certain facts are now available in the place of older types of opinion and empirical observation. In the first place, it now seems fairly clear that imitation is not an instinct. There are, to be sure, types of imitative behavior among the lower animals which seem to admit of this mode of explanation. As an example, we may take the simultaneous chirping of katydids. Under normal conditions, these chirpings take place in exact unison, as though some instinctive sense had made a well-organized orchestra out of many individuals. When the "auditory pegs" on the front legs of katydids are removed, however, all unison in performance disappears. It looks, then, as though imitation of this sort were dependent upon the fact that these animals not only hear their neighbors but themselves as well.[2]

In the second place, it seems fairly clear that some instances of imitation can be explained by that type of learning called conditioning. In the case cited above, let us suppose that chirping is the result of a definite organic condition in the animal itself. This condition will act as a stimulus. Since the katydid hears itself chirp, any chirping on its own part will quickly become a substitute stimulus for the original organic condition. But the katydid also hears the sounds from other katydids. This outside stimulus can easily become effective as a further substitute for its own chirping and for its own organic condition.

Imitation of this kind is more or less common with children. As we know, there are a great many reasons why children should include verbal reactions among their other types of action. A spoken word or syllable quickly becomes a substitute stimulus because the child hears its own words. To speak once, then, is to continue speaking. Since parents and other children may be using these same words, imitation will be carried one step further without making it necessary to bring in a new concept. Thus it happens that children will answer questions by repeating the last word or syllable of the question.[3] In abnormal cases such as echolalia, the patient will repeat over and over again some word or some nonsense syllable through no other mechanism than this. If, now, these same facts be applied to other kinds of action than verbal action, imitation will take place with

[2] Fulton, B. B., "Sound perception by insects," *Scient. Mo.*, 1928, *27*, 552–556. See also Murphy, G., and Murphy, L. B., *Experimental Social Psychology*, N. Y., Harper, 1931, pp. 174 ff.

[3] Cf. Allport, F. H., *Social Psychology*, Boston, Houghton Mifflin, 1924, pp. 183–186. Humphrey, G., "Imitation and the conditioned reflex," *Ped. Sem.*, 1921, *28*, 1–21.

respect to the movements of others, their postures, and other phases of behavior In one study, for example, a group of subjects was asked to write some phrases from models which were furnished them One of the models was typewritten while the others were written with different degrees of slant and shapes of letter. Even though the subjects were instructed to write as they naturally would under other circumstances, that is, give true samples of their own handwriting, it was clear that all of them had adapted their own style to the style presented in the models [4]

There is, then, a great deal of imitation which can be explained on the basis of conditioning From one point of view this type of imitation can be called unconscious or unintentional, but there is no evidence to show that it is instinctive A second type of imitation is obviously related to trial and error learning If, for example, a beginner asks for instructions concerning the right stroke in driving a golf ball, the professional will give him a sample performance The learner then begins to imitate this performance He does so, however, by making use of types of skill which have already been learned. As the process continues, those movements which are not desirable drop out of the whole performance whereas the correct movements are saved At the end of the learning process, the one person may say that he has imitated or copied the performance of the other. The situation cannot be greatly different when skills are used that have already been developed to a high level It is this sort of imitation which appears to play so great a part in the spread of custom, fashion, fad, and morals.

We mean to say, then, that the words custom, fashion, fad, and imitation do not describe special psychical or social forces which operate independently of the modes of psychological function that are present in any normal person. It is only a manner of speaking which makes us believe that we do not wear our hats at a dinner table or go without certain types of clothing because of the *power* of custom. From the moment a child is born until it attains adulthood, it is surrounded with all kinds of learning situations furnished to it by its elders and by its playmates. These learning situations may vary all the way from methods of handling one's utensils at a dinner table to one's beliefs and attitudes about money, politics, religion, or morals. If, then, a mature person feels inclined to adjust his clothing or his religious beliefs in conformity to those of the group to which he belongs, he does so because he has grown up in that particular way. It

[4] Starch, D., "Unconscious imitation in handwriting," *Psychol Rev*, 1911, 18, 223–228.

may be true, of course, that the type of learning which we call imitative learning has served mightily to make every person's particular pattern of behavior resemble the pattern which is characteristic of other persons in his own immediate environment, but the description of learning, even though it may be of the imitative sort, is not equivalent to a description of special social forces.

3. *The Individual Factor in Invention.*—Escape from fixed habits, whether they be of a distinctively personal character or of that social type described by the words custom, tradition, and fashion, is to be found in only two places, viz., in the use of the problem-solving functions and in the occasional appearance of a genius. Since it will be more convenient to say something about the nature of problem-solving in another place (see page 232), we shall limit ourselves here to the genius, his origins and his performances.

There are two fundamentally different ways of thinking about the genius and his performances. On the one hand, it will be said that the psychological processes of a genius differ in kind from those of ordinary persons On the other hand, it has been argued that the genius simply possesses a greater quantity of the same types of mental function which are possessed in a lesser degree by all persons Among the theories which look in the first direction we may dismiss quickly the classical conception that a man can be accompanied by a "demon" which possesses a divine power for inspiring creative work on the part of its companion. In more modern times, this older conception has been revived in the form suggested by the words "mystical insights" and "unconscious intuition." During trance states, for example, certain persons are known to see visions and sense meanings for which they have no adequate descriptive terms. The inference is that the genius, during his mystical moments, must be inspired by some force or power that lies beyond himself.[5] Powers of this same kind are often attributed to the unconscious. Everyone who has made a study of problem-solving remarks the strange fact that a great many of the most influential ideas have come to the problem-solver rather quickly and without the existence of any describable antecedents. It is inferred, therefore, that the subconscious mind must have creative powers which do not reside in the normal mind.[6]

During the nineteenth century the doctrine that genius must be

[5] See, for example, Austin, M., *Every Man's Genius*, Indianapolis, Bobbs-Merrill, 1925. Hinkle, B M., *Recreating the Individual*, N Y., Harcourt Brace, 1923

[6] Montmasson, J M., *Invention and the Unconscious*, N Y., Harcourt Brace, 1932 (trans. by H S Hatfield).

closely related to insanity became very popular.[7] Naturally, this doctrine and some of the older doctrines as well have been studied with due care by the experimenter. The general conclusion to be drawn from these studies is that men of genius are no more apt to be insane or to be subject to pathological disturbances than are normal men.[8] There is, however, some evidence to show that, while geniuses, taken as a group, are no more prone than others to nervous disorders, nevertheless artists and writers may be less stable than scientists and statesmen.[9] In view of the persistent belief against these experimental studies, it will be fruitful to name some of the circumstances that could support popular opinion. One would hardly need to argue that the genius has to endure more publicity than the normal person. This factor, in and of itself, may be sufficient to lead to the creation of legends about great men.* Then, too, any deviations in personality traits found among geniuses would almost be sure to be exaggerated.

None of these factors is so important, perhaps, as the attempt to relate the achievements of the genius to unsatisfied urges, compensation for frustration, and other types of substitution for unfulfilled emotional attachments. As we shall see in Chapter Twenty-One, some persons hold that the primary tissue needs of the body are the sources of tremendously powerful motives. Normal processes of education succeed in draining off the energies behind the primary tissue needs into adequate but unspectacular forms of behavior. It may happen, however, that education will be faulty. Since the forces which are alleged to reside in the fundamental tissue needs of the body cannot be repressed, they will express themselves, so it is argued, in such substitutional objects as a great painting, a great piece of literature, or a great tone poem. In other words, then, this theory would have it that the psychological operations of the genius differ from the psychological operations of the normal person not so much in their form and character as in the intensity of the motivating factors behind them.[10] We shall return to this theory of the nature of genius in later

[7] Lombroso, C., *The Man of Genius*, London, W. Scott, 1895. See also Grasset, J., *The Semi-Insane and the Semi-Responsible*, N. Y., Funk and Wagnalls, 1907. Nisbet, J. F., *The Insanity of Genius*, London, Kegan Paul, 1891.

[8] Ellis, H., *A Study of British Genius*, London, Hurst and Blackett, 1904. White, R. K., "Note on the psychopathology of genius," *J. Soc. Psychol.*, 1930, *1*, 311–315.

[9] White, R. K., *op. cit.*, *passim*.

[10] Adler, A., *The Neurotic Constitution*, N. Y., Moffat Yard, 1917. Dooley, L., "Psychoanalytic studies of genius," *Amer. J. Psychol.*, 1916, *27*, 303–417. Kempf, E. J., "Charles Darwin—the affective sources of his inspiration and anxiety neurosis," *Psychoanal. Rev.*, 1918, *5*, 151–192. Mordell, A., *The Erotic Motive in Literature*, N. Y., Boni and Liveright, 1919.

chapters, and especially in our study of the motivating factors behind artistic effort

As a result of the many studies that have now been made on the talents of gifted children, it is becoming increasingly popular to say that the genius is nothing more than a person who stands in the upper reaches of a normal probability curve The reader already knows that, whenever a large number of subjects have taken an intelligence test, the scores for these subjects will tend to cluster around a median value For the sake of convenience, the number 100 has been chosen to represent this median value The genius, then, may be the person whose intelligence quotient stands at 140 or above. There are, however, some types of personality trait which are not and cannot be measured by means of an intelligence test It is only rarely that such traits as originality, persistence of motives, and good judgment can be made statistically reliable parts of a test It follows that, before high I Q 's can be descriptive of true genius, the experimenter must follow gifted children into later life in order to see whether or not they actually live up to the prophesies that are easily made about them when the tests are administered

4 *The Social Factor in Invention* —Life histories, such as have just been suggested, are now available in a very few cases These life histories indicate that a larger percentage of children with high intelligence quotients are apt to do better in later life than are those children who have displayed low intelligence quotients. It is quite clear, however, that not all gifted children will, on that account, become eminent members of society. It is fair to ask, therefore, what happens to them. One of the most obvious answers is that the development of true genius is as much a product of social factors as it is of individual factors We mean to say that talented men may fail to achieve distinction for the same reasons that leaders may fail to arrive at the proper time.

It has long been recognized that inventions and discoveries are cumulative rather than saltatory. As an example we may take the modern motor car. There is more truth than jest in the common saying that the first automobile was a horseless carriage. The internal combustion engine was, to be sure, a true invention, but before materials and concepts could be brought together in that particular form which led to the internal combustion engine, other inventions and discoveries had to be made. Once the engine was placed on the carriage, the attention of inventors could be turned to those gradual

modifications of a wagon which would make it possible to engineer the body of an automobile to its motor. This has been a long and gradual process Every inventor has made use of the work of his predecessors.

Even when we recognize this feature of invention, however, we must remember that some notable achievements may remain for a long time unheralded and unsung. The early history of the airplane is a case in point. The men who risked their lives with artificial wings were looked upon as freaks and some of them were actually declared to be beside themselves with impractical ideas. It is clear, then, that the origin and development of inventions require not only the additive feature of cultural development but the creative activity of the group itself This creative activity may mean no more than recognition where it is due As a great dramatist has put it, some men have greatness thrust upon them [11] We may even go further than this. A good case can be made out for the proposition that greatness is almost always contingent upon the social pattern into which a person is thrust.

These several considerations hold true, in particular, of those inventions which can be called truly social in character. All of the great religious leaders,—or, to speak more truly, all of the great religious inventors,—have stood under deep obligation to slow accretions of spiritual history The success which men of this type may have achieved has been dependent, also, upon the degree of recognition which they have earned from their own communities. Where such recognition has not been gained, the religious inventor, like any other inventor in social matters, is set down as an opportunist or dubbed a radical. In other words, changes in the social mores are not subject to the same appraisals which are placed upon physical inventions. This fact holds true simply because the power of custom,—that is to say, the power of education,—has been exercised much more influentially with respect to social mores than it has with respect to the engineering sciences. A part of this inertia in the social mores is a product of religion itself. It has always been easy for mystics and theologians to assert that customs and fashions which have prevailed at some particular period merit, on that account, the sanction of divine power. The inventor in social matters, therefore, has had to face not only the natural inertia which accompanies socialized habits but the authority of religious sanctification as well.

[11] Consult Lange-Eichbaum, W, *The Problem of Genius*, London, Kegan Paul, 1931.

5. *Social Invention.*—It is sometimes said that the experimental laboratory and the general frame of mind of the man of science should be applied just as freely to social inventions as they are to physical inventions From the theoretical point of view, no one can successfully deny this proposition. The chances are that, if any social group felt itself as free to apply the results of laboratory investigations to its own organization and welfare as it is to apply scientific invention to the various gadgets on an automobile, immense and profitable changes could be brought about in the social order.

There are, however, certain facts which make experimentation in the social sciences much more hazardous than is the case with the physical and biological sciences. In the first place, where large numbers of persons are concerned, it is difficult to set up adequate experimental situations which are fortified by proper control groups. Moreover, social experimentation is almost inevitably a matter of long-time surveys. As we have seen in the last chapter, a great emergency may require that the opinions and prejudices of vast numbers of people shall be changed in a very short period of time. Sometimes these changes take on almost the proportions of a revolution. No one has ever seriously proposed, however, that the changes in opinion which must be brought about during times of war should become permanent. After all, the old saying that everything is fair in love and war gives a certain sanction to propaganda of the most violent type, for both the war and the maiden must be won Long-time views of group thought and action, however, may involve the lives of persons who are, as yet, unborn. In other words, it is difficult to predict the nature of the social organizations under which future generations will live. Since actions on the part of the present generation may promote or thwart reasonable action on the part of a future generation, the work of reformers and inventors in the social field and of geniuses in political or economic theory will always be viewed with suspicion.

It is not to be inferred from these considerations that the experimental frame of mind has no place in the social sciences On the contrary, there is every reason to believe that the social group which first undertakes seriously to examine its own life, including the factors which make for disintegration and the factors which make for cultural advancement, will be the group to survive. As we have remarked before, no one casts any aspersions on those investigators who examine the political, economic, and social organization of

ancient civilizations. The opinion is growing that the methods which are used by these students of dead cultures can be used just as effectively in the examination of a living culture. The persons who study this book will do well to remember that they will shortly be responsible either for the continuation of the present social order or for those progressive and intelligent changes in it which will make for better personal and group life. It would seem fair to say, then, that no student of the field of applied psychology can afford to neglect the psychological facts which may have a bearing upon the social order. He cannot afford, of course, to try out each of his inventions as though they marked a change in social practice which could become final or authoritative There will be plenty of opportunity, however, for him to exercise large measures of the scientific spirit without at the same time becoming an impractical dreamer.

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CHAPTER TWELVE

RACE DIFFERENCES

1. *Introduction*.—One of the great problems of a football coach is to take men who differ from one another in quickness and in coordination, in rate of learning and in alertness, and gear them together so that he will have a team of eleven members rather than a collection of eleven separate players. In the forward wall, for example, the most effective offense and defense is made possible only when the players are so placed that they can charge simultaneously against their opponents.[1] It often happens that, during a certain type of off-tackle drive, two men must block an opponent out of the way. If these men differ so greatly in reaction time that one of them hits the opponent before the other does, the opponent may easily stay in the game by reacting first to the one and then to the other. It has been shown that even very small differences in reaction time may make a great difference in the effectiveness of such blocking.

The same facts hold true in the backfield. If the ball-carrier is too fast for his interference or if the interference is too fast for the ball-carrier, the coach must place his men so that, at the critical point in the development of the play, the combined efforts of all of the men are made available. The ball-carrier, of course, must not be left to himself simply because he may be slower or faster than his teammates. So sensitive is a successful football team to very slight differences in speed or alertness that one slow man in a backfield may determine whether the same ball-carrier will have a good season or a bad season. It can be shown that many brilliant players are not superior to others in any single trait or in any combination of traits. On the contrary, such men sometimes achieve athletic distinction because they happen to fit into the pattern furnished by the rest of the men on the team.[2]

This problem of gearing one man to another or of creating an effective pattern out of a group of persons is sometimes said to mark

[1] Miles, W. R., "Studies of physical exertion," *Amer. Phys. Educ. Rev.*, 1928, *33*, pp. 9 ff. Also *Res. Quart.*, 1931, *2*, 5–13, 14–31.

[2] Unpublished material from the University of Illinois Laboratories for Research in Athletics.

one of the major problems of social psychology The very existence of any group implies that the members which make up that group can learn so to adapt themselves to one another as to make one another more rather than less effective Such groups may vary all the way from a small family to a large nation. It is often remarked that some of the major social problems before the United States have been created by the fact that the population of the Union is made up of so many national, economic, cultural, and political groups.[3] Unlike many other national groups, the United States is a collection of persons who have come from different habitats with different racial histories, with different cultural backgrounds, and with different economic and political beliefs. The problem, then, is to find out whether persons who differ in these ways from one another can be geared together into a successful team or whether legislation of various kinds must always be subject to the special interest of different groups.

The problem is even more pressing than this, for it is usually supposed that beliefs, prejudices, and attitudes are highly sensitive to educational processes It is conceivable, then, that all of the different peoples who make up our own national group can reasonably be expected to bring their beliefs and attitudes more into conformity with whatever may be described as our own national temper We may wonder, however, whether differences of the kind just named do not imply differences in the essential psychological traits of different groups. That is, do members of different races differ from one another in the same way that a group of football players may differ? Are some races quicker than others? Do some have a higher intelligence than others? Do some prefer emotional attitudes which are not preferred by others?

With the formulation of these questions we see that the psychological study of race differences stands out as one of the large problems of social psychology, for it touches everything that national groups may try to do. It touches them in their own internal problems and at every point where cooperation is sought between different national groups. If there are differences which are specific to races, the development of skill in handling problems which are international in scope would mean the adroit gearing of these race differences to one another so that a team with various members rather than a collection of individuals would be the result. On the contrary, if there are no such race differences, the entire problem of

[3] Sumner, W G, and Keller, A. G, *The Science of Society*, New Haven, Yale Univ. Press, 1927 (4 vols).

cultural, economic, and political development within a group and the entire problem of international cooperation might be reduced to nothing more than a problem of education.

2. *What Is a Race?*—An answer to the questions cited above depends, first of all, upon some statement as to how races may be distinguished from one another.[4] Several different considerations have been used in framing an answer for these questions. The most popular device, perhaps, is that which makes use of color differences. With respect to color differences we may say either that there are three different races or that there are five, the three being white, black, and yellow, and the five being white, black, yellow, brown, and red. This way of defining a race may work very well for drawing a distinction between the white and other races, but it would not follow that the darker colored races can properly be distinguished from one another in terms of that particular shade of pigmentation which they happen to have.

A second way of defining a race makes use of the word "habitat." This term implies that any group of people who have lived together for a long time in the same geographical area should be called a race. It would follow, of course, from this definition, that there are as many races as there are distinct habitats. Closely related to habitat is the matter of ancestry It is clear that if any considerable number of people have lived for a long time in a common habitat, the most recent members of the group will have in common with one another the same ancestry. Since some groups are more or less nomadic as, for example, the Hebrews, it must follow that neither habitat nor ancestry can say the last word in the definition of a race.

In recent times, a great amount of experimental work has been done on the question as to whether different races may be distinguished from one another by specific physical features other than color. Thousands of measurements have been made, for example, on the shape of the head, on such facial configurations as the eyes, the nose, cheek bones, and the like, and upon other anatomical facts This work seems to show that differences in anatomical makeup may go a very long way toward defining not only ancestry but the significance of habitat as well. It is fairly clear, for example, that some racial groups are characterized by a long head (dolichocephalic) whereas others may be characterized by a short or broad head (brachycephalic). These

[4] Smith, G E., *Human History*, N Y., Norton, 1929, Chap IV Rice, S A (ed.), *Methods in Social Science*, Chicago, Univ of Chicago Press, 1931, Chap XLII.

differences are expressed in what is called the "cephalic index." This index describes the ratio between the length and breadth of the skull.[5]

Another possibility for distinguishing races from one another lies in the history of the various languages. It is clear, of course, that if a group of persons have lived for a long time in a particular habitat and if the members of the group have a common ancestry, they will probably be distinguished from other groups by differences in language. There are, to be sure, several fundamentally different kinds of languages, but this mode of defining a racial group suffers because of the ready way in which dialects may be established in local communities even though these communities still belong to larger groups which hold in common some of the other features mentioned above.

It is easy to see that the problem of defining a racial group offers serious difficulties, but, for practical purposes, we may say that a race is any group of individuals which may be characterized in general by a specific color, by long habitat in some one place, by common ancestry, and by distinguishable physical features. This, however, is not our main concern. On the contrary, we wish to know whether, granted some reasonable distinction between the races, it is possible to find parallel distinctions in psychological functions? Does the black race, for example, exercise some psychological functions to better advantage than the white race can? Are there any races which exercise functions which are not present in other races? Given a demonstration of such differences, what use can be made of them in order to gear a large number of persons into a cooperative unit?

3. *Race Prejudices.*—Most persons, no matter what their race, have a quick and ready answer to the questions just asked and in particular to the question regarding fundamental psychological differences The members of the white race will often say at once that their race is superior to all other races not only in essential psychological functions but in the way in which these functions can be used.[6]

[5] Paterson, D G, *Physique and Intellect*, N Y, Century, 1932 See also Paterson, D G, *et al*, *The Measurement of Man*, Minneapolis, Univ. of Minnesota Press, 1932.

[6] Brown, H C, "Social psychology and the problem of a higher nationality," *Internat J. Ethics*, 1917, *28*, 19–30 Bogardus, E S, "Social distance and its origins," *J Appl Sociol*, 1925, *9*, 216–226 Bogardus, E S, "Measuring social distance," *J. Appl Sociol*, 1925, *9*, 299–308. Bogardus, E S, "Race friendliness and social distance," *J. Appl Sociol*, 1927, *11*, 272–287 Olivier, Lord, "Color prejudice," *Contemp. Rev*, 1923, *124*, 448–457. Poole, W C., and Poole, H K, "Laws of social distance," *J. Appl. Sociol*, 1927, *11*, 365–369. Thomas, W. I, "The psychology of race prejudice," *Amer. J. Sociol*, 1903, *9*, 593–611. Young, E F, "What is race prejudice?" *J. Appl Sociol*, 1925, *10*, 135–140. Some data on the way in which race prejudices get their origin among children is to be found in Lasker, B., *Race Attitudes in Children*, N. Y, Henry Holt, 1929. See also Cooley, C H, "Genius, fame, and the comparison of races," *Ann. Amer. Acad. Pol. and Soc. Sci*, 1897, *9*, 317–358.

Their evidence lies, of course, in the prejudice that the white races have actually produced better cultures than the other races have. It is illuminating to discover, however, that members of the other races will be just as confident in their belief that their own cultures are superior. No white race, for example, has had as long a cultural history as has the Chinese Certain inventions were made by the Chinese long before they were made by the whites. The Hindoos have an equal claim to race pride. Their advances have not been of the technical sort with which we are so familiar today but they do have a great many centuries of development in what may be called mystical modes of living.

It goes almost without saying that race judgments of this sort cannot throw very much light upon our problem. For one thing, it is not easy to describe the ingredients of cultural superiority If the white race wishes to lay emphasis upon technical advance, it certainly is superior to other racial groups, but if more attention is paid to ease and comfort in living, then a good case can be made out for the superiority of other groups

The chief ground for the white man's pride is found in his intellectual achievements. If one takes a large look at the history of communal living, however, it is possible seriously to question the long-time value of achievements of this sort The race has been perpetuated not by those persons who were intellectually superior but by those who were physically powerful. If Nature were asked to be the judge, she might assert that physical vigor stands out much more clearly as a mark of superiority than does any other human trait.

This whole problem is much confused by the plain fact that intermixtures between races often lead to a group which is superior in a good many respects to both of the parent races[7] The early Greeks were a mixture of this kind and some of the biologists are prepared to say that a further mixture of the black and white races in our own country might easily lead to the development of a strain which would be superior, in some respects at least, both to the pure white and to the pure Negro. It might be that this superiority would appear in physical stamina, in intellectual alertness, in emotional stability, in artistic expression, in religious and mystical insight, or in almost any other kind of achievement. Since we happen to be living in a climate of opinion where technical advances are thought more desirable, we naturally lay pride on the psychological operations which make these

[7] Morgan, T H, *The Physical Basis of Heredity*, N. Y, Norton, 1919.

technical advances possible, but, given a change in our climate of opinion, a parallel change might easily take place in what we conceive to be the criteria of superiority.

4. *Differences in Simple Functions.*—We shall now attempt to name some of the specific differences between the races which have been discovered by the use of experimental methods. As we do so, however, the reader must keep the fact constantly in mind that the question of racial differences is closely bound up with the question of methodology. In tests of some of the simpler psychological functions such as quickness of reaction, acuity of vision, and rate of learning, it is fairly easy to be impartial Experimental studies on all of the higher psychological functions, however, must depend sooner or later upon the use of language Intelligence tests, for example, have been used a great number of times in order to trace differences between the races, and it is commonly realized that most intelligence tests depend pretty largely upon the use of language [8]

In view of this fact, it becomes pertinent to ask whether a test made out in the English language and involving, as it does, concepts and symbols that are uniquely English could have any validity when applied to foreign-born children. It might be said that such a test can easily be translated into a foreign language, but translations of this sort do not evade an inherent difficulty in the use of intelligence tests, for words can easily have a different functional significance to persons of different racial origin even though objectively the words appear to be synonyms. Moreover there is the question of administration. If an American, for example, were to give a test to a group of Chinese or Japanese children, there lies behind the administration of this test a certain number of attitudes and prejudices which are already a product of supposed differences between the races

The question of getting representative samples is not the least of the difficulties that lie in the way of an adequate study of race differences. Let us suppose, for example, that intelligence quotients have been established for a group of children in an urban community of the United States What standards should be used in order to say that an urban community in Japan presents the same sort of cultural background as lies behind American-born children? Finally, there is the

[8] Wang, S L, "A demonstration of the language difficulties involved in comparing racial groups by means of verbal intelligence tests," *J Appl Psychol*, 1926, *10*, 102–106 It is not certain, however, that language difficulties are as serious as studies have made them appear Cf, for example, Goodenough, F L, "Racial differences in intelligence of school children," *J. Exper Psychol*, 1926, *9*, 388–397.

question of interpretation. No one is quite sure as to how intelligence tests administered even to American children should be interpreted. It is certain, of course, that scores among such children will vary widely from one another, but these variations cannot be taken from a quantitative point of view. It cannot be said, for example, that one child is twice as intelligent as another, even though his I Q is twice as high as another's. Distances along a scale of distribution appear to be quantitative distances, but the results of the psychological operations of such individuals cannot be compared in quantitative terms. Where these difficulties obtain with respect to interpretation of test results from a single racial group, it is clear that they must obtain to even a greater degree when comparisons are made between different racial groups.[9]

The first facts about human nature to achieve exact quantitative form were those described by the words "sensory acuity," "reaction time," and the like. It was natural, then, that the first studies on race differences should have emphasized these same functions A great many attempts have been made, therefore, to find out how the races differ from one another in acuteness of vision, acuteness of hearing, acuteness of touch, reaction time, and simple types of motor coordination. In contrast to casual observations made by travelers who have said that native guides in certain racial groups seem to have a remarkable superiority in perceptual function, it has been found that the races probably do not differ greatly in such functions. Where proper allowances are made for vision which is actually defective, it looks as though the visual perceptions of primitive peoples are much like the perceptions of more civilized groups.[10]

This conclusion is more important than appears at first sight, for it has been supposed for a long time that differences in discrimination or in simple motor functions would have a pronounced bearing upon the general question of differences in intellectual ability. Since the senses were said to furnish the material with which the intellect could work, it seemed to follow that the effectiveness of the intellect would be directly contingent upon the accuracy and amount of perceptual information available. Most of the early tests of intelligence, then, made much out of the study of sensory acuity. It is now almost certain that this is not the case and we may infer, therefore, that studies on

[9] Arlitt, A., "On the need for caution in establishing race norms," *J Appl. Psychol*, 1921, *5*, 179–183

[10] Woodworth, R S, "The comparative psychology of races," *Psychol Bull*, 1916, *13*, 388–397, "Racial differences in mental traits," *Science*, 1910, *31*, 171–186

racial differences at the simpler levels have no immediate bearing upon the more complex problem as to why some races have excelled others in cultural attainments.

5. *Differences in Intelligence.*—The more complex psychological functions have not been tested systematically save in a mass way by using what is commonly known as the intelligence test. The most ambitious study of racial differences in so far as they can be measured by an intelligence test came out of the use of such tests during the World War An intelligence test known as the Army Alpha was given to several hundred thousand men who belonged to a great many different racial groups. When these groups were distributed according to the number of persons in them who received low grades, intermediate grades, or high grades, it was found that different nations could be arranged in the following order of ability, viz., England, Holland, Denmark, Scotland, Germany, Sweden, Canada, Belgium, United States (white), Norway, Austria, Ireland, Turkey, Greece, Russia, Italy, and Poland. In more detail, only 8 7 per cent of the men of English descent made a grade of D or less, while almost 70 per cent of the Poles were found in these low grades. In general, the Scandinavian and English-speaking nationalities had relatively high scores, while the Slavic and Latin countries had low scores.[11]

There are, of course, a great many things to be said about these facts. In the first place, it is clear that the higher scores among English-speaking nationalities might possibly be attributed to the fact that the Army Alpha intelligence test was made out by members of these groups and pertained directly to concepts and situations characteristic of English-speaking persons. In view of the fact, however, that most of the persons tested were residents of the United States, this possibility must be discounted in direct proportion as these residents had become orientated with respect to English culture. When, for example, the foreign-born were grouped according to the number of years they had spent in the United States, their average intelligence score rose in direct proportion to the number of years of residence. In the case of the Negro, for example, 45 3 per cent of those who were tested in northern training camps received a grade of D, whereas 78.7 per cent of those registered in southern camps received this grade. There was some evidence to show that Negroes turned in poor performances

[11] Brigham, C C, *A Study of American Intelligence*, Princeton, Princeton Univ Press, 1923; Yerkes, R M (ed), "Psychological examining in the United States Army" *Mem Nat Acad Sci*, 1921, *15*, 547-875

in those phases of the test which depend upon a knowledge or a use of abstract terms. Moreover, the Negro appeared to be less accurate than the white. These differences might make it impossible for the Negro to do what is commonly called "abstract thinking" as well as the white.

One way of finding out whether the differences suggested by these results are native or acquired is said to lie in comparisons drawn between full-blooded Negroes, half-blooded Negroes, and full-blooded whites. When attention is paid to the distribution of scores according to the amount of white blood as indicated by skin color, it is clear that intelligence increases in direct proportion to an increase in white blood. Even in this case, however, it might be said that an increase in the amount of white blood would carry with it an increase in opportunities for intellectual development. This possibility is worthy of consideration when we recall that the best whites may not be very much superior to the best blacks and that there are not a great many Negroes who are lower in intelligence than the lowest whites [12]

Somewhat the same situation holds true in comparisons that may be drawn between the American Indian and the whites. In one study making use of the Otis intelligence tests, the median score for the Indian groups stood at 83 whereas the median score for the whites was 123. Mixtures show increasing median scores in direct proportion to the amount of white blood as indicated by skin color [13]

The evidence for differences between the oriental and the American are not so clear-cut [14] In one study on this problem it was shown that American college students excel Chinese students in tests of concentration, of attention, learning, speed, association time, immediate memory, deferred memory, and range of information. The Asiatic Indian excelled the Chinese in four of these tests, viz., association

[12] Graham, J. L., "A quantitative comparison of rational responses of negro and white college students," *J. Soc. Psychol.*, 1930, *1*, 97–121, 267–285. Peterson, J., and Lanier, L. H., "Studies in the comparative abilities of whites and negroes," *Ment. Meas. Monog.*, 1929 (No. 5). Mayo, M. J., "The mental capacity of the American negro," *Arch. Psychol.*, 1913 (No. 28). Morse, J., "A comparative study of white and colored children by the Binet tests," *J. Educ. Psychol.*, 1911, *2*, 366–367. Peterson, J., "The comparative abilities of white and negro children," *Comp. Psychol. Monog.*, 1925, *1* (No. 5). Schwegler, R. A., and Winn, E., "A comparative study of the intelligence of white and colored children," *J. Educ. Res.*, 1920, *2*, 848–848. Sunne, D., "Comparison of white and negro children in verbal and non-verbal tests," *School and Soc.*, 1923, *19*, 469–472.

[13] Garth, T. R., "The results of some tests on full and mixed blood Indians," *J. Appl. Psychol.*, 1921, *5*, 359–372. Garth, T. R., "A comparison of mental abilities of mixed and full blood Indians on a basis of education," *Psychol. Rev.*, 1922, *29*, 221–230.

[14] Walcott, G. D., "The intelligence of Chinese students," *School and Soc.*, 1920, *11*, 474–480. Darsie, M. L., "The mental capacity of American born Japanese children," *Comp. Psychol. Monog.*, 1926, *3* (No. 15), 1–89.

time, immediate memory, deferred memory, and range of information. The differences between the groups, however, was not significantly large. There is some evidence to show that the Japanese are superior to the Chinese and to the Portuguese in measures of persistence of effort and mental alertness In a study of the intelligence scores of American and Chinese children where the experimenter himself was Chinese, no significant differences were discovered [15]

A few studies have been made upon the educational achievements of various racial groups [16] In one case, for example, 150 Negro pupils in a public school system were compared with a like number of white subjects from the same general cultural level It was found that the Negro subjects usually began their careers some seven months later than whites, that they continued in high school longer, and that their achievement in different studies was slightly inferior Some attention has been paid to the number of Negro students who find their way into institutions of higher learning,—say, universities or graduate schools. In general, the relative number of such persons is pretty small

This very brief reference to a vast amount of experimental material gives a general picture of the nature of racial differences so far as intelligence test scores are concerned. It is very difficult, however, to place a proper interpretation upon the results. At the present time psychologists are inclined to say that the results are to be taken almost at their face value. That is, the opinion is usually held that the Negro, in particular, and other racial groups as well, differ from white groups in native intelligence. If we entertain this conclusion, we must do so subject to the arguments that will be made in Chapter Twenty-Five concerning the nature of intelligence and the arguments made in Chapter Thirty-Seven concerning the problems of original nature It goes almost without saying that the higher psychological functions are very sensitive to the stimulus value of the environment during the years of childhood. In general, it can be said that Negro children and even Indian children have been brought up in the same school systems with white children. It is true also that comparisons between parallel groups of such children give an advantage to the white children It is one thing, however, to say that school systems or even socio-economic conditions have been the same and quite another to say that identical objects or events have, therefore, had

[15] Yeung, K T, "The intelligence of Chinese children in San Francisco and vicinity," *J Appl Psychol*, 1921, 5, 207-274

[16] Cf Thorndike, E L, *Educational Psychology*, N Y, Columbia Univ Press, 1913, Vol III, pp 200-224

an identical functional value in promoting and guiding the growth of such children It seems fair to say, then, that the whole subject of racial differences must go through a vigorous experimental period before one can really be confident in one's conclusions. Even so, there is one fact that cannot be avoided. As matters now stand, there are distinct racial differences. It makes no difference whether we attribute these differences to innate factors or to training. In either case, society has to deal with such differences and as can be easily guessed, this fact raises no small problem, as we shall see in a moment.

o. *Differences in Emotion and Temperament*—In view of the high sensitivity of emotional action to training, studies on racial differences in emotion are even more confusing than studies on intelligence.[17] It is commonly pointed out, for example, that the emotions of the Negro race are less trained or less inhibited than is the case with white groups. This may be either an advantage or a disadvantage depending upon the way in which emotional action is used in any given situation. It is also said that the Negro is more apt to be temperamentally lazy than the average member of a white group. For a test of such traits as these, use has been made of the Downey-Will-Temperament Test. This is a test of speed of movement, ability to start work rapidly and to continue at high speed, flexibility, speed of decision, impetuosity and energy of reaction, degree of confidence in maintaining an opinion, tendency to overcome opposition, assurance in judgments, motor control and patience, interest in detail, and coordination of impulses. In general, it appears that the average white student is speedier in movement and slightly more proficient in warming up rapidly and continuing at high speed. Moreover, he is somewhat more flexible in meeting new situations but slower in arriving at decisions. The average white is less forceful when contradicted but firmer against opposition. His greater superiority appears in his ability to coordinate his impulses in meeting a conflicting or confusing situation.

One phase of temperamental differences has been studied by noting whether oriental subjects and white subjects differ from one another in their tendency to be discouraged at a learning task or to become confused by mistakes. A maze was used in this study, but the whole situation was arranged to test persistence of effort, resistance to suggestion, general alertness, and the ability to inhibit or control nervousness. In general, the Japanese subjects were superior in all of

[17] McFadden, J., and Dashiell, J. F., "Racial differences as measured by the Downey-Will-Temperament Test," *J. Appl. Psychol.*, 1923, 7, 30–52.

the traits measured, whereas Portuguese subjects made the poorest showing

Some light is thought to be thrown on emotional and temperamental differences by studies of relative suicide rates. In general, the suicide rates among Negroes are much smaller than among whites. This fact is taken to show that conflicts develop less easily among the former than among the latter. Similar studies on European stocks show that the suicide rates are very high among the Danish and the Scandinavian, very much smaller among the English and the Welsh. The lowest suicide rates are found among the Spanish and the Italian.

There are, of course a great many common-sense descriptions of emotional differences among Europeans. It is sometimes said, for example, that Nordic groups are naturally introverts, strong in curiosity, weak in gregariousness, whereas the Mediterranean groups are just the contrary. Altogether, then, the evidence concerning differences in emotional or temperamental traits is not very satisfactory.

GENERAL READINGS

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See also the general readings listed at the end of Chapter Twenty-Eight.

CHAPTER THIRTEEN

PSYCHOLOGY OF SEX DIFFERENCES

1. *Introduction*.—It is sometimes said that one of the most urgent problems in the study of racial differences rises out of the belief that, from a great many points of view, the male and the female are really two different species. The inference is that some of the anatomical and physiological differences between the sexes are an objective indication of equally fundamental psychological differences and that men and women must, therefore, expect to acquire not only different kinds of training but that they will arrive at excellence in different kinds of psychological function as well.

It has not been any easier to gain exact facts about sex differences in psychological function than it has been for true racial differences. For a long time, of course, it has been taken for granted that the female was distinctly inferior to the male in a great many different respects. As everyone knows, the position of women in human history has not been an enviable one.[1] Studies that have been made upon the number of eminent women as compared with the number of eminent men show clearly enough that, by any standards of eminence that can be laid down, the latter appear much more frequently than the former. In one such study, for example, only fifty-five eminent women were named among 975 cases.[2] In another study, 1,000 persons were named who were judged to stand high among the truly great. In this list there were only thirty-two women, of whom eleven owed their greatness to factors other than superior psychological quality.[3] Studies of this same sort, however, show that the percentage of eminent women has been increasing more or less rapidly during recent decades. Of a total of 868 eminent women, more than twelve per cent were living in 1913.[4] The inference is that the small number of eminent women

[1] Consult the monumental work of Briffault, R., *The Mothers*, N. Y., Macmillan, 1927 (3 vols.). See also Westermarck, E. A., *The History of Human Marriage*, N. Y., Macmillan, 1925. The first edition of this work was published in 1891.

[2] Ellis, H., *Man and Woman*, London, Scott, 1894 (also N. Y., Scribner's, 1914). This was one of the first of the modern studies to be made on this problem. It reviewed such experimental evidence as was then available. Also Castle, C. S., "A statistical study of eminent women," *Arch. Psychol.*, 1913 (No. 27).

[3] Cattell, J. McK., "A statistical study of eminent men," *Pop. Sci. Mo.*, 1903, *62*, 359-377.

[4] Castle, C. S., *op. cit.*, *passim*.

must be, in part at least, a product of adverse social conditions and, in part, a product of differential types of education, for after all, the cultural world in which we live has been manufactured by men for men rather than by women for women. This is to say that women have been forced to live in a world that is more or less alien to them. In any case, the social significance of this problem is so great that we are justified in reviewing such facts as are now known.

Differences between men and women, so far as the primary sex characteristics are concerned, need no description in this chapter save as we remark the distinctive rôle played by the sex hormones. In other details of form or structure, however, that is, among the secondary sex characteristics, much relevant data is to be found.[5] With respect to some of the bodily structures, a woman more nearly resembles a child than she does a man. This holds true, for example, of the relative sizes of the various parts of the brain and of the viscera and of the ratio of trunk length to limb length. In absolute size, the female brain (1,250 grams) is smaller than the male brain (1,400 grams) but as large or larger when the total size of the body is considered.[6] This fact becomes still more significant when we remember that a relatively greater part of a woman's weight comes from fatty tissue than is the case with men. It has not been shown, however, that there are innate sex differences in the number of convolutions, the number of nerve cells, or in other structures which are thought to be essential to excellence in psychological traits.[7]

There are other differences in anatomy, such as the width of the hips, the length of the thigh bone, proportionate size of the chest, the size of the larynx, and the shape and size of the fingers. Men are apt to be, on the average, some five inches taller than women and to weigh, on the average, about twenty-four pounds more than the female. These figures vary, of course, with age and with racial differences. As a rule, the thyroid gland is larger among women than among men, and diseases of this gland are more frequent in the one case than in the other. Much has been made of certain other physical differences, such as the greater physical strength of the male (although he has less endurance in some activities), the interference with normal physical

[5] Morgan, T H, *Heredity and Sex*, N Y, Macmillan, 1913 Geddes, P, and Thomson, J A, *The Evolution of Sex*, London, Scott (N Y, Scribner's), 1897, pp 322

[6] Mall, F P, "On several anatomical characters of the human brain, said to vary according to race and sex with especial reference to the weight of the frontal lobe," *Amer J Anat.*, 1909, *9*, 1–32

[7] Ellis, R. S, "Norms for some structural changes in the human cerebellum from birth to old age," *J Comp Neurol*, 1920, *32*, 1–34.

and mental functions which may come at the menstrual period,[8] the more rapid rate of maturation among girls than among boys, variations in rate of metabolism which emphasize increased vegetative functions among females,[9] and the greater variability in almost all functions of men over women.[10] With respect to stature, females are mature at about the age of twenty, whereas males do not mature until the age of twenty-three.[11]

It is not possible, of course, to say which of these anatomical and physiological differences has the most significance for differences in psychological function. It is commonly assumed, however, that the different biological functions of the male and the female must be more or less correlated with essential variations in behavior.[12] It goes almost without saying, of course, that the processes of education have served, in general, to increase rather than to diminish such psychological differences In any case, the problems raised here are problems that can be settled only by the experimental laboratory.

2 *Differences in Simple Functions* —In most of the tests that have been made on motor skills at very early ages, boys have been somewhat superior in the initial test but girls have been shown to profit more from practice.[13] It seems clear, however, that motor ability is a very specific trait and highly subject to training. This fact may obscure somewhat the significance of sex differences in these performances. In one case, for example, it appeared that sex differences in mechanical ability were traceable to differential amounts of prac-

[8] There is, however, no experimental evidence that the menstrual period actually lowers efficiency among normal women See Hollingworth, K S, "Functional periodicity," *Teacher's College Columbia Univ Contrib to Educ*, 1914 (No 69)

[9] Benedict F G, and Emmes, L E, "Physiology a comparison of the basal metabolism of the normal man and woman," *Proc Nat Acad Sci*, 1915, *1*, 104–105

[10] Hollingworth, L S, "Variability as related to sex differences in achievement," *Amer J Soc*, 1914 *19*, 510–530 Hollingworth, L S, and Montague, H, "The comparative variability of the sexes at birth," *Amer J Soc*, 1914, *20*, 335–370 Goodenough, F L, "The consistency of sex differences in mental traits at various ages," *Psychol Rev*, 1927, *34*, 440–462

[11] For curves of growth see Baldwin, B T, and Stecher, L I, *The Psychology of the Preschool Child*, N Y, Appleton, 1924 Also Baldwin, B T, *et al*, *Iowa Studies in Child Welfare*, Univ of Iowa, 1921, Vol I Goodenough, F L, "The measurement of mental growth," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ. Press, 1933, Chap VII

[12] As a matter of fact, these differences have been elevated to a major problem in the psychology of sex by Freud, S, *New Introductory Lectures on Psychoanalysis*, N Y, Norton, 1933, Chap VI

[13] Goodenough, F L, and Brian, C L, "Certain factors underlying the acquisition of motor skill by pre-school children," *J Exper Psychol*, 1929, *12*, 127–155 Also McGinnis, E., "The acquisition and interference of motor habits in young children," *J Genet Psychol. Monog*, 1929, *6*, 203–229.

tice rather than to innate differences.[14] In general, boys are superior to girls in motor ability tests.[15] In tests of tapping and in tracing board tests the superiority of one sex over the other seems to depend upon the selection of subjects and upon the techniques used rather than upon any innate differences. The same fact holds true of variability in motor performance.[16]

The greater rate of growth among girls probably accounts for the fact that they stand consistently ahead of boys in all phases of language development. This fact holds true not only of the age at which language begins but in the size of the vocabulary, the length and character of sentence structures, the use of various parts of speech, and the general symbolic function of language.[17] Boys, as a rule, are more liable to stuttering, the ratio varying from two to one to ten to one.[18] This greater speed in the development of language probably accounts, in part, for the fact that girls excel boys in tests of word completion and in the arrangement of dissected sentences.

In some of the completion tests, in puzzle tests, and on various types of machines, however, boys are known to excel girls. In general, girls are better in tests of memory, although the difference here is somewhat dependent upon the type of test material used.[19] During early infancy girls respond to colors more quickly than boys do. This means that, at subsequent ages, they are superior in color discrimination, in tests of association with color cards, in the naming of colors, and in the uses of colors on various designs. The sexes seem to vary somewhat, however, in preferences for specific colors. Men appear to be somewhat more talented in discriminating differences in brightness, but no sex differences have appeared in studies on the discrimination of pitch. In general, women appear to be more sensitive to pain than men, although this difference may depend upon different judgments as to what shall be called painful.[20]

[14] Paterson, D G, and others, *Minnesota Mechanical Ability Tests*, Minneapolis, University of Minnesota Press, 1930, p 283

[15] Bliss, J C, "A study of progress based on age, sex, and individual differences," *Amer. Phys Ed Rev*, 1927, *32*, 11–21, 85–90

[16] Wellman, B, "The development of motor coordination in young children an experimental study in the control of hand and arm movements," *Univ of Iowa Stud Stud Child Welfare*, 1925, *3*, No 4

[17] A summary of language development can be found in McCarthy, D, "Language development," in Murchison, C (ed), *op cit*, Chap VIII

[18] See Travis, L E, "Speech pathology," in Murchison, C (ed), *op cit*, Chap XVI

[19] Gates, A I, "Correlations and sex differences in memory and substitution," *Univ Calif. Pub Psychol*, 1916, *1*, 245–250 Pyle, W H, "The relation of sex differences to the kind of material used," *J Educ Psychol*, 1925, *16*, 261–264

[20] Wooley, H T, "The psychology of sex," *Psychol Bull*, 1914, *11*, 353–370 Also Burnham, W H, "Sex differences in mental ability," *Educ Rev*, 1921, *62*, 273–284

3. *Differences in Intelligence.*—The experimental study of sex differences has not gone far enough so that it is possible to state with respect to each of the various psychological functions the actual range of difference. It has been customary, however, to throw a great many different functions together into what is called the "intelligence quotient" and in this field a great many studies have been made. In general, it appears that girls have a slightly higher median score on tests of intelligence but the differences between the two sexes are rarely significant.[21] The difference appears more notably in the earlier years. During infancy, for example, and during pre-school ages, girls are uniformly superior to boys. It has been shown, however, that this superiority is dependent, in part, upon the fact that the tests themselves depend upon the selection of test items with respect to psychological functions that are more mature in the girl than in the boy. During the later years of development the evidence is just as strong in favor of higher median scores among boys as it was earlier in favor of girls It is sometimes said that this difference must be a true difference since more boys complete their high school course than girls do. One must remember, however, that a selective factor may have already been at work in this case, for tradition favors the boy over the girl in years of schooling In spite of their smaller numbers, it is known that girls, on the average, do better in their high school work than the boys do. A part of this superiority may depend upon their more rapid language development and upon the fact that handwriting is also known to mature early among girls. There is some evidence to show that boys excel in such subjects as mathematics and history, whereas girls excel in the literary subjects [22]

In general, then, the study of differences in intelligence seems completely to have destroyed the old prejudice that women are intellectually inferior to men. Such differences as have been discovered seem to be explainable partly in terms of a faster developmental tempo among girls than among boys. As we have seen, this fact holds true, in particular, of language development. Since the use of language is closely related to the so-called higher intellectual functions, one would naturally expect girls to be superior to boys at earlier age levels. One might expect also that differences on this score would decrease as boys and girls grow older. On the other hand, it has not been possible as

[21] Some of the literature on this problem has been summarized by Wellman, B., "Sex differences," in Murchison, C (ed), *op cit*, Chap XV, especially pp 628–630

[22] See Book, W F, *Intelligence of High School Seniors*, N Y, Macmillan, 1922

yet to get away from the prolonged effects of differences in general social status.[23]

4. *Differences in Mood and Emotion.*—It is commonly supposed that women are more subject to emotional forms of action than men. They are said, for example, to be more sympathetic, more devoted, and more unselfish than men. Although there is no experimental evidence to support these common assumptions, the fundamental difference in the biological functions of the male and the female might reasonably be expected to occasion differential types of emotional experience. It has not been easy, however, to get at the facts. Since emotional types of reaction are so highly subject to training, it would be almost inevitable that moody and emotional behavior should reflect social mores rather than innate sex differences. Then, too, as we have mentioned above, greater instability in glandular function among women might easily contribute to differences in moodiness. In any case, there is some evidence to show that women are more subject to psychopathic disorders than men [24] If, however, committing suicide can be taken as an evidence of emotional instability, then men must be more unstable than women, for they take their own lives much more frequently than women do [25] During the pre-school years and during the early school ages, girls resort to such nervous habits as nail-biting and finger-sucking much more frequently than boys do.[26] It is known, too, that girls are apt to be more jealous than boys, especially in the home situation.[27]

Empirical observations have suggested that men are naturally more pugnacious in their attitudes to other persons. On the other hand, it will be said that women are disposed with equal naturalness toward nursing, comforting, and consoling others.[28] Here again, however, we run into the perplexing problem of the relation between such attitudes and the prevailing temper of education. Society expects traits of this

[23] Haggerty, M E, and Kempf, E J, "Suppression and substitution as a factor in sex differences," *Amer J Psychol*, 1913, *24*, 414–425

[24] Cf Hollingworth, L S, "The frequency of amentia as related to sex," *Med Rec*, 1913, *84*, 753–757 Pollock, H, "Mental disease in the United States in relation to environment, sex, and age," *Amer J Psychiat*, 1925, *5*, 210–232, Porteus, S, "Temperament and mentality in maturity, sex, and race," *J Appl Psychol*, 1924, *5*, 78–84

[25] Cf Moss, F A, *Applications of Psychology*, Boston, Houghton Mifflin, 1920, *passim*.

[26] Mathews, E, "A study of emotional stability in children by means of a questionnaire," *J Delinq*, 1923, *8*, 1–38 Olson, W C, "The measurement of nervous habits in normal children," *Univ of Minn Instit Child Welfare Monog Ser*, 1929 (No 3)

[27] Foster, S, "A study of the personality make-up and social setting of fifty jealous children," *Ment Hygiene*, 1927, *11*, 53–77

[28] Thorndike, E. L, *Educational Psychology*, N. Y., Columbia Univ. Press, 1913, Vol. III, pp. 203 ff.

sort in either of the sexes but it would be foolish to suppose that social expectations should have hereditary foundations

5 *Personality Differences.*—The problem of sex differences in mood and emotion is intimately related to sex differences in personality. Here again there has been an enormous amount of speculation and prejudice, but gradually sufficient measures of differences in personality are being made. This holds true, in particular, of the genesis of personality traits among small children. Among the factors that have been studied are those that lead to the development of problem children, the responses which the two sexes make to external incentives, the relative resistance of boys and girls to suggestion, the presence or absence of such traits as honesty, moral knowledge, and general attitude, differences in nervousness, jealousy, and so on.

In general, it looks as though girls develop less frequently into problem children than do boys In one study, for example, it was shown that boys were reported about twice as often as girls on account of tardiness, truancy, destruction of property, stealing, profanity, smoking, masturbation, over-activity, laziness, disobedience, defiance, cruelty, meddlesomeness, slovenliness, and suggestibility. In such traits and activities as whispering, inattentiveness, tattling, stubbornness, outbursts of temper, domination, passing criticisms on others, and unhappiness, however, the two sexes did not differ greatly from one another [29] Some of the students of children hold that boys are apt to be more positive in their reactions than girls Girls, however, seem to rate higher than boys in such traits as industry, attention, interest, memory, and comprehension. This is in line with the statements made above regarding the higher I Q of girls [30] The positive reactions of boys are expressed in the fact that they react to situations with the large muscle groups more frequently than girls do. This behavior has been observed in mental test situations, in ratings on extroversion and introversion, in their responses to laughter-provoking situations, and the like.[31]

[29] Wickman, E K, *Children's Behavior and Teachers' Attitudes*, N Y, Commonwealth Fund, Div Pub, 1928, pp 247 See also Blanchard, P, and Paynter, R H, Jr, "The problem child," *Ment Hygiene*, 1924, *8*, 26–54 Blatz, W E, and Bott, E A, "Studies in mental hygiene of children I Behavior of public school children—a description of method," *J Genet Psychol*, 1927, *34*, 552–582 Olson, W C, "A study of classroom behavior," *J Educ Psychol*, 1931, *22*, 449–454

[30] Cornell, L L, "Why are more boys than girls retarded in school?" *Element School J.*, 1928–1929, *29*, 96 105, 215 226

[31] Andrus, R, "The spontaneous questions of public school children from four to eight years of age" *Childhood Educ*, 1931–1932, *8*, 187–193, Justin, F, "A genetic study of laughter provoking stimuli," *Child Develop*, 1932, *3*, 114–136 Marston, L R, "The emo-

It has not been easy to get at the facts about the effect of incentives on the performances of girls and boys A part of the difficulty is due to the lower rating of boys in a good many performance tests. As a rule, experiments in this field try to equate groups of boys against groups of girls by equating ages In some cases, therefore, boys will respond more fruitfully to special incentives because they have a wider span of improvement to cover. When incentives are created by co-operative work, it looks as though girls have a tendency to be more cooperative than boys [32] This fact is brought out by experiments which invite the suggestion to excel either for himself or for a class record. There are a good many experiments which show that co-operativeness may be limited in the sense that one person will co-operate with another but that he will not cooperate when the group is too large.

Suggestibility is a trait which is being brought more and more often under experimental control. One phase of this trait is revealed in the fact that girls are apt to be slightly more resistant during mental tests than boys are. Another phase is brought out by the fact that girls make higher scores than boys in such attitudes as inhibition and resistance to distractions. An extensive study of this factor has made it clear that girls work under stronger inhibitions in almost every kind of a test [33] Of the specific personality traits the advent of jealousy, honesty, and moral judgment have been most studied. We have already cited the evidence which shows that girls are apt to be more jealous than boys of siblings in the family. As a matter of fact, one study reports that two out of every three jealous children were girls [34] The development of jealousy has been taken as a rather important feature of personality because this attitude usually arises shortly after the birth of another child. It is a trait which is dependent apparently

tions of young children an experimental study of introversion and extroversion," *Univ. Iowa Stud Child Welfare*, 1925, 3, No 3, pp 99 Nelson, J F, "Personality and intelligence a study of some responses other than intellectual noted in a simple mental test situation," *Child Develop Monog*, 1931, No 4, pp 62

[32] Hurlock, E B, "The value of praise and reproof as incentives for children," *Arch. Psychol*, 1924–1925, *11*, No 71, pp 78 Leuba, C J, "A preliminary experiment to quantify an incentive and its effects," *J Abnorm and Soc Psychol*, 1930–1931, *25*, 275–288 Warden, C J, and Cohen, A, "A study of certain incentives applied under schoolroom conditions," *J Genet Psychol*, 1931, *39*, 320–327.

[33] Hartshorne, H, May, M A, and Maller, J B, *Studies in the Nature of Character: II Studies in Service and Self-Control*, N Y, Macmillan, 1929

[34] Foster, S, "A study of the personality make-up and social setting of fifty jealous children," *Ment Hygiene*, 1927, *11*, 53–77 Sewall, M, "Some causes of jealousy in young children," *Smith College Stud Soc Work*, 1930–1931, *1*, 6–22, Smalley, R E, "The influence of differences in age, sex, and intelligence in determining the attitudes of siblings toward each other," *Smith College Stud Soc Work*, 1930 1931, *1*, 23–40.

upon the advent of a new individual in the family group. As a rule, girls are known to be more dishonest than boys, although both of the sexes vary widely in tests of this trait. Moreover, the results vary widely from one social group to another.[35] In spite of this fact girls usually make higher scores on tests of moral judgment and opinion. Since these differences appear even where there are no differences in intelligence, it looks as though a child's knowledge of right and wrong must depend upon other factors than intelligence.[36]

We may now summarize the facts listed in the last two chapters by saying that nowhere has the laboratory brought out marked differences between the sexes or between members of various races. That is, there are no sex or race differences that are as large as the differences that obtain between members of the same sex or of the same race. Moreover, none of the information that we have reviewed will answer definitely the question as to how differences are created, whether by hereditary or by environmental factors. It is easy for uninformed people to act upon a profound prejudice in one direction or the other. Once again, then, we have seen how necessary it is that we turn to this general question in a special chapter. In the meantime, it should be pointed out that even slight differences in ability may make a very great difference in the accomplishments of an individual and in the entire organization of his personality.[37] This means that the study of individual differences cannot be finished until the laboratory has shown how specific environmental situations may make a difference in the extent to which original nature can manifest itself.

One further general comment is not without significance. As the student knows, almost every experiment requires close attention to one particular part of a whole configuration of events. It is assumed that the other parts will have remained reasonably constant. In the study of race and sex differences, however, these other parts cannot be kept constant. As a matter of fact, many of them are commonly ignored. This means that the real problems of race and sex differences may not even be touched by such experiments as we have cited. In other words, each person that is studied is a whole person in a very large configuration of events. Even slight differences in special apti-

[35] Hartshorne, H., and May, M. A., *Studies in the Nature of Character. I. Studies in Deceit*, Book 1 General methods and results, Book 2 Statistical methods and results, N. Y., Macmillan, 1928

[36] Hartshorne, H., May, M. A., and Shuttleworth, F. K., *Studies in the Nature of Character: III. Studies in the Organization of Character*, N. Y., Macmillan, 1930

[37] Goodenough, F. L., "The consistency of sex differences in mental traits at various ages," *Psychol. Rev.*, 1927, *34*, 440–462.

tudes, therefore, might make a large difference in the patterning and hence, in the effectiveness, of a person-environment configuration. The failure of the laboratory to discover marked differences indicates that this is probably the case, for the products of sex and race efforts are certainly diverse.

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CHAPTER FOURTEEN

PSYCHOLOGICAL EFFECTS OF SOCIO-ECONOMIC STATUS

1. *Introduction.*—There is one phase of the problems discussed in the last two chapters which has not been emphasized as sharply as it should be. Even though we have not always been able to state clearly just how racial groups differ from one another in psychological traits, our study of differences was more closely related to their presence or absence than to their causes. The student already knows, of course, that two groups of causes may be named. On the one hand, it is said that if the races differ from one another or if there are pronounced sex differences they must be due to hereditary factors. On the other hand, there are other people who are just as certain that differences of this order must be attributed to variations in modes of training

The hereditary factor is always invoked when it comes to such physical differences as eye color, pigment in the skin, stature, and shape of the head. In the same way, no one would ever suppose that the primary sex differences are in any way attributable to training. As we have seen, however, there is plenty of evidence to show that children of foreign-born parents increase in I Q according to the length of time they or their parents have lived in this country Moreover, a great many of the more pronounced sex differences are obviously a matter of training. Even though statistics may show that there have been a small number of eminent women, it seems to be quite clear that the social status of women has not been of such a character as to favor independence in intellectual or professional careers. It will be a very pretty problem then to find out just what part of racial and sex competence depends upon hereditary as opposed to environmental and environmental as opposed to hereditary factors. This, however, is not the purpose of this chapter. We shall return to the problem in Chapter Thirty-Seven where we can bring together more direct data bearing upon all of the questions of heredity and environment that have been raised at this and at other places. The purpose of the present chapter is to say something about another way in which people differ from one another, a way that is neither a matter of race nor of

sex but a possible consequence of the various conditions under which people live. In any normal society, there are all kinds of tasks which have to be carried out if the social group is to exist. On the one hand, there must be hewers of wood and drawers of water, and, on the other hand, there are teachers, lawyers, physicians, bankers, industrial leaders, political leaders, and diplomats. This means that whether it adheres to the doctrine or not, every social group is made up of layers or levels of persons who fall naturally into classes These classes are an inevitable product of the way in which most societies are organized.

It does not follow, of course, that these classes should necessarily live at this level It is a plain matter of fact, however, that in most social groups a difference in class means a difference in cultural, economic, or social level. Since other people and the ways in which they live form a considerable part of the effective environment of any single person, the division of the whole social group into classes and the assumption that these classes must live at different levels mean that, so far as a single person is concerned, he is surrounded by an environment which may have some effect upon his psychological quality. We mean to ask in this chapter, then, whether there is any relation between the socio-economic status of a group, on the one hand, and the psychological traits that can be developed among the members of such a group, on the other hand. It is hardly necessary to argue that this is a very important question in practical psychology, for the division of people into classes and the growth of the tradition that these classes ought to live at different socio-economic levels is almost, if not quite, a matter of changing social mores.

There is, perhaps, no place in the whole organization of society where the apparatus and the methods of psychological experimentation might be used to more effect than in studies on the psychological results of variation in socio-economic status. Among the various factors that may be considered, we shall mention the following We begin with the observation that almost every person does, as a matter of fact, live at some particular socio-economic level There are people whose children are persistently undernourished, there are others who cannot afford to purchase books, paintings, radios, automobiles, and other signs of cultural life, there are people the size of whose families must be limited and others whose families are almost unlimited; there are people who have the means to surround themselves with every kind of cultural object, and so on. Certain questions naturally spring out of these conditions. For example, what effect does a low

socio-economic level have upon such a trait as intelligence? What differences are there between rural and urban communities? What is the effect of schooling on the psychological functions? Do children suffer because of broken homes or because they have to be brought up in institutions? Do only children differ from children who have several brothers and sisters? Is there any difference in intelligence or in other psychological functions created by birth order,—that is, are the first-born children more or less capable than later-born children? It will not be possible to consider all of these questions, but the present chapter will, perhaps, point out some of the major problems to be met with in this particular phase of applied psychology.

2. *Intelligence and Socio-Economic Level.*—We may begin our study at the simplest possible level. The question asked is simply this. Is there any relation between variations in socio-economic level, on the one hand, and measures of general intelligence, on the other? The first suggestive answer to this question was furnished by the army intelligence examination. A good many hundred thousands of men were given this test and when median scores were arranged with respect to occupations the following effects appeared. Laborers, miners, teamsters, and barbers fell in the C-group. This means that the average laborer did not rank very high in intelligence. None of the men born to these groups ranked so high as B in intelligence. Engineers, however, ranked very high, most of them falling among the group called the A-group. None of them fell so low as the C-group. Although the test that was used during the war has not proved itself to be highly reliable, there was a general indication that the average intelligence score gained from men in different occupations rose evenly from those occupations which demand the simplest and roughest type of unskilled labor through the ranks of skilled labor, the trades, clerical workers, and the professions. There was, to be sure, a wide range of ability in any given occupation. This means that there was a great deal of overlapping between the various groups.[1] More direct studies of the relation between intelligence and social status have called for methods of measuring the latter factor. A number of scales have been made for this purpose. In some manner or other the size of the home, the number of books, the possession of radios, automobiles, and other luxuries, the number of servants, and similar items enter into the

[1] The results of the test given to army men have been discussed by Yerkes, R M., "Psychological examination in the U S Army," *Mem Nat Acad Sci*, 1921, Vol 15. See also Yoakum, C S, and Yerkes, R M., *Army Mental Tests*, N Y, Henry Holt, 1921.

scales.[2] While the correlations between intelligence and rank of socio-economic background are not high, there is some suggestion that important evidence about this relationship will come when the rating scales have been improved.[3] Students of exceptional children have pointed out that the quota of bright children coming from the higher occupational groups is much larger than would be expected from the average population.[4] There seems, however, to be some relation between class differences and race differences. When, for example, children have been distributed according to the occupation of their parents (viz., unskilled laborers, skilled laborers, and professional or salaried people), the lowest levels of intelligence are found in the first occupational group, the highest level in the third. If, however, these same children are distributed according to racial stock, the differences between the three groups is by no means so great. That is, unskilled laborers appear to be recruited from given racial groups which are already known to be inferior in test intelligence [5] In general, it seems fair to say that all of the persons in one socio-economic group tend to resemble one another more nearly than they will resemble persons belonging to another group.[6]

A good many studies have been made upon the average levels of intelligence found in rural as opposed to urban communities. For the most part, these studies agree, saying that there is a general retardation among rural children, so far as their ability to achieve scores on an intelligence test is concerned.[7] With respect to these facts, one may argue in either of two directions. On the one hand, it can be said that persons of higher hereditary quality will move to urban centers, leaving persons of lower quality in the rural communities. On the other hand, it can be said that an urban community offers a wider range of opportunity for psychological development because of the more effective

[2] See Chapin, F S, "A quantitative scale for rating the home and social environment of middle class families in an urban community," *J Educ Psychol*, 1928, *19*, 111 Chapman, J C, and Sims, V M, "The quantitative measurement of certain aspects of socio-economic status," *J Educ Psychol*, 1925, *16*, 383–390 Williams, J H, "The Whittier scale for grading home conditions," *J Delinq*, 1906, *1*, 273–286

[3] Cf Pintner, R, *Intelligence Testing*, N Y, Henry Holt, 1931, pp 517 ff

[4] Terman, L. M, *et al*, *Genetic Studies of Genius*, Palo Alto, Stanford Univ Press, Vol I, pp 63 ff.

[5] Kempf, G A, and Collins, S. D, "A study of the relation between mental and physical status of children in two counties of Illinois," *U. S Public Health Reports*, 1929, *44* (No 29).

[6] Sims, V M, "The influence of blood relationship and common environments on measured intelligence," *J Educ. Psychol*, 1931, *22*, 56–65

[7] Shimberg, M, "An investigation into the validity of norms with special reference to urban and rural groups," *Arch Psychol*, 1929, *16* (No 104) See also Sorokin, P A, and Zimmermann, C. C, *Principles of Rural-Urban Sociology*, N. Y, Henry Holt, 1929, *passim*.

school organization, better teachers, and more complete facilities, such as libraries, museums, supervised playgrounds, and a wider range of companionship. The fact that the I Q 's of children in areas that offer an extremely limited cultural opportunity stand very much lower than rural averages seems to suggest that there must be some basis for holding to the environmental point of view [8]

Among the physical factors that might be a consequence of low socio-economic status are physical defects such as glandular deficiencies, diseased tonsils and adenoids, and hookworm. Then, too, especially during periods of depression, it is fruitful to inquire about the effects of malnutrition In general, it is known that children of higher I Q do not have as many physical defects as are found among children with lower I Q 's. It looks as though this factor operates independently of race differences, language difficulties, and the like [9] The data on the relation between such inflictions as hookworm and intelligence are obscure, but the inference is that dullness in children is often correlated with the presence of this disease.[10] The doubt that one may have about this correlation arises from the difficulty in getting comparable groups [11] Other studies on the relation between physical defect and intelligence are not so easy to evaluate. This is due, in part, to the fact that one may not know, for example, how long a child's tonsils have been infected or how extensive his glandular deficiency may be It is fairly clear that the test intelligence of children whose tonsils have been removed does not increase subsequent to operation [12] It is easy to see that studies cannot be conclusive until much more is known about the long-time effects of ailments of this order.

In spite of a long tradition to the contrary, it is now clear that changes in I Q cannot be wrought by increasing the amount of food given to children who have been heretofore undernourished. The other side of this picture, however, is not so easy to describe If we suppose that children have been undernourished for a long period of time, the effects ought to manifest themselves in lowered intelligence

[8] Luedemann, W W, and McAndly, J R, "Intelligence of colony people," *J. Educ. Psychol* 1930, *21*, 612–615

[9] Kempf, G A, and Collins, S D, *op cit*, pp 1783 ff

[10] Smillie, W G, and Spencer, C R, "Mental retardation in school children infested with hookworms," *J Educ Psychol*, 1926, *17*, 314–321

[11] Cf Paterson, D G, *Physique and Intellect*, N Y, Century, 1930, pp 197 ff

[12] Rogers M C, "Adenoids and diseased tonsils their effect on general intelligence," *Arch Psychol*, 1922, *7* (No 50) See also Lowe, C M, "Mental changes after removed tonsils and adenoids," *Psychol Clin*, 1923, *15*, 92–100

and in a diminution of some of the other psychological functions as well It seems, however, that every human being has enormous powers of vicarious function. During the World War, for example, large numbers of children in Germany were seriously undernourished A student of these children has reported that not more than five per cent of the total school population were injured in such a way as to interfere permanently with their test intelligence [13] There was some evidence, however, to show that children of poorer hereditary stock suffered more from malnutrition than did those coming from normal stock. There is no doubt, of course, but that sufficient food makes children happier and more active, but none of the experimental evidence seems to suggest that short periods of malnutrition (from two to four years) have any permanent effect on test intelligence.[14]

Since we shall have occasion later on to say something about the effects of schooling on intelligence, we shall omit any reference to this topic save for the comment that the validity of tests of intelligence depends in part upon the fact that the schooling which different children get has been fairly well standardized. In other words, one may have grave doubts whether the intelligence test is a test of native ability rather than of the stabilized influence of identical environments. We shall, however, look into this matter in another chapter. In the meantime, it is important to note that none of the studies mentioned in this section have made use in any way of motivation. We have already seen that a person may do a good quality of work even though he has been without sleep for a great many hours. His quality is maintained because of his effort. Most normal persons will respond to any difficult situation in this way. This means, of course, that the psychological effects of low levels of socio-economic status cannot be revealed in short-time tests. It seems fair to say, therefore, that this whole problem constitutes an important chapter in the field of applied psychology, for the environments created by levels of living must be appraised if society is to understand itself.

3 *Institutional Children.*—One of the important consequences of change in social mores has been a marked increase in the number of broken homes. Economic difficulties have always led in this same

[13] Blanton, S , "Mental and nervous changes in the children of the Volksschulen of Trier, Germany, caused by malnutrition," *Ment Hygiene*, 1919, *3*, 343–380

[14] Nicholls, E E , "Performance in certain mental tests of children classified as underweight and normal," *J Comp Psychol*, 1923, *3*, 147–181 See also Stalnaker, E M , "A comparison of certain mental and physical measurements of school children and college students," *J. Comp Psychol*. 1923. *3*. 181–239. 431–468.

direction. It will be illuminating to inquire, therefore, what effect broken homes may have upon the development of psychological traits. This factor could operate in many different ways. There might, for example, be an increased number of children who would have to be brought up by foster parents. Moreover, larger numbers of children would have to be placed under institutional care.

As a preface to these problems, we may mention briefly some of the studies that have been made on siblings (normal brothers and sisters) who have been reared apart. It is now known that identical twins have a very high resemblance. If different degrees of kinship among children ranging from identical twins to unrelated children are arranged in order of similarity in physical and mental traits, the order runs as follows; viz., identical twins (r = .90), like sex twins (r = .82), fraternal twins (r = .70), unlike sex twins (r = 59), siblings (r = .50), parent and child (r = .31), cousins (r = .27), grandparent and grandchild (r = .16), and unrelated children (r = .00).[15] It is clear, then, that ordinary siblings are by no means so nearly alike as identical twins. Let us suppose now that siblings of nearly equal age are reared apart. If the children are separated early in life they are not apt to resemble one another so closely as they are if they are separated later.[16] The inference is that a part of the resemblance between siblings who have been reared together is due to the influence of a common environment. As we shall see in another chapter, the natural counterpart to experiments of this kind is to make a study of identical twins who have been reared under different environmental conditions.

There are a great many ways to get into the effects of institutional life on children. It often happens, for example, the children born out of wedlock are placed in institutions. In many of these cases both the mother and father are known. While it is not often possible to obtain the I.Q. of the father, one may, nevertheless, assign a probable value to him based upon his occupation. When this is done, it turns out that children who are brought up in a uniform but institutionalized environment still show marked differences in test intelligence. Moreover, there is some indication that these differences are correlated rather significantly with the presumable intelligence quotients of their

[15] See Wingfield, A H., *Twins and Orphans· the Inheritance of Intelligence*, London, Dent, 1928

[16] Freeman, F N , *et al* , *Nature and Nurture, Their Influence upon Intelligence*, Bloomington, Ill , Public School Pub Co , 1928 See pp 130 ff and 232 ff.

parents.[17] It must be stated, however, that differences in test intelligence among these institutionalized children are not so great as is the case with proper control groups. The inference is that institutional training may level out possible differences. When, for example, children come from a lower social level than that represented by the institutions, they tend to improve somewhat in their psychological quality Likewise, children who come from a higher social level show some signs of decrease in quality.[18]

As a typical experiment on the effects of placing unfavored children in a much better institutional environment we may take the following. A group of children drawn from an extremely low socio-economic level were studied after they had spent a considerable amount of time in the uniform conditions furnished by an institution. The children were then compared with one another according to the amount of time they had spent in the institution. Since increases in I.Q. were not very great, it seemed fair to conclude that a change for the better in environment would not lead to better quality.[19] There is, of course, one answer to make to results of this kind. As a rule, children are not placed in institutions until long after the general tempo of their lives has been set. When younger children are studied and where the character of the environment is specifically known, it does appear that fairly large changes in I.Q. may take place. In one study, for example, it was found that the average I Q. of a group of children in an experimental school could be significantly increased.[20]

The evidence which has been cited up to this point seems to suggest that, in general, changes in the environment brought about by broken homes do not necessarily lead to any significant alteration of intellectual quality. When this fact is stated, however, the reader must bear in mind a great many other considerations. One of these we have already mentioned, viz., that environmental factors probably exercise their greatest influence during the early years of childhood. Then, too, measures of test intelligence are by no means equivalent to a test of the general quality or social value of the person tested. We shall shortly come to a group of facts which show that some of the situations we have just been discussing are commonly found in the background

[17] Lawrence, E M, "An investigation into the relation between intelligence and inheritance," *Brit J Psychol, Monog Suppl*, 1931 (No 16)

[18] Jones, D C, and Carr-Saunders, A M, "Relation between intelligence and social status among orphan children," *Brit J. Psychol*, 1927, Gen. Sect. 17, pp 343–346.

[19] Lawrence, E. M, *op cit*, pp 39 ff.

[20] Wellman, B., "Some new bases for interpretation of the I.Q.," *J. Genet. Psychol.*, 1932, *31*, 116–125.

of delinquents. Finally, no one should ever make the mistake of supposing that an average home provides the best possible conditions for exciting and promoting psychological growth. On the contrary, most homes might be rated as no better than institutions. In any case, the problems suggested above cannot be brought to a satisfactory conclusion until very much more is known about those factors which promote intellectual growth than is the case at present.

4 *The Only Child* —It was said at the beginning of the chapter that there are several ways in which the social environment of a person may place a limit upon the size of the family group. It has long been recognized that persons having a high socio-economic status limit rather severely the size of their families. Experimental education has examined rather closely, therefore, the problems created by an only child. On the other hand, persons in the lower levels of socio-economic condition usually have large families, unless poverty is so great as to place a barrier in their way. This means that the only child may be compared to children who have several brothers and sisters. It means, too, that where there are large families one may reasonably ask about the first-born in relation to later-born.

There has been a long tradition to the effect that only children, while not necessarily less intelligent than others, are subject to a great many different handicaps, especially as regards normal emotional adjustment In one of the early studies in this field (381 cases) it was asserted that only children are below the average in health and vitality, that they are beset more frequently with grave mental and physical defects, that they enter school later than other children, and are less regular in attendance, that their achievement in school is below the average, that oddities in behavior are more pronounced, and that they are more affectionate, more selfish, and sometimes more precocious.[21] Some of the other studies that have been made in this field seem to support these conclusions On the other hand, some of the more recent and better controlled studies suggest that the unfortunate position of the only child has been greatly exaggerated. For example, fourteen different traits of 293 kindergarten children who had been under observation for at least half a school year were rated in such a way as to reveal departures from the "ideal norm" for each trait. No differences between only children and other children were found for such traits as social adequacy, attitude toward facts, attitude toward property, mood, stability, emotional response, and emotional

[21] Bohannon, E W, "The only child in a family," *Ped Sem*, 1898, 5, 475–496.

stability. Only children gave some signs of being more aggressive and self-confident, extremely responsive to affection, gregarious, excitable, distractable, and unstable in moods. The differences, however, were not very great.[22] The differences between only and other children brought out in this study were no greater than differences between first-born, middle-born, and youngest in families of several children. When the oldest child is compared with the youngest, it appears that the former may be somewhat less aggressive and less self-confident than the latter. Moreover, the oldest child is apt to be more suggestible, more seclusive, and more subject to introvertive tendencies. In another study of 200 kindergarten children, still smaller differences were found between the traits of the only child as compared with the traits of siblings. In only one trait was there an exception, viz, self-confidence.[23]

The evidence about the psychological traits of the only child, then, is not unequivocal. This, perhaps, is not strange, however, for there may be a good many uncontrollable factors around only children which do not interfere with the study of other children. For example, the experimenter cannot be sure that some of his results are not a result of sampling. Since there is a negative correlation between intelligence quotient and age on entering the kindergarten, it would be easy to get a better group of young children and an inferior group of first-born children. Then, too, the inexperience of the parents with reference to a first-born child, whether it be an only child or not, must have some effect. Where the first-born child is also the oldest child in a group, he will be asked to carry out tasks which do not often fall to the younger children. Finally, it is well known that a first-born child often has difficulties in relating itself to the arrival of other children. Most of the studies that have been made on this problem agree in saying that jealousy is much more common among the oldest children of a family than it is among the younger children. As a rule, this trait appears in its more extreme forms with the advent of a second or third child.[24]

The problem of trying to find out how siblings may vary from one another as a result of the order in which they have been born is even

[22] Goodenough, F. L., and Leahy, A. M., "The effect of certain family relationships upon the development of personality," *J. Genet. Psychol.*, 1927, 34, 45–71.

[23] Fenton, M., "The only child," *J. Genet. Psychol.*, 1928, 35, 546–556.

[24] Foster, S., "A study of the personality makeup and social setting of fifty jealous children," *Ment. Hygiene*, 1927, 2, 53–77. See also Ross, B. M., "Some traits associated with sibling jealousy in problem children," *Smith College Stud. Soc. Work*, 1931, 1, 364–376.

more difficult than the problem of naming the peculiar traits of an only child. Among the factors which have to be taken into account by the experimenter we may mention the following. In the first place, a first-born child may mean either the first pregnancy or the first child to grow to maturity. Since it frequently happens that a first pregnancy results in a still-birth, the "first-born" child may really be a second or third child. This same factor operates with the determination of other birth orders. In the second place, a first-born child is always older than the other siblings It would be unfair, then, to compare the traits of this child with children who are younger. This difficulty could be evaded if it were determined in advance that all the forthcoming children in a given family would be examined at identical age levels. In the third place, the age of the parents at the birth of any child always enters into the situation as a variable factor. Even in the study of only children, it may happen that one child will be born of a very young mother while another child will be born of a mature mother. Clearly, then, the question of birth order is subject to a great many variable conditions.

The problems of birth order, like the problems of the only child, have a fairly long tradition behind them. The very fact that primitive societies have differed in their method of treating the inheritance of goods shows early prejudices in this matter. Some social groups name the first son as the logical heir, while others distribute property and land to all children alike. Still other groups have had the custom of passing property on to the youngest son. In general, it has been thought that first-born children are more liable to mental defect than later-born children. Equally persistent, however, has been the belief that some first-born children may be superior to later-born children.[25] As an example of more recent studies of this problem, which use reliable techniques, we may take the following. The children of nearly 400 families who had come into the records of the Institute for Juvenile Research in Chicago furnished the material. The age range of the group varied from the pre-school years to twenty-one years. The mean I.Q. fell between 70 and 80. All of the children were tested with the Stanford Binet Test. After the data had been corrected for various types of error and correlated properly with a large group of control children, it turned out that later-born siblings seemed, on the average,

[25] Some of the conflicting evidence at an earlier date can be found in Mitchell, A., "Some statistics of idiocy," *Edinburgh Med J.*, 1866, *11* (Part 2), 630–645 Down, L., *On Some of the Mental Afflictions of Childhood and Youth*, London, Churchill, 1887 Galton F., *English Men of Science Their Nature and Nurture*, London, Macmillan, 1874, *passim*

to be more intelligent than the first-born. This order of preference held true not only when comparisons were drawn between the first-born and the last-born but when comparisons were drawn between any single birth order and a subsequent birth order. It is suggested that this difference in test intelligence might be due to such factors as more adequate parental care in rearing later children, progressive improvement in the economic condition of the family, a more favorable social environment for later-born created by the presence of other children and a possible change for the better in physiological condition of the mother.[26]

5. *Class Differences.*—Some of the experimental material which might have a bearing upon the vexing problem of class differences is now before us. To begin with, it seems fairly clear that there is a marked tendency for test intelligence to change with the occupation of parents. The lower grades of test intelligence are found in the children of parents who do the simplest types of manual labor. As a rule, the highest levels of test intelligence are found among the children of professional groups. Within limits these same facts hold also of variations in socio-economic status. It does not appear, however, that special conditions created by low versus high socio-economic status will have an adverse effect upon test intelligence. Among these special factors we have mentioned the institutional care of children, the only child, and the question of birth order. The student will find a great many other such factors mentioned in the references at the end of this chapter.

Behind all of the considerations mentioned above, there is the vexing problem of the dependence of class differences upon hereditary as opposed to environmental factors. It may be said that children from lower occupational levels are of lower intelligence because their parents were low. It may be argued that the parents must have been low in psychological quality or they would have found their way into some other occupation. On the contrary, it may be argued that low socio-economic status is a condition which tends to perpetuate itself. That is, children who are brought up in unfavorable environments will be prevented, by the very nature of their training, from getting out of the low occupation class. As we have promised, we shall bring together some of the more important evidence upon this general

[26] Steckel, M L, "Intelligence and birth order in families," *J Soc Psychol*, 1930, *1*, 329–344 Thurstone, L L, and Jenkins, R. L, "Birth order and intelligence," *J Educ. Psychol*, 1929, *20*, 641–651.

problem in another chapter. In the meantime, it will not be fair to draw the inference that the question with which we are here dealing is of the either-or type. No one now supposes that any query about human nature can be answered either in terms of heredity or in terms of environment.

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PART THREE

PSYCHOLOGY AND LAW

CHAPTER FIFTEEN

THE NATURE AND ORIGIN OF CRIME

1. *Introduction.*—It is one of the aims of science to find out what will happen to any given object or event under every possible change in the conditions. Let us say, for example, that we are studying oxygen. Given a small amount of this material, the chemist proposes to find out how it will behave at every temperature level with every other known substance. After a certain amount of such study has been completed, a few general principles of action begin to appear, whereupon the chemist can say that he knows how oxygen ought to behave not only in the cases studied but in unexamined cases as well.

From a theoretical point of view, this same thing might be done with human beings. That is, for every possible combination of stimulus-situations someone might work out the "right" mode of action [1] The teacher and all other promoting and guiding influences around each individual could then be used to develop the "right" reactions and thus human behavior would be as stable and as predictable as is the behavior of oxygen. There are two reasons why this goal can never be reached. In the first place, it would not be possible to name all of the combinations of stimulus situations which any given individual might have to meet. In the second place, it is not desirable that human behavior should ever have the fixity and witlessness that would come from an immediate and habitualized response to every occasion The one thing that distinguishes human beings from the lower animals is their freedom from fixity of response, either of the habitual or of the instinctive types.[2]

Every social group has found it necessary, however, to impose a certain amount of fixity or of dependability upon human nature. As we have seen in Chapters Nine and Ten, the words law, custom, tradition, imitation, and ceremony describe some of the things that a person can or cannot do so long as he remains a member of society.

[1] If this plan could be carried, one might create a real legal science Cf Goble, G W, "Law as a science," *Scient Mo*, 1933, *37*, 229–240

[2] It is sometimes illuminating to draw a comparison between the behavior of social insects and the behavior of human beings See, for example, Wheeler, W. M, *Social Life among the Insects*, N Y, Harcourt Brace, 1923.

Under certain circumstances, the act of reaching for a loaf of bread is a permissible act, but under other circumstances it is strictly forbidden. Under some circumstances it is not only permissible but desirable to remove one's clothing, but custom sees to it that nakedness does not occur on a public highway All of the forces of education and of other types of training, as well, are brought to bear upon each individual so that his conduct with respect to a great many matters shall be just as fixed and just as dependable as is the action of oxygen in the presence of hydrogen

Were we to take a sufficiently large perspective over human behavior we should find, no doubt, that more of it is of the witless habitual type than we like to attribute to ourselves By custom and by tradition, by law and by habit, we clothe ourselves in a given style, treat the other sex with all the mannerisms of good training, believe in Deity and in the church, read certain books and journals, accept the opinions and judgments of others, vote for the maintenance of a given social and political order, conduct ourselves with decorum at the table, at a marriage ceremony or at a funeral, accept a vast number of opinions and prejudices without any critical reflection upon them, secure an education, join any one of numberless clubs and societies, and so on. So much of our daily life is a direct product of the way in which we have been trained, either directly in the schoolroom or indirectly through the influence of custom and tradition, that a considerable number of people must go through life without ever having exercised in any significant way whatsoever their problem-solving functions Even the motives that drive most persons to action are not the result of deliberate training but an unreflective precipitate out of casual development.

There are four ways in which escape may be effected from the close confinement of law, custom, and imitation In the first place, one may take that kind of attitude which is described by the words "radicalism" or "revolt" In the second place, one may escape by using one's problem-solving functions at the social level in which case one becomes an inventor. In the third place, if the spirit of revolt is exercised against law rather than against custom or imitation, one becomes a criminal. In a superficial way, a law differs from a custom in the sense that the former is a mode of action which has been codified and written down in the statutes, whereas the latter represents a more or less informal gentlemen's agreement of long standing. In the fourth place, one may escape the restrictions placed upon one by the social

order through the various escape mechanisms described in medical psychology.

The method of escape which leads through maladjustment to actual psychological ailment will concern us in the next Part. The method of revolt or of radicalism has been sufficiently treated in Chapter Eleven This same chapter, together with most of Chapter Ten, has described the way in which the second method named above may be used It is now our task to describe the third method, viz., the method of actually breaking the law That is, some of the most ancient traditions and customs of men have been set down in the books as barriers against the perpetration of acts which stand against the common good The criminal is an individual who either knowingly or unknowingly trangresses the law by doing that which is forbidden him to do.

It goes without saying that a criminal act which is to be brought to judgment raises a whole group of problems of the most difficult type. There are, first, the factors which eventuate in the criminal act Then comes the question of determining who is guilty, a problem which touches the psychology of motivation, on the one hand, and of testimony, on the other This whole process varies directly with the psychological nature of lawyers, witnesses, and judges Finally, there is the problem of punishment or correction Each of these various topics will be considered in the chapters to follow The remainder of this chapter will be devoted to a study of the individual and social factors which favor criminal acts and to some of the means that may be taken to prevent them

·2 *Crime and the Problem of Freedom* —It has been simple enough to say, as we have above, that a crime has been committed whenever one breaks a law From this point on, however, there is nothing but confusion between psychology and current legal practice As a general rule the legal doctrine of crime and the theory of punishment for crime rests upon the assumption that human beings are free to do as they please A set of rules should, of course, state in simple and clear form a set of ethical principles and it should represent, therefore, the best thought and judgment of the individual himself. If, then, the individual chooses to go against his ethical principles, he must do so because of free choice in the matter [3] As we know, however, law came into its present stable form long before development of experimental psychology and it is inevitable that it should reflect pre-experimental types of psychological theory rather than current beliefs and practices.

[3] Cf Rosanoff, A J, *Manual of Psychiatry*, N Y, John Wiley, 1920, p 183

If a man is free to do as he pleases and if he elects to break the law, he should be punished On the other hand, if he is not free to do as he pleases, that is, if his action is, in any case, the product of his previous training, one may well wonder what meaning can be attached to punishment,—at least to punishment of the retributive type As we shall see in a moment, certain types of punishment may have a value in reeducating the individual and where punishment obeys the law expressed in the phrase "an eye for an eye" it can have meaning only so far as an individual is free to choose his own course of action. It might have a meaning even if an individual were free to choose his type of education and training, but even this privilege is denied to many persons. As we shall try to show in a moment, the determinative factors in delinquency become effective at fairly early stages in development

Current legal practice has sought to get around the problem of freedom versus determination by drawing a sharp distinction between the intent behind a crime and the crime itself. It has been said, for example, that if an individual has been forced to commit a crime by factors that were beyond his control, or if he has been the subject of an accident even though he has made every reasonable provision against accident, or where his intentions were unquestionably opposed to the commission of a given action, he should not be held liable for any damages he may have inflicted In the older psychology, it was held that the distinction between the intent to act and the act itself was a really significant distinction The intent was usually taken as a product of an individual's inherent character, whereas the action itself might be the product of temporary insanity, of an overstimulated emotional attitude, or the result of some such drug as alcohol. It now seems clear, however, that this way of distinguishing between the intent to act and the act itself is hardly defensible. On the contrary, one must distinguish between actions that are overt in the sense that they are carried out by some of the larger muscles in the body versus actions that are implicit in the sense that they represent language responses. In any given situation, for example, an individual might react by raising his arms against another even though he is at the same time saying to himself vocally or sub-vocally that he should not attack the person who has insulted him. When such an individual is brought before a judge, he could summon character witnesses to his aid. These witnesses would say that there was nothing about the general manner of living of the individual to suggest that he would attack another

without cause. It is clear, however, that the actual manual behavior of the accused must differ from his verbal behavior, that is, from his ways of thinking about conduct. Such a person, then, could be accused of not having integrated his manner of thinking or of believing, that is, his verbal behavior with the total pattern of his behavior. In short, then, the problem created by frequent differences between intentions and actions is a problem of integration of personality rather than a problem having to do with a mind which thinks better, standing opposed to a body which does worse.

There are a great many things yet to be said about the origin and nature of criminal acts, but, as a rule, the psychologist is inclined to feel that the legal view of such actions is wrong Any behavior pattern is, in part, a product of the actual stimulus situation and, in part, a product of the previous history of the individual. This previous history has been furnished by the general environmental factors surrounding the individual and by such specific environmental agents as parents and teachers Some of the responses which an individual may make to a present situation would certainly take a verbal form and it is fairly easy for these responses to represent what is commonly called one's conscience, that is, one's ideals of ethical behavior. Other responses, however, are more overt in character and it is the actual action rather than the thought which gets most people into difficulty.

Since education or training has to work against certain fundamental motives, and since most of the primary motives are innate in character, it may be said that even though a large number of criminal actions are a product of training, some of them, nevertheless, must be more or less inevitable. If an individual were to respond to a situation in terms of some primary tissue need, he certainly cannot be held personally responsible for a need that is a part of his biological heritage. Even in this case, however, it is not possible to get away from the matter of training, for the proper sublimation and redirection of primary tissue needs is one of the chief functions of that form of social action known as education. If a social group has chosen to order its life in such a way as to deny to any considerable number of individuals their right to an adequate training, an individual cannot be held responsible for criminal actions even though they come as a direct response to primary tissue needs. There are, however, a great many other things to be said on this problem and we may leave it at this point, then, until we have been able to bring further data to bear upon it.

3 *Individual Factors in Crime*.—We may dismiss almost at once the older notion that criminal actions can be directly attributable to specific instincts toward criminality. We may dismiss also the theory that there are individuals who make up what may be called a criminal type. This theory has had a large vogue, partly because of the work of a famous criminologist who undertook to identify the criminal type and to describe some of its chief characteristics. It was asserted, for example, that the criminal type is deficient in sensitivity to pain, untrained in certain socialized emotions, highly defective in moral sense, and definitely subject to such peculiar physical traits as excessive jaw, misshapen ears, and prominent cheekbones.[4]

There are other theories of the individual factors in crime which look in this same direction. It has been asserted, for example, that some children must be born with what has been called moral imbecility. The argument was based, in part, upon the fact that many criminals may have a normal or even a super-normal rating in intelligence but that from early childhood onward they show definite moral weakness.[5]

Both of these types of appeal to innate factors in criminal action are losing ground. More accurate measurements of large numbers of criminals have shown that there is no significant difference between criminal and non-criminal groups.[6] Moreover, as soon as any serious attempt was made to trace the genetic origins of delinquency, it turned out that anti-social conduct of this kind must be a product of training rather than a product of some innate tendency toward moral imbecility.[7]

With the overthrow of the doctrine of innate criminal tendencies, it was necessary to find quickly some possible substitute. This substitute was found during the early days of mental testing in the intelligence quotients of criminals. Because of the nature of mental tests it was possible to name a certain group of individuals that, with respect to the norm, could be called feebleminded. It became common practice, therefore, to say that the greatest single cause of delinquency among children and of criminality among adults must be low-grade

[4] Cf. *Criminal Man According to the Classification of Cesare Lombroso*, briefly summarized by his daughter Gina Lombroso, N. Y., Putnam's, 1911.

[5] Treadgold, A. F., *Mental Deficiency*. London, William Wood, 1908. See especially pp. 348, 349, 398.

[6] Goring, C., *The English Convict*, London, Duthing, 1913, pp. 45, 150, 173.

[7] Healy, W., *The Individual Delinquent*, Boston, Little, Brown, 1920, especially pp. 73–74.

mentality.[8] This fact quickly became a shibboleth which spread through the ranks of judges, social workers, and a large part of the general population As time has gone on, however, the factor of feeblemindedness in the causation of crime is known to be much less significant than these earlier studies have asserted. Whereas heretofore psychologists had been inclined to say that from thirty to ninety per cent of the criminals were feebleminded, the percentages have now fallen to as low as fifteen per cent. In one study, for example, of 4,000 juvenile offenders all of whom were repeaters, only 13.5 per cent were found to be feebleminded[9]

In a specific study of the relation between feeblemindedness and delinquency 200 juvenile delinquents were compared with 400 non-delinquents of the same age and social class This study is somewhat at fault in that it did not define accurately the phrase "the same social class" But, in general, the results showed clearly enough that while the low I Q 's may play some part in delinquency, they stand, in general, opposed to the idea that mental deficiency is a major source of criminal action[10] There are a large number of other studies which point in the same direction[11]

Among some of the other factors which have been used to explain criminal action are mental abnormalities and the use of various drugs. It seems to be fairly clear, however, that the number of crimes committed by mental defectives of the abnormal type is fairly small in comparison with the total number of criminal acts brought before the courts. Among the more common causes of such actions are insanity, epilepsy, psychopathic personality, drug deterioration, alcoholic deterioration, and the like[12] In one of the studies cited above, it was found that 72 5 per cent of all of the offenders studied were definitely normal[13] As we shall see shortly, there is some evidence to show that emotional instability may play a considerable part in both juvenile and adult delinquency, but it will be clear that emo-

[8] For examples see Terman, L M , *The Measurement of Intelligence*, Boston, Houghton Mifflin, 1916, p 9 Goddard, H H , *Human Efficiency and Levels of Intelligence*, Princeton, Princeton Univ Press 1920, pp 72–73

[9] Healy, W , and Bronner, A E , *Delinquents and Criminals, Their Making and Unmaking*, N Y , Macmillan, 1926, pp 155 ff

[10] Burt, C , *The Young Delinquent*, N Y , Appleton, 1925, pp 286–288

[11] Murchison, C , *Criminal Intelligence*, Worcester, Mass , Clark Univ Press, 1926, *passim* Slawson, J , *The Delinquent Boy, a Socio-Psychological Study*, Boston, Badger, 1926, Chaps I and II Gernald, M R , *et al* , *A Study of Women Delinquents in New York State*, N Y , Century, 1920, pp 527 ff

[12] Anderson, V V (ed), *Mental Diseases in Delinquency*, N Y , Nat Committee for Ment Hyg , 1919, *passim*

[13] Healy, W , and Bronner, A. E , *op cit* , pp 150–153, 273–274

tional instability is not so much a matter of innate weakness as it is a matter of training

The general import of this brief glance at the individual factors in crime is clear It is almost immediately clear that there is not an innate delinquent or criminal type. Moreover, one may feel sure that there is no such thing as innate moral imbecility. Furthermore, it looks as though students of criminology must go beyond mental deficiency if they are to find a sufficient explanation of the origin and development of criminal behavior. One of the possibilities and perhaps the most fruitful lies in a study of environmental factors This is the task of the next section.

4 *Social Factors in Crime*—We must mention in passing some of the relations that have been found to obtain between frequency of crime and prevailing weather conditions One student of this matter has plotted some 40,000 cases of assault against the various months of the year. It seems to be clear that an overwhelming percentage of cases of assault occur in the months of June, July, August, and September. The winter months, on the contrary, show relatively few cases of this type of criminal action.[14] It would not be fair to say, however, that weather, in and of itself, is either an essential or adequate cause of crime On the contrary, one must suppose that other factors, presumably social in character, may become more intensive during the hotter months of the year. That this is true will become clear from the following considerations

In the first place, there is the general problem of poverty. In an analysis of 584 delinquent boys and 157 delinquent girls, it was found that thirty-eight per cent of the former and sixty-nine per cent of the latter came from impoverished homes Eighteen per cent of these delinquents came from homes which stood below the margin of bare subsistence.[15] In another study of 2,000 cases, about twenty per cent were found to come from the very poor.[16] Poverty then stands in somewhat the same class with low intelligence. It cannot be said that poverty is a major cause of delinquency but it certainly appears to be one of the contributing causes.

This conclusion is to be modified, perhaps, by more recent studies of the relation between crime, delinquency, and depression. In one

[14] Dexter, E G, *Weather Influences*, N Y, Macmillan, 1914, *passim*

[15] Breckinridge, S P, and Abbott, E, *The Delinquent Child and the Home*, Charities Pub Com, 1912, pp 70–74

[16] Jones, V, "Relation of economic depression to delinquency, crime, and drunkenness in Massachusetts," *J Soc Psychol*, 1932, *3*, 259–282

state at least, theft committed by persons eighteen years of age or older has increased materially during the depression years The same thing was true during the depression of 1921. In general, however, arrests for violation of the motor vehicle law and violation of the liquor laws have decreased since 1929. It seems, then, that there is no relation between economic conditions and drunkenness. Curiously enough, juvenile delinquency has decreased in at least one state during the present depression. The percentage of delinquencies during 1930 and 1931 was found to be four per cent below that of 1928 and 1929 During the preceding years, however, delinquency rose and fell with unemployment in all but one out of eight years This result may be explained by saying either that constructive forces are at work toward the prevention of delinquency or that depression has a more direct effect upon adults than upon children [17]

Another possible social factor is the number of broken homes. In one study of 88 delinquent boys, only one-third were found to live at home with their parents [18] More extensive studies seem to say that approximately one-fourth of the children in the United States live in homes that have been broken because of death, separation, divorce, insanity, and similar factors More extensive studies on the family relationships of delinquents seem to suggest that approximately one-half of all delinquents have defective homes in their background [19] It frequently happens that delinquency among girls is produced by the anti-social conduct of their own fathers. This type of conduct appears most frequently in families of low social status [20] In general, then, it seems fair to say that broken homes play a larger part in delinquency than either intelligence or poverty. Clearly, however, the search for social factors in criminal acts must go still further. Among the possibilities are defective discipline, bad companions, undesirable recreational facilities, uncongenial schools, and the like One student has reported defective discipline in the families of eighty per cent of the delinquents studied by him, whereas only eleven per cent was the ratio in non-delinquent groups.[21] It does not very often happen that children are definitely trained to take up criminal ways [22] There is,

[17] Healy, W., and Bronner, A E., *op cit*, pp 117–121

[18] Fearing, F S, "Some extra-intellectual factors in delinquency," *J Delinq*, 1928, *8*, 145–153

[19] Shidler, E H, "Family disintegration and the delinquent boy in the United States," *J Crim Law and Criminol*, 1918, *8*, 714–717

[20] Slawson, J, "Marital relations of parents and juvenile delinquency," *J Delinq*, 1923, *8*, 278–280

[21] Burt, C, *op cit*, pp 63, 92

[22] Healy, W, and Bronner, A E, *op cit*, pp 127–129

however, some evidence to show that bad companions may serve as an effective instructional agent. In one study, for example, ninety-one per cent of 6,406 cases of stealing involved two or more participants.[23] It is probable that a large amount of additional information on this score will be available when the increasing number of studies on the development of boys' gangs have been completed.[24]

5 *Prevention of Crime.*—It seems to be clear from what has been said above that delinquency and crime are not inevitable features of social life. If Nature saw to it that certain individuals were disposed by heredity to act in criminal ways, this conclusion would not be possible. As we have seen, however, criminal behavior is, for the most part, a result of educational processes that have gone awry. It will be a long time, of course, before enough is known about the methods of training small children so that their motives to action will always find normal outlet, but a long step has been taken whenever it is recognized that crime is a matter of education rather than of heredity.

As a prelude to proper education, society must find a way of removing adverse environmental situations of a more general character. Although poverty, broken homes, and similar factors may not play a determining part in the education of the criminal, it still remains true that no amount of education could be absolutely preventive in character so long as large numbers of families have to live below a margin of bare subsistence. Moreover, education cannot hope to compete against the adverse conditions which obtain when homes are broken by divorce and similar factors. When low levels of socio-economic living can be eliminated, those forms of education which emphasize the development of normal moral and ethical traits might hope to achieve greater measures of success than is the case at present. Since we have already reviewed some of the main stages in behavior patterns of this type, we shall not repeat them here.

Moreover, in view of the fact that Chapter Eighteen will consider the value of punishment not only as a corrective but as a retributive agent in the handling of crime, we may pass it by with the statement that, in order to be most effective, physical punishment should be used, first, as a supplement to reward in the development of proper social and ethical conduct, and, secondly, as a method of treatment which will lead to the cure of an individual rather than to a kind of retaliation upon him.

[23] Thomas, W. I., and Thomas, D. S., *The Child in America*, N. Y., Knopf, 1928, p. 546.
[24] Thrasher, F. M., *The Gang*, Chicago, Univ. of Chicago Press, 1927. Shaw, C. R., *et al.*, *Delinquency Areas*, Chicago, Univ. of Chicago Press, 1929.

It is clear that, as matters now stand, the prevention of crime has two aspects. On the one hand, unfortunate methods of education aided by poverty, broken homes, and feeblemindedness have produced a great many delinquent children and criminal adults. Obviously, it is too late to prevent what these individuals have already done. It is necessary, therefore, that they be subjected to various methods of reeducation. Up to the present time, most of these methods have been used under the supervision of a court, by using some of the established social agencies, and by helping parents to become more effective guides for their own children. It seems to be quite clear, however, that methods of reeducation used in this way have not been effective. It has been shown, for example, that among 675 cases of delinquency only forty-five per cent responded to treatment.[25] Some persons might take this low measure of success to mean that methods of reeducation cannot be made really effective. The opinion is growing, however, that many delinquencies are the result of behavior patterns which are too deeply ingrained to admit of quick and easy eradication. The first three or four years of life are the most plastic. A great many studies seem to suggest that habits which are established during these early years are much more difficult to change or to remove than are habits which have been acquired during later periods of development. If, then, reeducation is to become really effective, it must be of such a character and continued for such a period of time as will enable it to reach habits that are of long standing.

As an illustration of what may be accomplished by a more direct type of reeducation we may take some data from 501 cases of delinquent and problem children who were studied by the Judge Baker Foundation. Of these cases seventy-five per cent were repeaters, and sixty-five per cent had appeared in a juvenile court. Reeducation was attempted through placing individuals under favorable family environments. Of the total group 330 made up a special group for they had been individually placed by private agencies. Of this total group ninety per cent of those who were mentally normal were successfully reeducated. Although only one-half of the abnormal cases were successfully treated, one may still argue that this percentage marks a distinctive achievement.[26]

As might be expected, this study showed that younger problem children who were placed in foster homes were much more likely to

[25] Healy, W., and Bronner, A. F., *op. cit.*, p. 28.

[26] Healy, W., *et al.*, *Reconstructive Behavior in Youth: A Study of Problem Children in Foster Families*, N. Y., Knopf, 1929, pp. 245 ff. and *passim*.

succeed than older children Moreover, it seemed to be clear that the problem of reeducation depended not so much upon learning situations which demanded constant repetition as upon changes in motives and the proper development of right motives. Finally, this study showed clearly enough that success must depend in part upon a continuation of the new environmental situations. Even though motives may be changed, the return of a delinquent child to an environment which is favorable to delinquency may mean the quick revival of the more fundamentally established habits As we have seen, delinquency is closely tied up with fundamental tissue needs which demand satisfaction. A low socio-economic status does not usually provide an environment in which fundamental tissue needs can be satisfied in the normal way.

There is, perhaps, one further feature of this study of reeducation which should be mentioned It appeared that eighty-two per cent of the delinquents for whom no known defect could be found in the forbears were successfully retrained. Subjects, one or both of whose parents could be described as mentally diseased or defective were almost equally successful, for eighty-one per cent of them responded to treatment. Seventy per cent of the subjects whose parents were criminalistic were successfully retrained It would seem then that poor heredity, in so far as it is revealed by mental inferiority or criminal behavior among the parents, is an insignificant factor so far as possible reeducation is concerned [27]

It is one thing, however, to reeducate a child after it has become delinquent and quite another to educate it from the very start in such a way that it will neither be delinquent nor carry out criminal actions during adulthood In other words, the prevention of crime calls for an aggressive and intelligent organization of education At the present time, this is not an easy goal to reach for training in ethical and moral traits has long been a primary function of the church school rather than of the secular school Moreover, the effectiveness of the church school was increased in direct proportion as social and ethical conduct was made to depend upon extraordinarily powerful rewards and punishments All of the Christian theologies have made much of such factors as the doctrine of innate sin, the absolute and final character of right and wrong conduct, the supernatural character of conversion, and so on It is now commonly recognized that the distinctively theological or religious motives which the church has been able

[27] Healy, W., *et al*, *op cit*, pp 250, 311–312

to bring to bear upon training have lost much of their effectiveness. It has been assumed, therefore, that the secular school must take over this task It has turned out, however, that the secular school is not in a position to perform this task well partly because not enough is known about the nature of moral and ethical traits and partly because methods of teaching have not yet been proven adequate to the task. It begins to look, however, as though this phase of education is receiving the attention that it deserves As a matter of fact, educational psychology is moving faster toward a solution of the problem than political and economic theories are As we have said above, education cannot become truly effective until those types of general environmental satisfaction are removed which make possible perverted expression of normal tissue needs

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CHAPTER SIXTEEN

DIAGNOSING GUILT

1 *Introduction* — In actual practice, the question as to whether a man is guilty or not guilty of a given crime is a matter that has to do with the gaining of evidence and with placing suitable degrees of reliance on this evidence. Guilt or innocence, then, is a problem that concerns lawyers, detectives, judges, and juries. For more than one reason, however, it concerns the psychologist. As we shall see in this chapter, it is a psychological problem because the laboratory of the experimental psychologist can be used to good advantage in studying the witness, the judge, and the lawyers, as well as the alleged criminal. But there is a totally different reason why the determination of guilt is of psychological interest. It illustrates as pretty a problem as can be found anywhere in the science.

Let us suppose that a man has committed a crime to which there were no witnesses and from which no clews have been left. This would be, of course, the long-wanted perfect crime, but we are not interested in it on that account. On the contrary, we wish to inquire whether, given such a crime and given a willingness on the part of the criminal to submit to any kind of experimentation, his guilt or his innocence could be established? To ask this same question in another way, is it possible for a person to possess some information or knowledge which he can forever lock up in his own heart so securely that it will never in any way reflect itself in his behavior? We may ask this question in still another form. Are such mental events which we describe as the memory of a crime so completely divorced from the operations of the nervous system and of the organs of response that there is a theoretical as well as a practical bar to their discovery?

An answer to these questions bears not only upon the general subject of this chapter but upon the whole point of view which one may take toward the problems of psychology, as well. Let us suppose that a person can have conscious experiences which are, in the very nature of things, divorced from the events that take place in his nervous system.[1] If such a person did not choose to talk about his experience

[1] A discussion of the problem of the private world, that is, one's own consciousness, as opposed to the public world, that is, behavior which is open to inspection, will be found in

or to confess his crime, it would follow that his inner experience could never become the subject of discourse between himself and some other person The religious mystic is in somewhat this position He affirms, after one of his visions, that he has seen objects or participated in types of experience which cannot be adequately described[1] Clearly, if they cannot be described, and if they do not reflect themselves in any other kind of action, they must remain enfolded within his own being It follows that the possible existence of such experiences may be affirmed by the one who has them but they can never become the subject of an experimental examination save as they are revealed in the spoken word The science of psychology would have to remain helpless before them

And now we may turn to the other side of the question Let us suppose that no person can ever have an experience of the conscious type which does not have some relation to or is in some way contingent upon the functions of his nervous system It ought to follow that, were it possible to keep a faithful record of the behavior of such a person over a long period of time, there would be some change in behavior related to the experience This is an assumption which the psychologist has to make He even goes further than this He argues not only that, to have an experience is to act it sooner or later, but that the acting is somehow an adequate reflection of the experience. Let us suppose, for example, that the entire history of an individual up to the time the perfect crime was committed is known Among other things, the number of words he prefers to use, his reaction time to words and to various types of objects, his preferences for money and modes of expenditure, his friends, his likes and dislikes, and many other things besides are known At this point in his history, the crime is committed The psychologist makes the assumption that the having of this experience will and must reflect itself somewhere in the subsequent behavior of the individual In other words, the having of the experience is not something that may take place in the realm of pure mind, it must take place in the ongoing history of the individual himself.

The reader will now see that we have just taken another way of

Hogben, L, *The Nature of Living Matter*, N Y Macmillan, 1932 See also Lashley, K S, "The behavioristic interpretation of consciousness," *Psychol Rev*, 1923, 30, 237–272; 329–353

[1] Consult Bennett, C A *The Dilemma of Religious Knowledge*, New Haven, Yale Univ. Press, 1931 James, W, *Varieties of Religious Experience*, N Y, Longmans Green, 1912, *passim.*

illustrating a fact which he has already met in our discussion of the difference between an act and the intent behind the act. If an act is something that takes place in nature so that it can be observed and an intent is something that takes place outside of nature where it cannot be observed, then there is no hope for a science of psychology. Similarly, if the perfect crime can be carried out by a mind which is not in any way related to the ongoing history of a person, there is nothing that anyone can do about it. On the other hand, if the crime is within the natural history of the individual and if it has been made a part of his particular stream of behavior, it ought to manifest itself whenever such a stream has been adequately studied.

The question as to how a guilty person may be apprehended, then, refers not only to legal practice itself but to the nature of psychology. We shall have more to say about this second fact in Chapter Thirty-Six. We must now turn to the more legal aspects of the problem

2 *Problem-Solving in Detection* —We could not stop to consider the problem-solving way of searching out a criminal were it not for the fact that it throws a very interesting light upon the psychological activities of a true detective. In all major crimes, there are evidences such as finger prints, weapons, the nature of the wounds on the victim, chance articles that have been dropped, and the like When a detective has brought all of these things together he has what might be called the raw data of thinking His task is to fit these data together so that they will point to or suggest the person who must have committed the crime In other words, the detective has to solve a problem, he has to draw inferences, make deductions, arrive at tentative judgments, try out theories, and eventually come to a conclusion

We may take advantage of this situation in order to see how the processes of reasoning or of problem-solving can be used to best advantage in a practical situation. This is not an easy task for there are so many times when solutions to problems just happen We do not go after them, they simply come to us. As one person has put it, one may have a rendezvous with an idea but one can never expect the idea to be on time As an illustration of this quick type of problem-solving we may take an illustration from some of the studies that have been carried out with chimpanzees [3] Let us suppose that food has been placed outside a cage beyond the reach of the animal. We may suppose, also, that this animal has already learned how to reach food with the aid of a stick Now, however, there is nothing available

[3] Cf Kohler, W , *The Mentality of Apes*, N Y , Harcourt Brace, 1925

save the branch of a tree in one corner of the cage. We may think of this branch as a unit made up of such parts as smaller branches and twigs If the chimpanzee is to get the food he must be able to see a smaller branch not as a part of the larger unit but as a tool which can be used for the purpose of reaching the food That is, one object must be detached from its normal setting and brought into another setting so that a new configuration of data is the result.

This is, as a matter of fact, just what the chimpanzee does Quite suddenly, while looking at the food and searching for something which can be used as a tool, the animal breaks off a smaller branch from the whole and uses it as a stick to draw in the food An object which hitherto has stood in a meaningful relation to one set of objects has now acquired a meaningful relation to a new object This is, in part, just what the detective does He may possess a large number of objects or facts which do not sustain meaningful relations with one another. On the contrary, many of them may be tied up so intimately with other situations that the detective does not, at first, see their significance at all While working over them, however, that is, while thinking about the matter, it will often happen that one or more objects will jump, so to speak, out of one setting and enter into another In this case the detective has what is commonly called a "hunch" Given enough hunches, the most difficult of crimes may be solved

Successful thinking means, then, some such procedure as the following First, there must be a total situation made up of data. These data may be either objective, such as the clews which a detective might gather together, or subjective, such as the knowledge or information which the detective is said to carry in his head Out of this whole situation a problem will arise One of the first tasks is to locate and define the problem If all of the facts in the possession of the detective naturally fitted into an organized picture from the very start, there would be no problem. Problems arise only when there is a partial picture and when there are contradictions and unknown parts.

Having once located and defined the problem, the thinker may then proceed to bring all of the relevant material that he can find to bear upon it. Even this, however, is not enough. Some of the facts are missing. There are also relationships between facts which must be discovered One item of information may have to be taken out of one setting and placed in quite another It is at this point that thinking or problem-solving simply happens. The only thing that one can do

to help such happenings is to remain in what we may call a problem-solving attitude. That is, one must keep constantly before one all of the materials that are available. These materials may be experimentally tried out in all sorts of relationships with one another. The variable meanings of one clew must be put into a tentative relation with the variable meanings of another. During this process, new types of meaningful relation appear and gradually a situation which had been made up of unrelated parts acquires coherence and intermingled significances of a new type.[4]

There is one feature of these processes which distinguishes them from all other processes in nature. When a series of causally related events happen in nature we know that they must happen in that particular order on a subsequent occasion. If the nervous system worked in this same way, it would always have to write over again the order of events just as they occurred in the first place. Fortunately, it does not work in this way. Events which may have taken place in it at some past time can be lifted out of their old temporal order and brought into a present series. It may be, for example, that one of the clews used by a detective was discovered in a certain spatial and temporal relation with other events. A second clew has come to notice in another spatial location and at another time. If these items were forever locked up in their own special setting, they could never come together in such a way as to sustain a meaningful relation to one another. The nervous system makes this kind of coming together possible.

As a practical matter, then, thinking or problem-solving depends upon the presence of information. If thinking is to be accurate and successful this information must be accurate. Observation must be acute and memory must be reliable. Problems emerge out of such situations and once they have emerged they must be identified or located as accurately as possible. The thinker then persists through what may be called the problem-solving attitude. He ponders, he reflects, he explores here and there, he tries all sorts of combinations of relatedness. At variable times in this process hitherto unrelated items suddenly become related. These new relatednesses are, in their turn, used in the same manner as the original data. At length a tentative conclusion is reached, whereupon it is put to a critical test. If the tentative conclusion does not turn out well, the problem-solver must then continue his searchings until a working conclusion is reached.[5]

[4] Consult Dewey J., *How We Think*, N. Y., Heath, 1933.

[5] A good description of sudden types of thinking may be found in Carmichael, R. D., *The Logic of Discovery*, Chicago, Open Court Pub. Co., 1932.

3 *The Analysis of Motives* - - If a man were perfectly free to do as he pleases, that is, free in the second sense described on page 220, any crime that he might commit would have no discoverable motive It would simply be an act of free choice and thus not related to his past experience or to any of the things that ordinarily excite him to action. As we have seen, this view of human behavior is not tenable On the contrary, every act is the more or less direct outcome of some form of stimulus to action Moreover, some of the facts in Chapter Four have suggested that such stimuli need not consist of the direct physical presence of an object or event To begin with, the word motive applies to those forms of stimulus to action which are resident within the body itself Hunger, thirst, sex, the need for change or activity, and the need for rest are some of the primary tissue needs of the body. As time goes on, these primary motives become converted into a large number of secondary motives such as social, religious and idealistic, compensatory, pleasurable, pathological motives, and the like. It has been pointed out that it is a far cry from such a persistent stimulus to action as hunger, on the one hand, and a trip to Europe, on the other, but the experimental laboratory seems to be furnishing some of the main outlines of the way in which such transitions are effected.

Any given action, then, must have an incentive behind it, either in direct form among the objects and events around the individual or in indirect form among the various primary and secondary urges. It follows from this that the search for a criminal and the direction of suspicion upon such a person comes from a study of the motives that might have prompted him to his act If, for example, there were circumstantial evidence pointing toward a half-dozen individuals, the detective in the case would go beyond his circumstantial evidence to the possible motives which could have driven these persons to the criminal act As a rule, if no such motives can be found for any given person, this fact is almost enough to clear him, although the circumstantial evidence may run strongly against him.

Aside from crimes which owe their origin to pathological conditions, there are some which are, as we have seen, a product of hunger or of economic incentives, and of sex That is, some crimes are obviously the result of primary tissue needs which have become misdirected in expression, or thwarted because of the obstacles which social living may have placed in their way There is one theory of the nature of criminal acts which strongly emphasizes this feature, especially in the case of the sex impulses In order, then, to understand the relation

between motives, on the one hand, and criminal acts, on the other, we must find out what the Freudian school of psychology has to say about the matter

In the next chapter we shall describe in more detail the fundamental thesis of Freudianism In brief, this theory of the nature of psychological facts argues that the conscious ego commonly studied by the psychologist in his laboratory is only one of the parts of which the whole mind is composed Below this part there is that reservoir of instincts, strivings, and urges sometimes summed up by the word "libido" Most of these urges, if not all of them, are sexual in character This level of the mind has been called the *id*. Above the normal mind, so to speak, and in eternal conflict with the *id*, is that part of the ego which may be called the super-ego From a good many points of view, the super-ego is the Freudian substitute for the more old-fashioned term "conscience" It is an ego which develops between the fourth year and adolescence and represents the ethical and moral ideals of the social group

In the Freudian system, the motives leading to criminality are to be found in the original nature of the *id* Among other things, the *id* is essentially cannibalistic in its desires as is illustrated by the way in which it eats, so to speak, of the mother's body while it is feeding at the breast Moreover, the *id* is essentially filthy in its initial desires, an attribute which is said to be illustrated by the interest and sometimes, actual delight, which the small infant takes in the excretions of its own body A further trait of the *id* is to be found in its sex desires It is asserted, for example, that the first smiles of infants are initiated by gently stroking its sex organs, the breast region, and the mouth parts. During the first three or four years of development, the infant is openly and frankly sex-minded, but after this time, the developing ego and the developing super-ego make it necessary for the infant to repress, change, or modify its initial character more in conformity with the ethical and moral standards of the adults around it.

It would follow from this theory of human nature that all human beings are essentially criminal. Even those adults who have been more or less successful in repressing their criminal tendencies still revert, on occasion, to infantile modes of action These impulses are said to be illustrated by the occasional criminal, by dreams, by bull fights, boxing, football, and other types of socially approvable brutality, and by the complete reversion to animal behavior which fre-

quently occurs during warfare Even the socially approved functions of the surgeon are said to mark one outlet for a more primitive sadistic impulse, that is, an impulse to inflict pain as a substitution for sex behavior.

As we have said, the process of converting the *id* into a social individual takes place during the so-called period of latency, that is from the third or fourth year to adolescence It must follow, then, that the deviation of the criminal type from the normal type, or conversely, the deviation of the normal type from the criminal type, takes place during this period The individual who, in the future, is to act in a more or less normal way, will succeed in suppressing his native criminal drives He will cut them off from direct motor expression but use their energy in ways that can be approved by the group The criminal, on the other hand, continues to act as though he were an infant. In short, the only difference between the normal individual and the criminal would lie in the fact that the normal person has found more or less harmless ways in which he can express his primary criminal tendencies.[6]

It would follow, from this account of the nature of the criminal, that the dice are loaded against education or training from the very start. This theory of human nature is allegedly a scientific revival of the much older doctrine of innate sin It follows, too, that the solution of any crime depends primarily upon a successful search for the essential motives It is already determined what these motives shall be As we shall see, in our study of the relations between psychology and medicine, the primary tissue needs of the body get caught up in all kinds of conflicts, repressions, and sublimations At root, however, the thousandfold variety of sublimational activities may be traced back to libidinous strivings. It would follow, therefore, that the psychoanalyst should play as important a part in the court of law as the lawyer or the judge. From some points of view he might even play a more important part for it is his particular function to search out motives. Having once found the particular complex out of which the crime has sprung, the crime can be said to have been explained. Since, however, explanations of this type would have dubious relations to personal responsibility, the aftermath of the trial should take place in a psychopathic hospital rather than in a jail. There will be times, of course, when complexes and other faulty

[6] Alexander, F , and Staub, H , *The Criminal, the Judge, and the Public*, N Y , Macmillan, 1931, pp 33 ff and *passim*

derivatives of the criminal character of the *id* would be so firmly established as to resist medical and educational treatment It would be the hope of the psychoanalyst, however, to rescue a large number of criminal types, first, by digging out the perverted urges of an individual and, secondly, by attempting to reeducate him

We shall, of course, have much more to say about the psychopathic personality in some of the chapters that are to follow In our study of punishment, for example, it will be necessary to come back to the theory of human nature just outlined because punishment may have an effect not only on the criminal but upon the normal person as well If, for example, a normal person sees criminal acts go unpunished, his super-ego which fortifies him against his own criminal tendencies, loses some of the support which it should rightly expect Moreover, the theory which we have just outlined belongs to a whole group of theories as to the nature of psychological ailment We cannot do full justice to it, then, until we have considered these ailments more in detail and have had the chance to see what other modes of explanation may be offered for them

4 *Associative Reactions*—One of the most fruitful methods of detecting guilt is known as the association method This method simply means that a person suspected of some crime may be asked to reply to a list of words by giving the first word that occurs to him after the stimulus word It might appear, at first sight, that this initial response would be subject to no controlling factors It turns out, however, that the responses that are made are always controlled in one way or another If no other factor is operative, the response word will be an expression of normal associative dispositions In response to the word "dark" for example, the word "light" will come more often than any other If large numbers of words are given to normal subjects, one can find out what the normal probability for any given response word will be Usually the response words are limited to five or six different terms[7]

If the first word aroused by some stimulus word could be explained only in terms of normal associative connections, the association test would have no particular value in the diagnosis of conduct There are, however, a great many features of it which

[7] Jung C G, "The association method" *Amer J Psychol*, 1910, *21* 219-269 Jung, C G *Studies in Word Association*, N Y, Dodd Mead, 1918 Kent G H, and Rosanoff A J, "A study in associations," *Amer J Insan*, 1910 *67* 37-96, 317 390

may reveal other psychological events than associative connections This revelation comes, in part, from variations in reaction time As we shall see in a moment, words which touch upon some complex,—say the effort of an individual to conceal an act,—will cause the reaction time to be longer than is normally the case Among other features of the behavior of an individual who is being studied by the association method, there are such items as the desire to change a response word, fidgeting, interjections not intended as response words, laughs, failure to understand the stimulus word, repeating the stimulus word, speaking phrases or sentences which may contain the response word, giving more than one response word, making no response at all, asking questions about the stimulus or the response, and the like[8]

Each of these variations in response may be used at one time or another as diagnostic signs of lying, cheating, or of the existence of some complex They owe their origin to the fact that the list of stimulus words may be made up of some words that are irrelevant to the crime or to the complex and of other words which are supposed by the experimenter to be distinctly relevant In general clinical practice, it is known beforehand that certain words are almost sure to touch a complex if the complex is present In such cases, the experimenter may expect that the response word will be delayed Intense complexes or extreme guilt may sometimes block the making of any kind of a response It is even possible that an extremely short reaction time or a repetition of the stimulus word itself may become significant, because, in such cases, the liar would attempt to conceal his guilt by affecting indifference to critical words. General confusion may reveal itself in an apparent misunderstanding of the stimulus word or by the use of meaningless reactions or by persistent use of a single word This last device is often resorted to by sophisticated subjects

It has been fairly easy to use the method of free association even in ordinary laboratory experiments on the detection of guilt In one case, for example, two judges were asked to decide guilt in the case of twenty-six subjects Only one error was made[9] In another study it was shown that the average reaction time of a guilty subject to the crucial words in a stimulus list was 0 831 of a second longer

[8] Wells F L *Mental Tests in Criminal Practice*, N Y, World Book Co 1927, p 211

[9] Terry H M and Washburn, M F, 'Some tests by the association reaction method of mental diagnosis' *Amer J Psychol*, 1910, 21, 162–167 Larson, J A, *et al Lying and Its Detection* Chicago Univ of Chicago Press 1932

than for the non-crucial words. The innocent subjects, however, showed an average increase of only 0 37 of a second [10] In these and in other cases the subjects have usually been instructed to make every attempt to conceal their guilt. The situation is somewhat different, however, in actual courtroom procedure. The chances are that a criminal may easily have other complexes aside from his actual guilt or innocence Moreover, the method of association works to best advantage only with those persons who are naive throughout the experiment Clearly a sophisticated subject could defeat the purposes of the test by responding with numbers or with the successive words in some bit of poetry or prose.

5 *The Lie Detector* – Some persons have taken the free association method as a sure way of detecting the guilt of an individual. Even more credence has been given to the use of other measures of emotional states It has long been known that some of the more common physiological functions change during emotional action. Among the functions that have been studied most intensively are blood pressure and the ratio between inspiration and expiration. Here again pseudo-crimes committed in a laboratory furnish appropriate opportunities for study. In one such case, for example, the experimenter thought he was able to render a correct judgment of truth or falsehood in ninety-six per cent of the cases.[11] In a more careful study, however, another experimenter was able to judge correctly only twelve out of twenty-two cases. That is, the experimenter had done scarcely better than chance [12] Among the symptons that have been used in these studies are increase in blood pressure, decrease in blood pressure, changes in pulse, variations in inhibition, irregular fluctuations in heart beat, and the like.[13]

The detection of lying in terms of the inspiration-expiration ratio seems to be a little better established than is the case with blood pressure. The inspiration-expiration ratio is created by the fact

[10] Langfeld H S, "Psycho-physical symptoms of deception," *J Abnorm Psychol*, 1920, *15*, 319–325 See also Marston, W M, "Reaction time symptoms of deception," *J Exper. Psychol*, 1920, *3*, 72–87

[11] Marston, W M, "Psychological possibilities in the deception tests," *J Crim Law and Criminol*, 1920, *11*, 551–570, "Systolic blood pressure symptoms of deception," *J Exper. Psychol*, 1927, *2*, 117–163

[12] Landis, C and Gullette, R, "Studies of emotional reactions three systolic blood pressure and inspiration-expiration ratios," *J Comp Psychol*, 1925, *5*, 221 253 Landis, C, and Wylie L F, "Changes of blood pressure and respiration during deception," *J Comp Psychol*, 1926, *6*, 1–19 Landis, C, "Detecting the deceiver," *Indust Psychol*, 1927, *2*, 241 249

[13] Larson, J A, "The cardio-pneumo psychogram in deception," *J. Exper Psychol*, 1923, *6*, 420–405

that, during strong emotions, the time for inspiration may be greater than the time for expiration. When a man is angry, for example, he will breathe out rapidly but take in air more regularly. Moreover, the breath may be held for a longer period than under normal conditions. During normal breathing the inspiration-expiration ratio averages o 805 of a second. During laughter, the ratio drops to o 20 of a second, but in fear it rises to 2 66 of a second [14] Various experimenters have claimed various degrees of accuracy in the detection of lying through these means. In one case, an accuracy of one hundred per cent has been claimed [15] In another case, however, the experimenter was successful in ratios varying from fifty to seventy-three per cent [16]

It is clear that studies of this kind must depend upon accuracy in the use of very sensitive instruments Moreover, it is not often that an experimenter can produce a situation in a laboratory which would have the same emotional quality which a courtroom situation might possess. As in the case of the free-association method, studies on blood pressure and the inspiration-expiration ratio are more effective in direct proportion as the subjects are naive. The reader will also see that the success of such methods as these for the detection of lying must depend upon the emotional training of the individual A criminal could easily remain more or less insensitive to the emotional situations of a crime whereas an innocent person might be uneasy, if not actually frightened, by formal cross-examination.

6 *The Third Degree.*—There is a great deal of popular superstition around that method of determining guilt commonly described as the "third degree" In general, the method depends upon the brutality of a man's captors and upon the development of fear and fatigue through long wakefulness, deprivation of food, a return to the scene of the crime, and the like In short, the third degree is a sort of psychological version of the old-fashioned methods of inquisition

The third degree is, of course, an extreme form of a method which may run all the way from physical violence to continued question-

[14] Feleky, A M, "The influence of emotions on respiration," *J Exper Psychol*, 1916, *1*, 218–241

[15] Benussi, V, "Die Atmungssymptome der Lüge," *Arch f ges Psychol*, 1914, *31*, 244–273

[16] Burtt, H E, "Further technique for inspiration-expiration ratios," *J Exper Psychol*, 1921, *4*, 100–110, "A pneumograph for inspiration-expiration ratios," *Psychol. Bull*, 1918, *15*, 325–328 Landis, C, and Wylie, L E, *op cit.*

ing for the purpose of picking out flaws in the replies of the suspect. If a guilty person were to try to put his accusers off the track by creating a fanciful story of his whereabouts at the time a crime is committed, one could take advantage of the normal laws of forgetfulness in order to search out discrepancies between stories that are told on successive days In this case the accusers would simply depend upon the normal processes of forgetting They might also use a modified form of the free association test, for it often happens that certain types of questions addressed to a suspect will bring the same revealing signs in response as accompany a response word in a normal test

There is nothing of particular psychological import in the use of more extreme methods of winning a confession The only factor at issue is the readiness with which any given subject will prefer relief from pain, from prolonged sleeplessness, and from hunger as compared with a confession If it is true, as some suppose, that all human beings seek for pleasure and try to avoid pain, a confession would be nothing more nor less than escape from the brutal tactics that are sometimes alleged to take place

GENERAL READINGS

Burtt, H E, *Legal Psychology*, N Y, Prentice-Hall, 1931
Symonds, P M, *Diagnosing Personality and Conduct*, N Y, Century, 1931

CHAPTER SEVENTEEN

ON THE WITNESS STAND

1. *Introduction* There are two ways in which the facts about an automobile accident can be established On the one hand, there is the physical view of the situation This view would require that an experimenter find out how fast each of the cars was moving, how heavy they were, the direction in which they were moving, and the exact angle of incidence at the moment of collision. These and other bits of information, - such as a physicist or an engineer might collect, if they could be forewarned of the accident, —would make it possible to explain the damage that had been wrought. It might even be possible, given sufficient knowledge about the materials that were used in the construction of the two cars, to explain why it was that one of them rolled over, why certain pieces of glass were broken why different areas on the bodies of the two cars were dented or torn, and why they stopped just when they did Absolute information in all of these respects could be gained by staging an artificial accident in which all of the various physical features that might be measured would be determined in advance of the accident.

A second way of describing an accident may be called the psychological or subjective way This way would make use of the reports of persons who happened to be present when the accident occurred At first sight, one might suppose that the facts could be established in this case just as accurately as they can be in the other, but as we shall see in a moment, even though all of the observers know beforehand that an accident is to occur and even though they have been instructed specifically to note and to report on the situation, it is not possible to find out for certain just exactly what occurred The psychological report of an accident depends, among other things, upon the competence of the perceptual apparatus of the witnesses, upon their general attitude (the direction of attention) at the moment the event happens, upon involuntary inferences which they may draw from what they have seen, upon their previous training, including their experiences with sudden events, upon their ability to recall what has been seen, and upon such factors as their prejudices for or against

the drivers of the two cars. All of these factors and a great many more would be different from one witness to another. Each person would have his own estimate of the speed at which the cars were traveling and of the actions of each driver when it became clear that a crash was imminent [1]

These variable factors exhaust, by no means, the difficulties which would lie in the way of assigning a given degree of guilt to one driver or to the other The faulty and biased observations of the witnesses modified, as they are, by the variable processes of forgetting, must pass, first, through the hands of the lawyers These men, too, differ from one another just as greatly as the witnesses do Previous training, differences in the use or significance of words, differences in attitude, prejudices of a racial or a sexual origin, personal attitudes for or against the parties concerned, external motives which may be a product of even such seemingly irrelevant factors as the character of one's breakfast, and a great many other circumstances, as well, would bring about a further distortion of a series of events which have already been distorted by the eye-witnesses.

Even yet we are not out of the woods. The reports of the witnesses of an accident, after having gone through the hands of the lawyers, must still pass through the hands of the judge or of a jury Here again men differ from one another just as widely as the witnesses differ from one another The judge and the jury may like or dislike a lawyer or a witness, they may hear certain types of testimony while they are deeply absorbed in some economic, political, or social problem of their own, they will forget what has been said and misinterpret the meaning of certain words, they will have had variable amounts of training and have developed preferences, on the one hand, or inhibitions, on the other, toward certain kinds of facts. These are only a few of the circumstances which make the ascertainment of the truth in a court of law almost impossible [2]

In view of all of these contingencies and of a great many others besides, it is a wonder that a court can ever arrive at a just verdict on a question of damages or on a question of criminal guilt. If legal practice could be made scientific, that is, if observation and report could always

[1] Marston, W M, "Studies in testimony," *J Amer Inst Crim Law*, 1924, *15*, 5–31. Cady, H M, "On the psychology of testimony," *Amer J Psychol*, 1924, *35*, 110–112. Hutchins, R M, and Slesinger, D, "Some observations on the law of evidence The competency of witnesses," *Yale Law J*, 1928, *37*, 1017–1028

[2] We may remind the reader of the facts named by the words "inhibition" and "facilitation" as they were discussed in Chapter Six

be strictly accurate and if it were possible to take human action out of the variable settings in which it always occurs, many of the problems of legal psychology would be much simpler than they are. As a matter of fact, rather serious attempts have been made to simplify them. There is, perhaps, no social institution which is based upon a more thoroughgoing system of cross-indexing decisions and judgments than is the case with law. Legal books are filled with judgments that have been made on human action. Once such a judgment has been rendered, it can be taken out of the particular and highly individualized situation in which it occurred and treated as though it were as impersonal and objective a fact as are some of the facts in the physical sciences [3] In the handling of a new situation, therefore, both judges and lawyers are inclined to consult the records. In reply to any given situation a lawyer will find out what was done in previous cases of the same general class. He cannot, however, review again the variable factors which always give to any particular set of circumstances a unique configurational pattern of their own In short, the possibility of a legal science depends upon the deliberate disregard of particular or individual facts and a relatively large regard for classes of fact.[4]

The only escape from these several considerations, so far as courtroom procedure is concerned, is to find out as much as possible about the circumstances which make the testimony of witnesses, the interpretations of lawyers, and the judgments of juries unreliable In view of the extreme variability of human nature, it would never be possible to make just and due allowance for every variable factor. It begins to look, however, as though certain sources of error can be properly accounted for. In any case, it is the task of this chapter to describe some of the psychological characteristics of witnesses, lawyers, and judges in so far as these characteristics concern courtroom procedure [5]

2 *Observation* —A full account of the errors to which observation is subject would mean almost a complete review of the whole field of perception. It is clear, in the first place, that facts about any event depend upon normal powers of vision and hearing. In order to make our task simpler, we shall assume that the perceptual apparatus of our witnesses is in good condition.[6] We shall also assume that the

[3] Cf Goble, G W , "Law as a science," *Scient Mo* , 1933, 37, 229–240

[4] Osborn, A S *The Problem of Proof*, N Y , Bender, 1922

[5] The reader should compare what is said in this chapter with the other chapters that have treated individual differences more specifically Cf also Ellis, R S , *The Psychology of Individual Differences*, N Y , Appleton, 1929, Chap XX

[6] Sheard, C , "Some factors affecting visual acuity," *Amer J Physiol* , Oct , 1921, pp 168 ff Other factors that have to do with vision have been described in Chapter Two.

events being observed are not of such a character as to create what are commonly called illusions.[7]

As an example of faulty observation, even where the apparatus is normal, we may take variations in the judgment of the speed of an automobile. Twenty-nine subjects were asked to judge the rate at which automobiles passed a given point. The cars differed widely from one another, ranging all the way from a small four-cylinder car to a large de luxe model. Speeds varied from six to sixty-eight miles per hour. It was clear from the judgments gained from the observers that estimated rates of movement depended upon the size of the car, the noise that it made, the rate of movement of a car which had just passed, and the general training of the subject. Obviously, estimates of rate of movement must be just as variable as this variability in conditions.[8] Similar errors of judgment occur in the estimation of the passage of time. In one study on this matter the estimated duration of a 20-second interval varied with different judges from 5 to 100 seconds, whereas an estimated duration of a 30-second interval varied from 5 to 155 seconds.[9] In another study a group of forty-four subjects was asked to estimate the time spent in looking at a motion picture scene. The actual time was one minute. The estimated time varied from 10 to 400 seconds.[10] Other experiments have shown that errors in the estimation of time depend upon the kind of activity going on during the interval. The activities used in one experiment were as follows: complete rest, holding arms extended to the side, listening to a slow metronome, holding the palm on a thumb tack, reading directions in a mirror, copying from dictation, and doing long division. The average lengths of the judged interval (200 seconds) decreased with reference to activity in the order just named.[11] It is, of course, one thing to measure variations in the judgment of rate of movement or time under laboratory conditions and quite another to say what the interval was between a pistol shot and

[7] Judd, C. H., "A study of geometrical illusions," *Psychol. Rev.*, 1899, *6*, pp. 241 ff.

[8] Richardson, F. E., "Estimations of speed of automobiles," *Psychol. Bull.*, 1916, *13*, pp. 32 ff. See also Munsterberg, H., *On the Witness Stand*, N. Y., Clark Boardman, 1908 (reprinted 1925), p. 23. Other experiments bearing upon the perception of movement are Thelin, E., "Perception of relative visual motion," *J. Exper. Psychol.*, 1927, *10*, 321. Carr, H. A., and Hardy, M. C., "Perception of relative motion," *Psychol. Rev.*, 1920, *27*, 24–40.

[9] Axel, R., "Estimation of time," *Arch. Psychol.*, 1924 (No. 74).

[10] Boring, E. G., "Capacity to report upon moving pictures as conditioned by sex and age," *J. Amer. Inst. Crim. Law*, 1916, *6*, pp. 820 ff.

[11] Gulliksen, H., "The influence of occupation upon the perception of time," *J. Exper. Psychol.*, 1927, *10*, 52–59. Woodrow, H., "The reproduction of temporal intervals," *J. Exper. Psychol.*, 1930, *13*, 473–499.

a shout or the distance to be covered in comparison with a change in the traffic signals It is quite clear, however, that these phases of perceptual function are exceedingly variable [12]

Sometimes the getting of exact facts requires that witnesses shall tell how many persons or objects were present at certain crucial moments. Judgments of this kind are also highly subject to error It is well known that the number of objects which can be reported in a very short period of time is only five or six As a rule, where longer intervals are involved, one may greatly exceed this limit, but even so, judgments are apt to be highly unreliable When, for example, cards containing 50 spots were presented to a group of subjects, the subjects being asked to estimate the number of spots, the answers ranged all the way from 25 to 200. Similarly, when the number of spots was only 20, the judgments ranged all the way from 10 to 70 [13]

As a final illustration of the way in which the perceptual functions may lead to error in observation, we may mention one or two of the studies on the estimation of distances It is commonly known, of course, that the perception of distance is, in part, the result of slightly dissimilar images upon the two retinas because of the spatial separation of the eyes [14] Other factors, however, such as the intervention of nearer objects, the distinctiveness of the object and its size, contribute to judgments of this sort. In general, most persons tend to underestimate distances It is clear, also, that judgments of distance are highly subject to training in the sense that they may be made much more dependable through training [15] The same facts hold true of judgments of angles In general, angles are either underestimated or overestimated, inaccuracy being greatest with acute angles [16]

Another source of inaccuracy in observation has been suggested by the statement above to the effect that situations which are highly complex in character cannot be adequately observed This fact holds true both with respect to quick glances at a situation and with respect

[12] Consult the references in Slesinger, D , and Pilpel, E M , "Legal psychology," *Psychol Bull* , 1920, *20*, 677–692

[13] Poffenberger, A T , *Applied Psychology*, N Y , Appleton, 1928, p 479 Also Weinland, J D , "The effect of grouping on the perception of digits," *Amer J Psychol* , 1924, *35*, 222–229

[14] Titchener, E B , *Textbook of Psychology*, N Y , Macmillan, 1910, *passim* Smith, W G , "Prevalence of spatial contrast in visual perception," *Brit J Psychol* , 1915, *V*, 317–326

[15] Consult any of the general texts on child psychology listed at the end of Chapter Twenty-Four

[16] Pratt, N B , "Visual estimation of angles," *J Exper Psychol* , 1926, *9*, 132–140 See also Young, P T , "Auditory localization with acoustical transposition of the ears," *J Exper. Psychol* , 1928, *11*, 399–429

to longer inspections of them. As we have seen from some of our earlier discussions, no person can ever react at one and the same moment to every object or event in his effective environment. There are two conditions which make it certain that some objects and events will become more prepotent than others. "Attention" is the word which is used to describe the fact that those objects or events which are more intense, which are in movement, or which are new or strange, tend to become prepotent over others in controlling the perceptual behavior of a possible witness On the other hand, those objects and events which an observer has reacted to previously or which are congruent with his present attitude or set tend to become prepotent over all others This fact is frequently summed up in the word "interest" [17]

In addition to these features of perception, there is that whole group of problems named by the words "attitude" or "set" As we have seen in our brief discussion of some of the stances which an athlete may take, no witness can ever make an observation in complete independence of the way in which he has been tuned by previous experiences [18] If a witness has only a brief glance at a very complex set of events, it is almost inevitable that most of the events will remain unnoted so far as he is concerned The partial pictures which different witnesses get of the same events must, then, be assembled by the lawyers in the hope that some approach to an actual reconstruction of the scene can be made. It is hardly necessary to argue, however, that any reconstruction will include a considerable amount of fancy. This fact has been pointed out abundantly in the study of dreams where it has been shown that the dreamer will have a tendency to make a logical story out of meagre nonsense material.

3. *Retention.*—It is scarcely necessary to remind the reader of the extremely rapid way in which forgetting takes place. Experiments that have been made on what is sometimes called the curve of forgetting show that approximately half of the material that entered

[17] For references to studies on memory span, see Guilford, J P, and Dallenbach, K M, "The determination of memory span by the method of constant stimuli," *Amer J Psychol*, 1925, *36*, 621–628 For recent work see Fernberger, S W, "A preliminary study of the range of visual apprehension," *Amer J Psychol*, 1921, *32*, 121–133 Oberly, H S, "The range of visual attention, cognition, and apprehension," *Amer J Psychol*, 1924, *35*, 332–352 Dallenbach, K M, "Note on Dr Oberly," etc, *Amer J Psychol*, 1925, *36*, 154–156. Whipple, G M, "The effect of practice upon the range of visual attention and of visual apprehension," *J Educ Psychol*, 1910, *1*, 249–262 Foster, W S, "The effect of practice upon visualizing and upon the reproduction of visual impressions," *J Educ Psychol*, 1911, *2*, 11–22 Dallenbach, K M, "The effect of practice upon visual apprehension in school children," *J Educ Psychol*, 1914, *5*, 321–334, 1919, *10*, 61–82

[18] Refer again to the discussion of stance in Chapter Two and to the references on set or attitude

into an initial presentation is forgotten within the first twenty-four hours. To be sure, a witness could overlearn or overmemorize events that have taken place, providing the events could be repeated. Since this is rarely possible, the witness must depend upon a process of remembering upon which destructive forces begin to work just as soon as the event is experienced. Among the destructive forces which we have already mentioned are the interference created by additional experiences, inhibitions that may work against the recollection of unpleasant matters, and the tendency of most witnesses to fill out unobserved portions of a complex scene by inserting objects and events which he believes must have been present.[19]

One of the most serious faults to be found in testimony is created by the readiness with which a witness will transpose the order of events. Since judgments of time, distance, and rate of movement are so variable, we can scarcely wonder at these transpositions. In a great many trials, however, it is absolutely essential to know the exact order in which a series of events may have taken place. If a witness knew that he would be called upon to tell his story, his memory of the events seen and heard would be greatly strengthened by immediate recall. Even this process, however, has its dangers for if an accident were described to a group of listeners, questions would almost certainly be asked which would tempt the witness to justify his report even though such justifications might lead to actual falsification.[20] The suggestions made by one's auditors will often be accepted by the witness himself and made a part of his own testimony.

It is sometimes said that the completeness of retention is a function of the similarity which an observed event has with previously observed events, the frequency of repetition, and the recency with which the event has occurred. All of these factors have entered into practical legal judgments. There are cases on record, for example, where courts have excluded memoranda from the record if these memoranda have been made as much as a week after the events under discussion have occurred.[21] In other cases, however, courts have assumed that retention may be fairly reliable for longer periods of time. The student already knows that an event which has been experienced in connection with deep emotional stress may not easily be forgotten, but he knows too that effective factors are likely to introduce serious errors in re-

[19] Dunlap, K., *Habits Their Making and Unmaking*, N. Y., Liveright, 1932, Chap. VIII.

[20] Hutchins, R. M., and Slesinger, D., "Some observations on the law of evidence: Memory," *Harvard Law Rev.*, 1928, *41*, 860–873.

[21] Cf. Burtt, H. E., *Legal Psychology*, N. Y., Prentice-Hall, 1931, pp. 70 ff.

tention Excitement usually works against accurate observation and, moreover, it serves to fix some features of a total situation more clearly than other features [22]

During the emotional stress of an accident, witnesses will often make involuntary exclamations concerning what has happened Legal procedure has been much perplexed as to how to handle these exclamations for it is affirmed, on the one hand, that since excitement dulls reflection, they must represent an unbiased comment upon the situation If this is taken for granted, then, a court must decide what an exclamation is and how long after the event it may occur in order to be counted as truly exclamatory [23] There are instances on record where courts have ruled that exclamations are spontaneous only when they have been uttered within a few minutes of the events under discussion. In other cases, however, the interval has been much longer [24]

4 *Making a Report*—Obviously, all of the circumstances which have been mentioned concerning observation and retention must interfere more or less seriously with the nature of the report rendered. In addition to these circumstances, however, there are certain other factors which modify still further the reconstruction of a criminal action or an accident Let us assume that the observer has been as reliable in his observations as the frailties of human nature will permit. Let us assume also that the witness has an unusually good memory. In spite of these advantages, the character of the report which he will give may depend in part upon the way in which the report is rendered. On the one hand, he may simply repeat what he saw and, on the other hand, he may respond to a series of questions about the events under examination These two methods of report differ in reliability Moreover, if the second method is used, the accuracy of the report will depend upon the form in which the questions are phrased.

A study of this last factor will illustrate the difficulty we have in mind. A series of motion pictures were presented to a group of fifty-six subjects. The subjects were then asked a number of questions based upon the events just observed. Some of the questions were phrased so as to use the definite article "the" For example: "Did you see the object?" Others, however, used the indefinite article as, for

[22] Cf Myers, G C, "Affective factors in recall," *J Phil, Psychol, and Sci Meth*, 1915, *12*, 85-92

[23] Hutchins, R M, and Slesinger, D, "Some observations on the law of evidence I Spontaneous exclamations," *Columbia Law Rev*, 1928, *28*, 432-444

[24] Burtt, H E, *op cit*, pp 74 ff

example· "Did you see an object?" Both of these questions are more or less direct when compared with such suggestive modes of query as are illustrated by these sentences, viz, "Wasn't there an object present?" or "Didn't you see the object?" Finally, it is possible to ask direct or indirect questions about objects that were not actually present If, in a given case, one of the parties concerned did not wear a hat, one may still ask, "What kind of a hat did the driver of the first car wear?"

The results of the above study showed quite clearly that a change from the indefinite to the definite article decreased suggestiveness, caution, and reliability of the answers The introduction of a negative into the question increased suggestiveness but decreased caution and reliability When both a definite article and a negative were used, suggestibility was decreased but caution and reliability were increased. Questions which implied the presence of an object gave the lowest scores in suggestiveness, caution, and reliability. In general, it appeared that the most reliable form in which to phrase a question is one which contains neither a negative nor a definite article [25] A more recent study of this same problem, making use of a very large number of subjects, has given the same general results It may be that the difference between the use of an indefinite and a definite article has been somewhat exaggerated, but there can be no doubt about the main facts, viz, that the reliability of a report does depend in an intimate way upon the form of the question We need not argue, perhaps, that there is a certain difference between laboratory experiments of this type and an actual courtroom situation where a witness would be much more open to suggestion, either from the prosecution or the defense [26]

There is a great amount of difference between the simple recital of a series of events and a description of the same events subsequent to question. In general, it seems fair to say that witnesses will make more errors when they are answering questions than when they are reciting from memory It is to be remembered, however, that simple narration may cover a wider range of topics than the question method does [27]

It is possible to compare even more directly than we have as yet the

[25] Muscio, B, "The influence of the form of a question," *Brit J Psychol*, 1915, *8*, 351–389

[26] Burtt, H E, and Griskill, H V, "Suggestibility and the form of the question," *J Appl. Psychol*, 1922, *10*, 358–373

[27] Kady, H M, "On the psychology of testimony," *Amer J Psychol* 1924, *35*, 110–112 See also Morgan C S, "Study of the psychology of testimony," *J Crim Law and Criminol*, 1917, *8*, pp 222 ff Otto, M C, "Testimony in human nature," *J Crim Law and Criminol*, 1918, *9*, pp 98 ff

accuracy of a simple narrative report, of simple interrogation, and of narration plus interrogation. In one study of these three forms of report, the subjects were asked to recall the events seen immediately and also to recall them after a delay of thirty, sixty, ninety, and one hundred and twenty days The results showed that when questions were asked immediately following narration, a subsequent recall would usually be more accurate. This fact holds true for each of the intervals named, viz., thirty, sixty, ninety, and one hundred and twenty days. Accuracy of report stands higher at ninety and at one hundred and twenty day intervals than it does at thirty and sixty day intervals. The contrary method of questioning the observers immediately before a narrative report does not aid recall [28]

Not the least of the difficulties present in successful recall is created by the difference between what may be called intentional memory and incidental memory We have already seen that the intent to learn a piece of poetry or to acquire a skill greatly favors the rate of learning. Let us now suppose that an experimental situation has been so arranged that the learner is bent upon recalling only certain parts of a complex set of factors It is to be expected that the intent to recall such parts will manifest itself in greater success All of the other parts of such a situation, however, would remain more or less accessory to the principal task In one such experiment the subjects were presented with cards which contained a number of different letters printed upon them. The card itself was yellow with a border made up of black dots. The letters were printed in red The specific instruction was to count the number of "O's" on the card and to remember this number. After the experiment, however, the subjects were questioned concerning other features of the total situation. It turned out that only one subject out of 450 was able to recall all of the other letters printed on the cards. Only six of the subjects remembered four of the additional letters [29]

Better success for incidental memory was achieved in another experiment of the following type. The subjects were asked to learn nonsense syllables and to associate names with photographs. During one phase of the experiments the subjects knew that they would be asked later on to recall the material, but during another phase there was nothing about the instructions to give them this intention. If the amount of material recalled when there was an intent to learn is rated

[28] Whitely, P L, and McGeoch J A, "The effect of one form of report upon another," *Amer J Psychol*, 1927, 38, 280–284

[29] Myers, G C, "A study in incidental memory," *Arch Psychol*, 1913 (No 26)

as one hundred per cent, incidental memory for nonsense syllables stood at eighty-one per cent and incidental memory for the association of names with photographs stood at only fifty-seven per cent.[30]

Since most accidents or criminal actions take place without forewarning, it is clear that any report of them must be made up pretty largely of incidental memories. Those features of a total situation which demand attention or which the witness is in any way prepared to observe will stand out over the other features. If a witness is to make a report about events for which he has had no previous intention to recollect, his answers to questions will be a product, in part, of what he thinks must have occurred, in part, of suggestions made by the lawyer and, in part, of sheer imagination.

5. *The Lawyer and the Judge*—We have by no means reached the end of the variable factors which stand in the way of an accurate description of an accident. Even though a witness were so fortunate as to be forewarned of a misadventure, the report that he makes must still pass through the hands of the lawyers, the members of the jury, and of the judge on the bench. None of these men will have seen the incident under investigation and they are confined, therefore, to second-hand information. After the witnesses have tried to reconstruct an event as it must have taken place, the lawyers and the members of the jury must try to reconstruct the constructions of the witnesses This process cannot help but include factors which had nothing at all to do with the original event. Each person sitting in the jury box, for example, has his own interests and occupations. He comes to the box with these things in the foreground of his attention. Each man will be prepared by his previous experience to attend more closely to some phases of the accident than to others. Each one will have different standards of value which he will place upon conduct. Some of these standards of value take the form of fairly permanent biases or prejudices Among the attitudes which are known to be most powerful in the interpretation of testimony are race prejudices, dislike for certain types of personality trait, sex prejudices, sympathy for the young or for the aged, and the like. Then, too, it has been shown that most persons are subject to a large number of ordinary annoyances [31] It is almost certain that some of these annoyances would be tapped during a trial.

Everything that we have said about lawyers and jurors would apply

[30] Achilles, E N, "Experimental studies in recall and recognition," *Arch Psychol*, 1920 (No 44)

[31] Cason, H, "Common annoyances a psychological study of everyday aversions and irritations," *Psychol Monog*, 1930, *40* (No 182)

also to judges As one student of the matter has put it "Furthermore, who can predict the effect of the judge's likes or dislikes as to the lawyers or parties in the case, his economic bias, racial or religious prejudice, or other leanings or antipathies. Some contend that his decision may even depend upon what he has eaten for breakfast, hence the term gastronomical jurisprudence, which has been given to this school of thought. Are not all the diverting factors that warp a witness's impressions of the facts likely also to warp the judge's? If the dispute is between capital and labor, who can say how much his opinion will be determined by his bias for or against labor? If the question relates to domestic issues, how much will his decision be controlled by his personal feeling about marriage and divorce, sex conduct, etc? How much weight will such as the following factors have—that one of the parties is a Jew, is a Catholic, is a Republican, a communist, is wealthy, wears a diamond stud, was born on a farm, is uneducated? It must be remembered that every case involves the making of innumerable inferences and deductions first by the witness himself, then by the lawyer in the case, and then by the judge and jury The factors enumerated are especially influential in these inferences The judge, although not a witness of the facts giving rise to the dispute, is a witness of what transpires in the courtroom He is a witness of what the witnesses say and how they say it All the limitations of a witness and many more limit the judge, because many wills, emotions, prejudices lie between him and the first-hand facts. If the case is tried by a jury, their biases, racial feelings, economic status, likes and dislikes, etc, all influence their compromise verdict and complicate the situation manifold" [42]

One phase of judicial preferences reveals itself in a predilection for certain numbers It has long been recognized, for example, that round numbers appear more frequently in census returns than other numbers. There are, for example, more twenty-year-old persons than there are nineteen- or twenty-one-year-olds. This factor appears to good advantage in the assignment of sentences When a large number of sentences are tabulated, it appears that high points occur at five, ten, fifteen, twenty, and twenty-five years, with low points at six, seven, eight, eleven, thirteen years, and so on In the same way, sentences for less than a year tend to concentrate around one, three, six, and nine months Sentences for intermediate points are much less frequent [43]

[42] Goble, G W *op cit*, pp 233-234

[43] Coover, J E, *Experiments in Psychic Research*, Palo Alto, Stanford Univ Press, 1917, pp 2, 8 ff

As a final example of the factors which may interfere with sound evidence we may ask the reader to remind himself again of what was said on pages 142-145 regarding the effect of discussion on group opinion. Our previous discussion of this matter must have made it clear that even if the evidence is all in, it may still be modified as a result of consideration and debate.[14] Since a jury must turn in a unanimous decision or else give up the case, the judgment that is rendered may not be a group judgment at all but a reflection of the opinions of one or two dominant persons

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Wigmore, J. H., *The Principles of Judicial Proof*, Boston, Little Brown, 1931.

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[14] See, for example, Burtt, H. E., "Six differences in the effect of discussion," *J. Exper. Psychol.*, 1920, *3*, 390-395

CHAPTER EIGHTEEN

PUNISHMENT

1. *Introduction.*—Long before there was any such thing as a formal system of jurisprudence, society had worked out a scheme for handling the wrongdoer and the criminal which has persisted to the present time This scheme was based upon the doctrine that punishment should be essentially punitive in character The point was that a criminal had willfully brought injury to another person or to the social group and that he must, therefore, pay a proper penalty for his action. For this reason, one may often hear it said that the law cannot be satisfied until an eye has been given for an eye and a tooth for a tooth. This means that the history of penology is replete with tales of the dungeon, the inquisition, stoning, and other forms of violence. It means also that the history of education is just as replete with whipping, reproof, and the fool's cap.[1]

To be sure, it looks as though this older view of the retributive character of punishment has been modified whenever attempts have been made to humanize legal practice. Some of these modifications, however, seem to be nothing more than rationalizations of a deep-running belief that a real price should be paid for committing a careless or a criminal act. It is often said, in authoritative works on legal practice, that modern jurisprudence makes three specific assumptions about punishment, viz., (i) that punishment shall really exact the pound of flesh from the criminal, (ii) that it ought to reform or redeem him, and (iii) that it should deter him, and all other persons as well, from further crime [2] It usually happens, however, that arguments in favor of the redemptive and preventive power of penal methods turn upon the assumption that the majesty of the law and the supremacy of society must be maintained no matter what happens to correction and prevention. It is certainly true that the release of a criminal after a long period of confinement may be neither a punishment, a cure, nor a source of prevention.[3] Some persons will still argue that confinement

[1] Barnes, H E, *The Story of Punishment*, N Y, Stratford, 1933, *passim*

[2] Schlapp, N, and Smith, E, *The New Criminology*, N Y, Boni and Liveright, 1928, pp 30 ff

[3] Smith, M, *The Psychology of the Criminal*, London, Methuen, 1922, pp 5 ff.

must be punishment to some wrongdoers for they are taken away from their normal surroundings and denied most of the privileges that belong to a free man, but there is no reason to believe that this is the case with persons from whom society really needs protection. Moreover, it is hard to see how the payment of a small fine can possibly have anything to do either with punishment, redemption, or prevention. It has not been shown, for example, that a social group has secured any particular advantage by having levied fines against offenders and the evidence is rather scanty to support the view that the individual himself has profited much thereby.[4]

Some of the facts which have been mentioned in the preceding chapters make it all the more evident that legal practice must, in the future, undertake an entirely new appraisal of the whole field of punishment. So long as men are agreed that punishment is only a legal matter, that is, a matter that can be defined in terms of an arbitrary amount of money, a set period of imprisonment, or the taking of a life, nothing significant can be done. Of one thing we may be sure, viz , that punishment is a psychological rather than a legal problem. Moreover, a type of treatment that may be punitive for one person will not always have a significant effect upon other persons. It is even true that a procedure which may be punishing in one context can be wholly lacking in punitive quality in another context Finally, the older view of taking a pound of flesh can have no meaning with respect to criminal acts which are a product of broken homes, maladjustments, poverty, and poor training If it could be shown that, in spite of poor training or in spite of some perverted expression of basic tissue needs, a person is still free to do as he pleases, society might exact an eye for an eye and a tooth for a tooth. In the light of the evidence, however, it is hardly credible that any systematic study of the relation between human nature and jurisprudence could be based upon this premise.

2. *The Functions of Punishment* —There are a good many different ways in which one may look at the problem of punishment both as regards its functions and as regards types. We have already spoken of the fact that, in addition to the punitive or retaliatory doctrine of punishment, there is the doctrine of redemption and the doctrine of deterrence. Those who try to sanctify the retaliatory functions of punishment often say that retaliation is incidental to what, after all, must be the primary function of punishment, viz., redemption. The criminal must be handled in such a way that he will come out of his

[4] *Ibid*, p 6.

confinement with a new attitude toward society and with new motives and new skills such as can make him a self-sustaining member of society.[5]

The actual evidence on this point has not been altogether encouraging In one study of 500 cases it was found that nearly one-third of the subjects had been benefited in no way by the reeducational activities of a reformatory Most of the persons who reported no aid appeared actually to have received further schooling in crime.[6] As a matter of fact, those who know of some of the conditions which obtain in prisons are about inclined to say that society has not advanced its thought and practice about these matters beyond medievalism To be sure, physical distress is not so common as formerly, but psychological distress is much more common Moreover, the adverse educational effect of prison life is almost beyond recital[7]

Somewhat the same facts hold true of the deterrent theory of punishment. It is commonly supposed that, if the innocent actually see or know that a guilty person is condemned to imprisonment, this fact will act upon him as a preventive against possible misdemeanor. In so far as a criminal himself is reeducated by his punishment, he too would stand as an example of the deterrent effect of punishment. Both of these inferences, however, are faulty. It is commonly known that a considerable proportion of criminals are repeaters As we have just seen, this is particularly true of delinquency during the early years Moreover, if knowledge that a price will have to be paid for the commission of the crime is really an effective obstacle in the way of criminal action, one might expect to find some evidence for this type of learning on the highway And yet, as every vacationist knows, it is not possible to make a journey of any length without running across the scenes of one or more accidents Injury and death always face a motorist, but no one has seriously argued that accidents, even of the most violent type, have more than a temporary effect upon automobile drivers Moreover, it seems to be quite certain that careless and criminal acts are often the result of factors which would not normally be sensitive to punishment In proportion as crimes are the result of misdirected tissue needs or are done on the spur of the moment at the

[5] Cf Sutherland E H, and Gehlke C E, *Crime and Punishment, in Recent Social Trends* N Y, McGraw-Hill 1933, Chap XXII

[6] Glueck, S, and Glueck, E T, *Five Hundred Criminal Careers*, N Y, Knopf, 1930 See also Smith M, *op cit* p 6

[7] See for example, Karpman B, *Case Studies in Psychoneurology*, Washington, St Elizabeth's Hospital, 1933

behest of strong passions, they stand beyond the reach of punishment.[8]

We may draw the inference, then, that legal practice must take up the problem of punishment as a distinctively psychological problem. Even from this point of view, however, the problem is by no means simple. Punishment ranges all the way from the form which it takes in studies on learning to the extreme penalty of death. It goes almost without saying, of course, that death, in and of itself, is not punishment at all. As a rule, modern methods of inflicting capital punishment mean almost instantaneous cessation of life and it is not, therefore, the act of dying which can have any significant value If the death penalty does have a deterrent value, this value must lie in the frightful period of waiting for execution It can be argued, perhaps, that the death penalty should be retained simply because of the horrors that sometimes attend the long interval between conviction and final execution. Obviously, however, these horrors can have no redeeming effect upon the person who is already condemned, and they can protect society only because such a person is taken out of the social group.

Pain and unpleasantness are the root factors which operate in all forms of punishment. During the early days of infancy both of these factors are immediately physiological in character They issue, on the one hand, from a special set of end-organs in the skin and in the vegetative system and, on the other hand, they issue from those general bodily conditions which give rise to moods and emotions.[9] This means that stimulus-situations are punishing only when they are intimately tied up with the pain end-organs and with unpleasant bodily conditions. Quickly, however, through learning (conditioning) many other situations can be substituted for the original conditions, and thus the ground is prepared for punishment at a social level. Reproof, for example, gains its punitive character not because certain words are inherently painful or unpleasant but because they have acquired meanings which have an unpleasant quality. In experimental work, much use is made of primary painful stimuli such as an electric shock, but reproof, privation, and other socialized forms of punishment also have their place. The electric shock is preferred, in part, because it can be measured and controlled and, in part, because the punishing value of reproof or privation depends upon the extent to which a

[8] Arnold, G., *Psychology Applied to Legal Evidence and Other Constructions of Law*, Calcutta, Thacker Spink, 1913, pp 526 ff See also Schlapp, N., and Smith, E., *op cit.*, pp 274 ff

[9] Beebe-Center, J G, *The Psychology of Pleasantness and Unpleasantness*. N Y, Van Nostrand, 1932

person has been negatively conditioned to them, through his previous training [10]

3. *Experimental Studies on Punishment.*—It is now a matter of common knowledge that all kinds of learning processes go on much faster when correct actions are rewarded and wrong actions are punished. We propose to consider a few of these studies because the obvious place to apply psychology to the correction or prevention of crime is not after the delinquent has already learned how to put himself at odds with the social group. On the contrary, it is in the psychology of learning during the early period of growth that these tendencies for or against proper social balance are established. It is at this point, then, that an understanding of the effect of punishment will have practical consequences of the greatest significance

We may remark, first, that there is a certain amount of difference in the way in which punishment and satisfaction work in learning situations. Learning always involves action which is made more or less continuous by the presence of some motivating factor. Among the lower animals where many of the studies have been carried out, use is made of hunger, thirst, and sex in order to secure consistent action. Learning processes at this level are usually rewarded at the end of successful trials It has been shown, in these studies, that reward may act as though it could reach back over previous events and promote the preservation of those events which lead to success.[11] Punishment, however, cannot be used in this manner On the contrary, it must be used while the learning process is actually under way. In some cases, punishment may be made continuous, relief from punishment being found only when the right response is made. In other cases, if punishment is to be effective, it must be applied just at the moment a wrong response is attempted. From the experiments that have been performed on the lower animals, it is certain that this use of punishment promotes learning.[12]

[10] For a typical experiment see Vaughn, J., and Diserens, C. M., "The relative effects of various intensities of punishment on learning and efficiency," *J. Comp. Psychol.*, 1930, *10*, 55–66

[11] This is, however, a highly debatable question in psychology See Cason, H., "The pleasure-pain theory of learning," *Psychol. Rev.*, 1932, *39*, 440–466, "Criticisms of the laws of exercise and effect," *Psychol. Rev.*, 1924, *31*, 307–317

[12] Aylesworth, M., and Warden, C. J., "The relative value of reward and punishment in the formation of a visual discrimination habit in the white rat," *J. Comp. Psychol.*, 1927, *7*, 117–127 Bunch, M. E., "Effect of electric shock as punishment for errors in human maze learning," *J. Comp. Psychol.*, 1928, *8*, 343–360 Dodson, J. D., "Relative value of reward and punishment in habit formation," *Psychobiol.*, 1917, *1*, 231–276 Jones, H. E., "Emotional factors in learning," *J. Genet. Psychol.*, 1928, *2*, 263–272

The same facts hold true of human learning Experiments of a more strictly laboratory type are unanimous on this point In one study, for example, the subjects were asked to press a key with one of five fingers when a certain color was flashed on a screen The use of the other fingers was punished. Throughout this experiment, rate of learning was significantly hastened both as regards correct response and as regards number of errors as compared with the performance of control groups who were not punished.[13] In another experiment an attempt was made to find out how quickly one could learn to stop one's arm movements in response to a danger signal Electric shock for slowness in reaction was the most effective aid to learning Next in order came (i) threat of punishment with occasional shock, (ii) threat of punishment with a statement of how it might occur, (iii) an indefinite threat that something might happen, (iv) a simple negative instruction, and (v) positive instructions.[14]

Studies on the learning processes of children have shown that these subjects are also highly sensitive to reward and punishment In one case, for example, 100 children in the fourth and sixth grades were confronted with arithmetic tests. Some of the children were called by name and praised for their good performance before the rest of the class. Other children were reproved, and some were wholly ignored. There was, of course, a control group from the same class levels. The results showed clearly enough that the children who had been praised displayed an increased amount of improvement, whereas those who had been reproved stood intermediate in rate of improvement The poorest scores were turned in by the control group.[15] In another study of the same sort both white and Negro children from the third, fifth, and eighth grades were used. After an initial test in which norms of performance were established, some of the children were subjected to the highest praise and others to the most withering scorn. The results were the same as those named above save that reproach and scorn

[13] Rexroad, C N, "A continuous multiple choice reaction apparatus," *J Exper Psychol*, 1925, *8*, 325–336, "Administering electric shock for inaccuracy in continuous multiple choice reactions," *J Exper Psychol*, 1926, *9*, 1–18

[14] Vaughn, J, "Positive versus negative instruction," *Pub Nat Bur Casualty and Surety Underwriters, Educ Series*, Vol II Other studies in this field are Johanson, V M, "The effect of incentive and punishment upon reaction time," *Arch Psychol* 1922, *8* (No 54) Watson, J. B, "Recent experiments on how we lose and change our emotional equipment," *Ped Sem*, 1925, *32*, 349–379 McTeer, W, "A study of certain features of punishment in serial learning," *J Exper Psychol*, 1931, *14*, 453–476

[15] Hurlock, E B, "An evaluation of certain incentives used in school work," *J. Educ. Psychol*, 1925, *16*, 145–159

were somewhat more effective for younger children than for older children [16]

There are several general conclusions which may be drawn from these and other experiments In the first place, it seems to be quite clear that punishment is not really effective in relation to a learning process unless it is applied at the time the wrong actions are being carried out. This is particularly true of that form of learning named by the word "conditioning." There is a large amount of experimental evidence which shows that conditioning takes place most quickly and most effectively when the conditioned and the unconditioned or conditioning stimuli occur almost, if not quite, simultaneously As a child grows older, the two stimulus situations may be separated more widely from one another in time through the processes of association. During early infancy, however, punishment administered because of some wrong act may lead to a negative attitude toward the source of punishment rather than toward the act itself As an illustration we may take the way in which a child would learn not to touch a hot object as compared with the way in which it might learn not to reach for a dish on the table In the first case, the punishment comes simultaneously with the act This means that a negative response to the flame of the candle is established almost instantaneously, in the other case, however, punishment might be delayed for some minutes, if not for some hours. With older children, it frequently happens that punishment is delayed for as much as a half-day. In these cases the child is very apt to develop a shyness toward the parent who administers the punishment rather than toward the act for which punishment is being administered [17]

It looks as though some of the punishment given to small children is not really effective in the sense that it does not favor the development of good social habits because it is administered in the spirit of anger or of vindictiveness. In other words, if early social behavior is to develop in a normal way children must not be put in the position of giving the appearance of submission or of repentance while entertaining the idea that they will retaliate at some future time. Some of the

[16] Hurlock, E B, "The value of praise and reproof as incentives for children," *Arch Psychol*, 1924, No 71 See also "The effect of incentives upon the constancy of the I Q," *Ped Sem*, 1925, 32, 422–434 See also Briggs, T H, "Praise and abusiveness as incentives," *School and Soc*, 1927, 6, 596–598

[17] For data on the temporal relation between the unconditioned and the conditioned stimuli, see Cason, H, "General aspects of the conditioned response," *Psychol Rev*, 1925, 32, 298–316 Wolfle H M, "Conditioning as a function of the interval between the conditioned and the original stimulus," *J Gen Psychol*, 1932, 7, 80–103

studies that have been made on methods of handling delinquents seem to suggest that a child may nourish an antagonism not only toward the person who administers the punishment but toward the whole of society as well.[18]

Long tradition has it that children pass at or near the sixth year from the stage of irresponsibility into a stage of accountability This tradition seems to say that there comes a time in the development of a child when it can begin to react to objects and events in terms of the consequences of its actions. Before the years of accountability, learning by conditioning appears to be the primary method of favoring right habits, and eliminating wrong habits In short, direct bodily punishment or any equivalent to it must be used by parents and teachers if unsocial modes of action are to be avoided. After the years of accountability, however, punishment should never take place unless an attempt is made to relate the action of the child to the punishment. One might, of course, avoid all such explanations but the result would almost certainly take the form of a whole series of negative attitudes toward individuals and toward social forms which are the core of delinquency. On the other hand, proper explanations of the relation between punishment and an anti-social act will often favor the growth of a proper sense of responsibility.

The difference between these two procedures may be illustrated by the difference between a trained animal and a trained citizen. No one has ever supposed that a circus animal has a sense of responsibility. The animal will perform just as well as the rewards and the punishments that have been administered will permit. In short, the trained animal is caught up in a system of definite stimulus-situations to which it must respond in a more or less rigorous and automatic manner.[19] Children too may be trained in this way, but it often happens that they will entertain antagonisms and a sense of retaliation which must express themselves sooner or later in anti-social conduct. Feebleminded children and very young children must be taught in the same way that one might teach an animal. As mental age increases, however, the normal child may be expected to sense the possible consequences of its actions and to regulate its conduct accordingly.

One need hardly argue that punishment must be consistent. Parents and teachers frequently make the mistake of warning a child or of

[18] See Watson, J B , *Psychological Care of the Infant and Child*, N Y , Norton, 1929

[19] For relevant experimental studies on animal behavior, see Munn, N L , *An Introduction to Animal Psychology*, Boston, Houghton Mifflin, 1933, *passim*.

promising punishment without realizing that such warnings or threats must be fulfilled. As we shall see in a moment, those persons who learn that punishment does not always follow wrong action or who know that some children are not punished quickly lose their respect for punishment It is an obligation of parents and teachers then to see to it that wrong acts are followed just as quickly and just as inexorably by pain as natural law would suggest.

It is clear, of course, that punishment need not always be physical or corporal. Just as a slap on the hand or washing the mouth out with soap may become conditioned to other stimulus-response situations, so the word "no" or some other negative instruction may become substituted for physical punishment. Obviously, a vigorously spoken "No! no!" can have no meaning to the child until it has acquired meaning through some previous learning. The extent to which corporal punishment is used, then, depends upon the way in which negative attitudes have been tied to words. If the command "No!" has never been supported by physical punishment, control over the child through verbal commands will never serve as a means of training a child

4. *The Social Consequences of Punishment.*—Everyone is fully aware of the fact that punishment, both during the early years of training and as consequence of criminal action in adult society often misses the mark We have tried to say in the preceding chapter that there are some criminal acts which should not be punished at all. If a criminal is caught in unsocial conduct because some of his primary tissue needs have not been adequately modified or sublimated during early training, an attempt should be made to reeducate him rather than to punish him If he is punished at all, the punishment ought to be a part of a reeducation program rather than a means of satisfying the retaliatory impulses of the social group. It is certainly clear from the work of such organizations as the Judge Baker Foundation that large numbers of delinquent individuals can be retrained and turned back into society as responsible members of the group [20]

It is safe to say, perhaps, that the general sense of justice among human beings is not built altogether on a rational foundation This point stands as a fundamental part of the Freudian arguments regarding crime and the way in which such acts shall be expiated. The psychoanalytic school points out that when there has been a mis-

[20] Healy, W., and Bronner, A. E., *Case Studies Judge Baker Foundation*, Boston, 1922, 1923

carriage of justice the individual himself feels as though his personal freedom had been endangered. As we have seen, crime is for the Freudian school a continuation into adulthood of infantile modes of behavior. It is the task of education so to modify or change the impulses of the *id* that socially approvable modes of expression may be developed. It is clear that each person must use every resource at his command to aid the processes of training. One of his principal sources of aid comes from the development of what Freud calls the super-ego, that is the personal conscience. The super-ego is intimately dependent upon outside authority. The social group, for example, has seen to it that the best impulses of the super-ego shall be caught up in systems of law, of morals, and of justice which may even be written down in books in order that they may be made more effective. When, therefore, a criminal act is punished too severely or when the criminal escapes punishment altogether, the average person is apt to feel that his own personal freedom is in danger. It is as though he could say to himself, "If another person has escaped the punishment that he deserves, why should I seek to conform to standards which are against my own instinctual impulses?" In other words, a failure to punish a criminal is a kind of threat to the repressions which each person places upon his own *id*. When a criminal whom everyone believes to be guilty is dismissed by the creation of a reasonable doubt in the minds of a jury, a court is put in the position of saying that the defendant must be allowed to conduct himself in a way that is denied other persons.[21]

To summarize, then, the psychoanalytic school holds that punishment must be exactly adequate to the nature of the crime lest other persons feel that their own super-egos, that is, their own consciences, are being overthrown. If the instinctual impulses of the average person were not so powerful, this threat would not be a serious matter. Freud has argued, however, that human nature is in its very origins anti-social. Even when training is at its best the native impulses of the *id* are almost beyond complete redirection or sublimation. If, then, any single person argues earnestly for the punishment of a law-breaker, he does so because he knows that justice will aid him in his struggle against his own repressed impulses. Conversely, one might say that the widespread feeling of sympathy toward the criminal may be nothing more nor less than an unintelligent recognition of one's

[21] Consult Alexander, F., and Staub, H., *The Criminal, the Judge, and the Public*, N. Y., Macmillan, 1931, *passim*.

own criminal impulses and of the precarious hold which the super-ego has over the *id*.

One other phase of the Freudian point of view toward punishment deserves, perhaps, a brief note. The reader will recall that one of the primary instinctual urges of the *id* sometimes finds expression in sadism and masochism. Sadism describes the fact that the infliction of pain on others is one substitute for the sexual urges. Since, however, this is not a normal type of expression, the exercise of it lies under social taboo. One may, however, find in punishment a socially approvable way of compensating for one's own sadistic impulses. The more righteous member of a community, for example, while never yielding either to improper sex behavior nor to sadism, could find a safe outlet for his impulses possible through the pain which society itself would inflict upon unsocial conduct. For this reason, so the Freudians would argue, court trials, and especially the trials of those who are accused of capital crime, are made a public performance. They perform in a civilized society somewhat the same functions athletic contests perform Moreover, they enable each person to live out in a vicarious way his own energies. We may see from this, then, why it is that social justice becomes an important feature of psychoanalytic theory. If justice is to prevail, those individuals who are obviously maladjusted to their environments must be retrained rather than asked to pay for their crime by giving their pound of flesh. In other types of criminal action it is absolutely essential that the punishment be adequate to the nature of the crime It has long been recognized that the length of a term of imprisonment does not satisfy this requirement. Moreover, the majesty of the law, according to Freud, would be seriously threatened whenever a jury is persuaded against its better judgment by irresponsible lawyers who will use any means whatsoever to create a reasonable doubt

5. *Conclusion*.—We may now bring this part of our survey of the problems of applied psychology to a conclusion by raising again a situation which we have had to face at every point in our study. In the psychology of law, as in other branches of psychotechnology it is easy to suppose that one may conduct experiments in a laboratory and then suppose that the results of these experiments can be bodily transferred from the laboratory to the courtroom. In our study of the lie detector, for example, we found that it may take slightly longer to tell a lie than it will take to give a truthful answer, but the reader will see at once that the times used in a laboratory

experiment might have no relation at all to the time that it would take a witness in the witness chair to respond to the interrogations of a lawyer.

The psychologists are not alone, however, in this sort of transference. As the reader knows, the science of psychology has shifted its ground rapidly in recent years. The older study of the mind has now been replaced by a study of behavior in which the words "stimulus" and "response" play a more important part than such words as "sensation" and "perception." Lawyers who have thought hitherto in terms of sensation, perception, emotion, and reasoning can easily be tempted to rewrite their legal documents simply by putting in behavioristic terms wherever mental terms had been used. Clearly a legal psychology which is adequate to the courtroom, on the one hand, and a direct reflection of the experimental laboratory, on the other, cannot be written in these ways It seems to be clear, then, that the student interested in the psychology of legal situations must take from the laboratory those facts, but especially those methods, which guarantee dependable results. So far as is possible, he must try to analyze jurisprudence in terms of actual legal situations. Neither a witness in an actual murder trial nor the judge who must give his instructions to the jury can be taken out of the courtroom and brought into an experimental laboratory. The very conditions in which the witness and the judge are placed mean that the behavior of these men will be a function of these circumstances rather than of a controlled experimental situation.

It follows from this that as we look back over the last four chapters we can remember certain facts about the nature and origin of crime, the nature of report, and the general significance of punishment. These things that we remember, however, must not be confused with the exceedingly complex set of circumstances which actually obtain during an actual trial. The main fact to be remembered is that the psychologist has a method for studying certain kinds of problems. This method implies that while all other things are equal, one thing shall be examined in detail. Since in actual life, other things never are equal, the experimental facts gained by the psychologist may be misused just as often as are prejudices and opinions. The experimenter has, however, one advantage. As a rule, he will know and recognize the limits under which he works, whereas the man who has nothing but opinions and prejudices may be quite confident that he is right.

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PART FOUR

PSYCHOLOGY AND MEDICINE

CHAPTER NINETEEN

THE PROBLEMS OF ADJUSTMENT

1. *Introduction.*—When Nature casts up her accounts of the various ways in which animals have lived, there is good reason to suppose that the insects will stand in excellence not far from the head of the list. Men like to think that they have found *the* way of life, but when they say this they are using other standards than those which are suggested by the natural order of things Human standards are usually manufactured out of such factors as wealth and inventions and only occasionally out of intelligence or good judgment, but the dominant note expressed by natural processes is named by the word "adjustment." [1] Most of the creatures whose members have been seriously at war with one another or which have not been adapted to their environments have fallen by the wayside. On the other hand, animals which were highly organized in their own bodies and which were neatly adapted to their environments have survived. It looks as though no animal societies had met these two requirements more perfectly and for a longer period of time than the insects. The common ant, for example, has always been a source of amazement to the biologist, partly because of the nice balance that is maintained among its several structures and functions, and partly because of the splendid way in which it carries on its commerce with the objects and events around it.[2]

The word "adjustment," then, may have two meanings. We may think either of the way in which different organs and different functions are integrated into a single pattern, or we may think of the way in which organs and structures are used in that kind of intercourse described by the concepts "stimulus and response," "variation and adaptation," "acclimatization," and the like. Both of these types of adjustment are to be found in the psychological operations of a human being. There is, first, the problem of wide variations of internal organization and balance. Just as the body is made up of a great many cooperating organs and functions, so each person is the sum of a good many different types of psychological operations. We

[1] Raup, R B, *Complacency, The Foundation of Human Behavior*, N Y, Macmillan, 1925, *passim*

[2] Wheeler, W M, *Social Life among the Insects*, N Y, Harcourt Brace, 1923.

may suppose that the easy and successful use of these several functions will be promoted whenever they are effectively integrated with one another into suitable patterns. A football player can be ever so well equipped in skill to avoid a tackler, but his equipment will do him no good if he has an inordinate fear of bodily contact. That is, if these two functions are out of equilibrium with each other, we may say that the person in whom they operate is not in the best shape to do his psychological work well It is just this fact about human beings which makes the study of adjustment or of integration important, for there are persistent types of maladjustment that make men less worthy of survival than the ant. Even as we say this, however, we state a paradox, for we shall find types of maladjustment that may become a motivating force behind some of the best things that human beings do.[3]

As we have said above, the second meaning in the word adjustment arises out of the relation between men and their environments. The ant is so well equipped with serviceable modes of action that it has been able to survive and to multiply almost beyond counting. What is the case with man? Is it guaranteed to him that he can relate himself efficiently and happily to other men and to all of the products of collective living? Does he have, in his intelligence, a means of adjustment which really makes him superior to the rest of creation or are the big-brained animals, like the big-bodied animals, nothing more than a temporary freak of the evolutionary process? Can we be assured that, with all of our acumen, we have actually learned how to meet the various situations around us in the best possible way?

The purpose of this chapter is to phrase, in a preliminary fashion, some of the answers that may be given to these questions In other words, we wish to find out what the average person can do in order to increase his psychological fitness. The reader will see that this task divides itself almost at once into two parts On the one hand, he knows that there are certain general types of activity which must be carried out if society is to maintain itself in good order. There must be doctors, lawyers, teachers, engineers, artists, bankers, and other leaders of the same type Each of these professions demands a certain amount of information of a special kind and some of them require high levels of skill. They may even require of a man that he shall use particular types of psychological functions which would not be used in other professions There is, then, a science (or the beginning of a science)

[3] This whole problem will be studied in Part Seven.

which is called vocational guidance.[4] It is the purpose of this science to find out what steps may be taken in order that a man may be fitted more closely to any one of the various professions Closely related to vocational guidance there is a phase of human engineering known as personnel selection.[5] It is necessary, for example, that some persons learn how to use a typewriter, and that others learn how to use a telegraph key, or a lathe in a factory, and so on, for each of the special occupations made necessary by our complicated society. Every one of these special service functions demands a distinctive type of equipment among the servants of society. As a rule, this equipment consists of a fairly large range of special skills There is, then, a science (or the beginnings of a science) which may be called personnel selection. It is the function of this science to analyze jobs of various types in order to see what types of psychological function are most desirable if the job is to be done with safety and with speed. The science considers, too, the analysis of human beings so that a particular human being and a particular occupation may be brought together in the very best manner This phase of the problems of adjustment will be discussed in Chapter Thirty-Three.

The task of the present chapter is to describe types of adjustment or of coordination that are presupposed both in vocational guidance and in personnel selection. No man can become an effective member of a profession nor can he do well in a more ordinary occupation unless he is a sound or healthy working instrument. This means that he has acquired some facility in the use of all of his psychological traits. Still more important, however, it is required of him that his various traits will be mixed in that happy manner which forbids conflict, dissociation, worry, anxiety, ungrounded fears, ineptness, lack of initiative and decision, inability to relate himself easily to his fellows and to the other sex, and the like. Some of these conditions occur because a person may become divided against himself. Others will occur whenever a person stands at odds with his surroundings.

As we have said above, the problems of external adjustment and maladjustment arise in connection with the fact that every human being is always in an environment made up of physical objects, of other living creatures like himself, and of a vast number of products of collective living such as languages, customs, institutions, cultures,

[4] Hollingworth, H L, *Vocational Psychology and Character Analysis*, N Y, Appleton, 1929

[5] Link, H C, *Employment Psychology*, N. Y., Macmillan, 1919.

and inventions. In general, human beings find it desirable to survive; but survival depends in an intimate way upon the success that is achieved in adapting themselves to these several types of environment. If adaptation is achieved by any person, we may say that he is well adjusted to his surroundings, but if his psychological functions are not adequate or if he uses one function where he should have used another, or if one function is in constant warfare with another, we may say of him that he is badly adjusted. At a more concrete level, then, what do we mean when we argue that one person is adjusted in his own psychological operations and that he is in a state of aggressive equilibrium with the objects and persons around him? Moreover, what advantages or disadvantages accompany different types of maladjustments?

2. *Adjustment in Behavior Patterns.*—When we say that a person is in good health we refer to the condition of his body taken as a whole. We ought to follow the same plan when we say that he is ill, even though the injury or the infection is localized in a single member of his body. In other words, every human body is a highly integrated and cooperative union of structures and functions. This proposition holds even more truly of the psychological functions of a person. We commit a certain fault, therefore, when we say that we can describe different classes of function As we do so, it is only for convenience in discussion. Psychologists are, as a rule, inclined to dig into the whole stream of behavior at the following places As the focal points in human conduct they usually consider (i) the range and variety of action patterns, (ii) the various forms of perception, (iii) the processes of learning or memory, (iv) the varieties of attention and interest, (v) the changing aspects of the moods and the emotions, (vi) the excellence of thinking or reasoning (problem-solving), (vii) the number of and relative intensity of various motives, incentives, desires, and urges, and (viii) the richness in content and total patterning of personality traits. It is our thought that each one of these several aspects of human behavior can be related in a particular way to the concepts of adjustment and maladjustment.[6]

In general, a man who is adequately adjusted, both internally with respect to himself and externally with reference to his environment so far as action or behavior is concerned, would be in possession of those skills, postures, and attitudes which are necessary for handling,

[6] This method of stating the problems of psychology will receive further comment in Chapter Thirty-Six.

in an effective way, any one of the situations he might be called upon to meet. We have already illustrated one phase of this problem in our study of the extent to which driving an automobile depends upon reaction time and coordination. It would be possible to say that a man who cannot move one part of his body,—say, his head,—without moving another part,—say the hands which rest upon the wheel,—is maladjusted to the situation described by the phrase "driving an automobile." The person who has not found it worth while to develop speed and accuracy in handwriting would not be very well adapted to taking notes in a lecture room. In other words, a very definite and measurable meaning can be given to the word "adjustment" so far as action or behavior patterns are concerned. The very great significance of maladjustment in various types of action will be seen when, later in the book, we shall try to show how improper skill or improper training may lead to accidents in industry and to the creation of that expensive feature of employment known as labor turnover.[7]

In addition to adjustments effected by the specific skills or other specific features of action, there are all of those variations in behavior which are suggested by the words "posture" and "attitude." There is, of course, a precise meaning to the word "posture," a meaning which is better carried by the word "stance," as was illustrated in our discussion of the athlete. More frequently, however, the words "posture" and "attitude" refer to the way in which a person deports himself in social situations. Some persons, for example, are forward or aggressive in a social situation, while others are timid, bashful, and uneasy.[8] Since attitudes of this type almost run over into the group of problems named by the words "mood" and "emotion," we shall say more about them in a moment.

This is, of course, a very sketchy view of a very large and a very complex picture. A few of the details may be added by naming some of the ways in which behavior patterns go wrong. In the next chapter we shall find that, even among the milder forms of psychological ailment, such features of movement as speed, accuracy (coordination), and strength often show wide divergences from the normal Just as the spectator at a football game may display over activity in movement, so patients in a hospital will speed up their movements and give exhibitions of excessive strength. Among the particular forms of

[7] Hull, C L., *Aptitude Testing*, N Y., World Book Co., 1929 See below, Chapters Twenty-Nine and Thirty

[8] Cf Marston, L R., "The emotions of young children an experimental study of introversion and extroversion," *Univ of Iowa Stud Stud in Child Welfare*, 1925, 3 (No 3)

maladjustment in behavior, we may mention the following A tremor is a slight muscular contraction having a distinct rhythm. It appears frequently as a result of cold, extreme sorrow, fear, emotion, or habit. More pronounced contractions of large muscular groups are known as spasms. If spasms are the result of a functional rather than an organic factor, they may take the form known as a tic, that is, a convulsive fluttering of the eyelids, of the hands, of the shoulders, or of any other muscle group. True convulsions are much more intense in character. In opposition to these excessive movements, there are many forms of paralysis ranging from complete inability to move to a slowing down or marked enfeeblement of movement. Still another type of motor disorder appears in stammering. The motor functions of writing may also suffer disturbance.

Of these variations in motor skill, stuttering has, perhaps, the greatest interest for us since speech defects appear rather commonly in the classroom and among one's friends. Speech stands in a rather unique position among other types of performance because it is the only one of them which has no specific structure of its own. When a word is spoken the lips, the tongue, the muscles of the jaws, the palate, the mouth cavity, the vocal cords, the lungs, and the diaphragm must enter into a pattern of action which is highly intricate and deeply sensitive to interference. No less than ten different theories have been devised to explain the way in which this apparatus may go wrong. Faulty action is said to be due (i) to conflicts created by the taboos which society places upon the use of certain words, (ii) to fears induced by awkward social situations, (iii) to a reduction in the control exercised over lower nerve centers by the cortex, (iv) to temporary forgetfulness as to how a word ought to sound or to look, (v) to anxiety aroused by unconscious emotional complexes, and so on.[9] It would follow from these and the other theories that have been advanced that no single cure for stuttering has been discovered On the contrary, a great many methods must be used pending further studies of this problem Since a great many cases of stuttering are associated with nervous instability and with dissociation in function, it ought to follow that rest and removal of conflict should take place wherever possible. A change in environment often proves helpful. It is even

[9] See Dunlap, K., "The stuttering boy," *J Abnorm Psychol*, 1917, *12*, 41–48 Travis, L E, *Speech Pathology*, N Y, Appleton, 1931, *passim* Fletcher, J M, *The Problem of Stuttering*, N Y, Longmans Green, 1928, pp 223 ff Blanton, S, "The medical significance of the disorders of speech," *J Amer Med Assoc*, 1921, *77*, 373–377 Adler, A, *Practice and Theory of Abnormal Psychology*, London, Kegan Paul, 1927, *passim*.

urged that deliberate practice in stuttering will diminish the involuntary control of the speech mechanisms and promote their voluntary control.[10]

3. *Adjustment in Perception.*—We are seeing, hearing, touching, and otherwise sensing the objects around us so continuously that we seldom think of the various forms of perception in any other terms than original nature or native endowment. We have found, however, both in our study of the hazards of the open road and of some of the performances of the athlete that skill in the use of the perceptual apparatus is acquired in much the same way that other skills are acquired. A part of our skill in observation and in discrimination depends upon the proper use of the sense organs and upon their normal growth or maturation. If the sense organs have not come to maturity or if they are defective in any way, very serious types of maladjustment may develop. A person may become sensitive about his defects, for example, and thus move toward a true functional disorder. Then, too, where the sensory apparatus has not grown properly, one must find compensation either in some other mode of perception or else remain at odds with environmental situations. These facts hold true, in particular, of school children whose eyes are defective and yet who may be called upon to adjust themselves to drawings and written material on a blackboard or to printed material in their books. It is now recognized that a great many cases of childhood maladjustment are directly dependent upon or indirectly related to poor vision.[11]

There is, however, another phase of perceptual adjustment which enters into the whole picture. From one point of view the problems of perception may be described as follows. The way in which a person reacts to his environment may depend, in part, upon the total range of objects or events around him which can become effective in regulating his behavior. This general fact is to be modified in two ways. On the one hand, good adjustment may be reached not because of the total number of objects and events to which a person can react intelligently but to minimal changes in these objects and events.[12] On the other hand, through our daily experience with stimulus-situations, they quickly come to exercise a kind of pointing or signifying func-

[10] Dunlap, K., *Habits, Their Making and Unmaking*, N. Y., Liveright, 1933, *passim*.

[11] Baker, S. J., *Child Hygiene*, N. Y., Harper, 1925, Chap. XIII. Terman, L. M., and Almack, J. C., *The Hygiene of the School Child*, Boston, Houghton Mifflin, 1929.

[12] This is one of the famous problems in psychology. It is called the psychophysical problem. Cf. Titchener, E. B., *Experimental Psychology Quantitative Manual*, Part II, N. Y., Macmillan, 1901.

tion for the observer. In other words, the objects and events which regulate human conduct acquire meaning or significance in the sense that they point to or signalize events which lie wholly beyond them.[12]

From these considerations we derive three types of possible adjustment in the use of the perceptual functions In the first place, that person may be called well adjusted who makes an intelligent response to a large variety of objects and events. In the second place, that person is well adjusted who can upon demand react effectively to minimal changes in environmental situations. This is a type of adjustment which is often required in industry where fine discriminations have to be made among colors, intensities of illumination, pressures, differences in temperature, and so on. In the third place, that person is well adjusted whose world of objects is rich in meaning. For example, a person who has a limited environment,—that is, a person who is familiar with only a few stimulus-situations which are limited in range and significance,—would be more or less maladjusted. On the other hand, the person for whom every object has not only a single meaning but a variety of meanings would be much better adapted to get along in what we call the world of science, arts, and letters. Men who read much and travel much are called, therefore, "men of parts" much more often than men who read little and see less.[14]

Some of these considerations will become much more real to us if we look briefly at their more common types of perversions It is said that approximately fifty-seven per cent of native-born males suffer from some one of the many forms of defective vision.[15] Many of these defects concern the lenses in the eye, the receptors for light and color in the retina, and injuries to the optic nerve and related brain areas. Many of these defects can be remedied by the use of artificial lenses; but color-blindness (which occurs in about four per cent of the male population) cannot be remedied.[16] Save for audition, defects in other types of perception are much less frequent than is the case with vision.[17]

Of more importance to the general problems of adjustment are those disorders of perception which can be called functional. This

[13] Cf Bode, B H, *Conflicting Theories of Learning*, N Y, Heath, 1929, Chap XV

[14] Cf Osburn, W J, and Rohan, B J, *Enriching the Curriculum for Gifted Children*, N Y, Macmillan, 1931 Martin, E D, *The Meaning of a Liberal Education*, N Y, Norton, 1926, *passim*

[15] Sydenstricker, E, and Britten, R H, "The physical impairments of adult life," *Amer J. Hygiene*, 1930, *11*, 73–94

[16] Haupt, I, "The Nela test for color-blindness applied to school children," *J Comp. Psychol*, 1926, *6*, 291–302

[17] Hurst, V F, *The Psychology of the Speech Senses and Their Functional Disorders*, London, Oxford Univ. Press, 1920, *passim*.

word means that, without any signs of injury to the structures involved, a nervous person may become excessively sensitive to or totally insensitive to, almost any kind of stimulus-situation. One may, for example, suffer blindness in a part of the field of vision or loss of sensitivity in some particular part of the body. As a case in point, anesthesia means that the sense of touch may be lost for no other reason, apparently, than a functional blocking of the nerve impulses from given areas of the body. Hyperesthesia, on the contrary, means an increased sensitivity to stimulation [13] These forms of maladjustment in the perceptual apparatus will be discussed again in the next chapter.

4. *Adjustment in Learning.*—This phase of the problems of adjustment has received, perhaps, as much space as we can give to it. In the chapter on How to Study, for example, we have tried to describe a few of the more important experimental facts which, if used wisely, will make the learning process more effective It would seem to follow that any student who does not make use of the principles of learning in the right way would be poorly adjusted so far as his attempts to train himself are concerned. Since learning describes one of the ways in which we grow older, the excellence which we will have attained at any particular moment must depend upon the way in which growth has been guided and promoted under the influence of oft-repeated stimulus patterns.

There is, perhaps, one phase of adjustment in learning about which a further word could be said As we shall see in Chapter Thirty-Eight, it has not been possible to say, as yet, whether all measures of profit from past experience are of a single type or whether there are really several different kinds of learning. In our daily conversation, we speak of remembering, of learning, of recognition, of forgetting, and of other phases of a very complex process. In addition to these terms, we have such phrases as "learning by trial and error," "learning by conditioning," "learning by insight," and so on. It may be, of course, that all of these words and phrases refer to a single kind of operation. Even if this were the case, however, it would still remain true that these words must describe different kinds of situations in which different aspects of the learning process ought to be emphasized It would seem to follow that adjustment in learning means wisdom in using the right aspect of learning with respect to any particular situa-

[13] Dorcus, R M, and Shaffer, G W., *Textbook of Abnormal Psychology*, Baltimore, Williams and Wilkins, 1934, Chap. II

tion or for any particular purpose. Having chosen a particular aspect of learning for some particular situation, one could then make use of the sort of information suggested in Chapter One. In this case, it could be said that the student was well adjusted in his learning activities. This conclusion would be all the more significant if it should turn out that memory, learning, conditioning, and insight describe one or more fundamentally different kinds of profit from past experience Economy in effort and speed in attaining a goal would absolutely demand the use of the right learning method.

Since it falls more naturally among the problems to be considered in Chapter Twenty-One, we shall do no more than refer briefly to the fact that a great many types of maladjustment, if not all of the more serious types of psychological ailment, are the result of learning in the sense that some persons simply learn how to be poorly adapted to their environments. We have spoken several times of the fact that learning is a word which describes some of the ways in which growth or development can be promoted.[19] A great many theories have been offered in order to explain the nature of some of the more serious types of maladjustment, but, as we shall see, a fairly good case can be made out for the proposition that many of them are a product of poor ways of growing.

5. *Adjustment and Attention.*—The word attention describes the fact that, under certain circumstances, the objects and events around a learner may become alternately or successively prepotent in regulating his behavior. This is simply another way of saying that no person can react to everything in his environment at once. It is always this event and then that which takes the lead in exciting a response. As we have seen, there are two sets of circumstances which may serve to give any single object or event an adequate degree of preference over others. On the one hand, stimulus patterns outside of us have certain properties or characteristics which determine the direction of attention. Some of these factors will be studied in the chapter on the Psychology of Advertising. On the other hand, there are certain conditions internal to the body which act in the same way. These conditions, too, will be studied in a later chapter. They refer to all of those events which underlie the development of interests and preferences.

It is easy to see that proper adjustment within the group of facts named by the words attention and interest would call for a nice balance between those situations which "ought" to be attended to

[19] Wheeler, R H., and Perkins, F T., *Principles of Mental Development*, N Y., Crowell, 1932, *passim*

as opposed to situations which "ought not" to be attended to on any particular occasion. A part of this proposition is sometimes expressed in the saying that every person should learn how to develop and to use his powers of "voluntary attention." Another part is expressed by saying that a well-adjusted person submits himself to a minimal amount of that haphazard kind of attention which we often describe by the phrase "scatter-brainedness" It is never possible, of course, for any human being ever to keep on attending to nothing. What we mean when we use this expression must run somewhat as follows. There are some persons who appear to have developed no permanent preferences whatsoever and they throw themselves wide open, therefore, to stimulation from any event which happens to pass by To be sure, it is not possible ever to submit one's self completely to the controlling influence of a single object save when one is obsessed by what is called a fixed idea In spite of all that we can do, attention will fluctuate, but there is a wide gap between uncontrolled fluctuations and well-developed habits of strict concentration upon a task. These same considerations hold true of all of those persistent directions of attention which are described by the word "interests"

It used to be supposed that interests must be an expression of the inborn nature of a person. It is now known, however, that the development of attention and interest is made possible by the same kinds of processes that lead to the development of any other skill. We tend, for example, to have an interest in those objects and events to which we have attended before. Other things being equal, a group of objects which has been presented to a person over and over again will finally exercise a prior claim to the postures and attitudes of that person. Whenever a whole set of these prior claims have been fairly well established,—that is, when a learner has developed certain persistent interests,—and moreover, when these interests are of such a character as to enjoy the approval of the group to which the person belongs, we say of such a person that he is well adjusted. If the major interests of such a person are not approved by his social group or if he has developed no enduring interests whatsoever, then we may say that he is poorly adjusted.[20]

There is one feature of this type of adjustment about which a further comment may be made. Students often say that they are not in-

[20] All of the problems of attention and interest have become subjects of marked controversy in education See Thorndike, E L, "Early interests for permanence and relation to abilities," *School and Soc*, 1917, 5, 178–179 Symonds, P M, *Diagnosing Personality and Conduct*, N Y, Century, 1931 Chap VII

terested in a given subject matter and that there is, therefore, no reason why they should have anything to do with such material. When they say this, they usually mean that something has been left out of their original nature. In view of this omission, they will argue that an attempt to acquire a second nature,—that is, a new interest,—will be more or less fruitless. The answer to comments of this kind is more or less simple and straightforward. If a person does not have interest and boasts of his lack of interest, he is boasting of the inadequate nature of his early training. In other words, there is no subject matter which is intrinsically and inherently uninteresting even though students often feel that such is the case. Every type of interest is a product of training and depends, therefore, upon the previous history of each person. It does not depend upon a quality possessed by objects. To be sure, every person begins life with primary tissue needs, but all of these needs are quickly converted into a vast array of secondary or derived interests.[21]

One of the curious facts about attention may be stated as follows. If a person is concentrating intensively upon some particular object or event, it must follow that irrelevant objects and events cannot be attended to. In other words, attention to one thing means attention away from others. Now let us suppose that, for reasons that will appear in Chapter Twenty-One, a person does not attend to excitations on some part of his body, to the possible recall of certain kinds of previous events, to certain portions of the field of vision, and the like It must follow that such events that are not attended to will not be in existence for that particular person. During the profound emotional excitement that may be aroused during an automobile accident, it often happens that a person will not hear or see certain things which in and of themselves are really clear and distinct These facts have been used as a basic explanation for a great many different kinds of psychological ailment. If the student will refer to the many times in his own experience when attention-to has directly implied attention-from, he will easily appreciate how it may happen that, in more extreme cases, objects attended-from simply could not be in existence so far as a patient is concerned. We shall refer to this matter again in another chapter.[22]

6. *Balancing the Emotions.*—The books on psychology with which

[21] See Blatz, W E., "The physiological appetites," in *Handbook of Child Psychology* (ed C Murchison), Worcester Mass Clark Univ Press, 1933, Chap XVIII

[22] Hurst, A F., *The Psychology of the Special Senses and Their Functional Disorders*, London, Oxford Univ Press, 1920, *passim.*

the student is already acquainted have not given very much space to those aspects of adjustment which have been considered up to this point. The situation is wholly different, however, with respect to emotionalized types of action. It was in this field that the concept of adjustment in human behavior had its origin and it is in this field, too, that a very large amount of significant work is being done.[23] The problem is simply this. The moods and the emotions represent types of action which reflect either the general tonus of the body or a quick and intensive use of some of the reserve energies of the body. It follows, therefore, that any given situation can be reacted to not only in terms of the habits and skills that have been developed to meet that particular situation but in terms of the general health of the reacting system itself. Whenever it turns out that a person has no adequate means of response to a situation, he will endeavor to make up for his inadequacy by over-activity of the emotional type.[24]

It used to be thought that emotions and moods were related in an intimate way to some of the more native traits of human beings and that not much could be done, therefore, in educating or training emotional expression. As we have seen in one of the sections of Chapter Four, however, emotions represent types of action which may be easily and quickly transferred from one situation to another. As a matter of fact, experimentation has now gone so far in this field that it may be said that all types of emotional expression are acquired. In the face of new or unexpected situations, small infants will respond with much over-activity and with much energy. These responses are made possible by the glands of internal secretion and they may become conditioned to almost any stimulus pattern whatsoever.[25]

In general, a person who is well adjusted in his emotional behavior ought to be able to bring to bear upon every situation that kind of equilibrium in energy of response which the situation just demands. Conversely, a person who is not well adjusted at the emotional level would bring to bear on his environment those types of emotional over-activity or under-activity which could be called improper or inadequate. As an example, we may consider that kind of emotionalized action called fear. We have already found that fear reactions may

[23] Jones, M C, "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester Mass, Clark Univ Press, 1933, Chap VI

[24] See Bard, P, "Emotion the neuro-humoral basis of emotional reaction", also Landis, C, "Emotion the expressions of emotion," in *The Foundations of Experimental Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1929, Chaps XII and XIII.

[25] Cannon, W B, *Bodily Changes in Pain, Hunger, Fear, and Rage*, N Y, Appleton, 1929, *passim*

become conditioned to almost any object whatsoever. Some people are afraid of other people, of the dark, of the unexpected or unknown, of disease, of thunder, of lightning, of large crowds, of being buried alive, of being caught in a small space, of persons of superior attainment or superior ability, of the other sex, of a man of large stature, and the like. From one point of view and under most circumstances, each one of these fears is inappropriate. It would be proper to say of such a person, then, that he was maladjusted to his environment in all of these respects As we shall see in the next chapter, these and a great many other distortions of emotionalized action appear in almost every type of psychological ailment.[26]

One aspect of human nature in relation to mood and emotion which plays a very significant part in our daily affairs is named by the word value That is, some objects and situations are preferred to others simply because of the state of pleasure that is aroused by them.[27] Values and preferences, of course, range as widely as the objects and events with which human beings have to deal. Some values and preferences can be approved by the social group whereas other values and preferences contribute neither to the comfort of society nor to the long-time comfort of a member of the group. It is possible to say, then, that any person who displays what society would call a wrong sense of values must be maladjusted. Conversely, persons who have a proper sense of values are well adjusted [28]

7 *Good and Bad Thinking* —At the present time it looks as though problem-solving or thinking might take either of two forms On the one hand, there is that more logical form in which a person sees a problematic situation, defines it, rummages through his past experience for material that may be relevant to the situation, selects one or more relevant associations, experiments upon them, and finally concludes that the perplexity can be resolved in a given way [29] On the other hand, however, some of the most significant discoveries that have ever been made have come suddenly and without warning, as though two or more hitherto unrelated sets of information have been quickly brought into relationship with one another. Out of such a

[26] Consult Jones, M C, "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933, Chap VI

[27] See Beebe-Center, J G *The Psychology of Pleasantness and Unpleasantness*, N Y, Van Nostrand, 1932 Troland, L T, *The Fundamentals of Human Motivation*, N Y, Van Nostrand, 1928, Chaps XVI and XVII

[28] Shand, A F, *The Foundations of Character Being a Study of the Tendencies of the Emotions and Sentiments*, London, Macmillan, 1920 (2nd ed)

[29] Dewey, J, *How We Think* (2nd ed), N Y, Heath, 1933.

relationship there may emerge a new judgment or discovery which could not have been predicted by any analysis of the contributing events. This kind of problem-solving is called insight [30]

In either of these types of thinking it would seem that adjustment would be promoted whenever a person has exercised care in the use of the information out of which his conclusions emerge. Much thinking is bad, not because the processes of arriving at a conclusion are bad, but because the information with which one begins the process is inadequate. It is for this reason that we say that the problem-solving activities of children are neither very significant nor appropriate. We may say this even though the child displays some cleverness in drawing his conclusions. The point is that the child does not yet have sufficient information upon which to draw.[31]

There is, however, another phase of adjustment in thinking to which attention is rarely called. It looks as though human beings have three different ways of handling situations. If a situation is familiar, and if a person has reacted to it or to some situation like it on a previous occasion, his present reaction will probably take the form of some habit or skill or attitude which has been acquired through past experience. If the situation is new, one may take it as a problematic situation and proceed to the rational solution of it according to either of the methods described above This means, of course, that his first response to such a situation can be described as a problem-solving or thinking attitude. All too often, however, new situations issue in an emotional reaction Instead of taking a problem-solving attitude toward an unexpected event, a great many persons will allow the very intensity of their behavior to make up for their lack of insight and judgment. In some cases, perhaps, an intense emotional reaction will be a very appropriate reaction, for an emergency must be met on its own terms. On the other hand, however, it is one of the functions of education to help people to respond to as many situations intelligently,—that is, rationally or thoughtfully,—as possible When a person has solved an unexpected situation by an emotional reaction, he has scarcely prepared himself to handle such a situation any more effectively in the future In other words, his behavior patterns will remain at an infantile or primitive level. The thoughtful solution of such a situation furnishes a basis for continued

[30] Kohler, W., *Gestalt Psychology*, Liveright, 1929, Chap X

[31] Consult Peterson, J., "Learning in children," in *Handbook of Child Psychology* (ed. C Murchison), Worcester, Mass., Clark Univ Press, 1933, Chap X.

successes in handling similar situations. In civilized communities, therefore, it is generally inferred that persons are well adapted to their environments in proportion as they can solve unexpected or perplexing situations in terms of new patterns of skill rather than in terms of an emotional reaction.[32]

It is now being said that education is not contributing quite as much to this kind of adaptation as it should. It is obvious that a book of this kind,—and most other textbooks, as well,—lay before the student a group of facts and principles which are the products of someone else's thinking We have, for example, been laying out for inspection the discoveries of men who have been at work in their laboratories. We have not filled these pages with perplexing or unexpected situations which would demand thoughtful activity on the part of the student. On the contrary, this book will not do much more than demand of him a certain amount of learning or remembering Now it is true that learning and remembering furnish practically all of the material which a person must use if he is to solve problems rather than be emotional about them, but mere learning, in and of itself, does not develop aptitude for solving problems [33] .

It is very easy, of course, to teach facts that have already been discovered. One has only to lay them out in an order somewhat like the one suggested in Chapter Six and then learn them as one would learn to perform any other kind of skill This kind of teaching can be done under the direction of a single person even though the number of learners may run into the hundreds. Education has been tempted, therefore, to reduce all of its training to this level. It is only in the progressive school that serious attempts have been made to introduce growing children to practical problem-solving situations in which they might find an opportunity to exercise their own thought functions [34] In any case, no person can say that he has become really an effective and well-balanced member of society until he has learned how to meet every situation with that degree of reflection and good judgment which the situation demands

8 *Adjustment and Personality.*—There is one type of adjustment which should be included in this chapter, but since it will be much more fruitful to consider the details in later chapters, we shall merely

[32] Consult Boas, G , *Our Ways of Thinking*, N Y , Harper, 1930

[33] A delightful account of some of the various aspects of thinking is to be found in Dimnet, E , *The Art of Thinking*, N Y , Simon and Schuster, 1928

[34] See, for example, Stevenson, J A , *The Project Method of Teaching*, N. Y , Macmillan, 1921

remark that, along with emotional action, on the one hand, and the development of personality traits, on the other, it marks a major source of conflict. We refer to one of the problems of motivation The reader will recall that there are a great many ways in which the primary tissue needs of the body may go wrong simply because they become associated with improper stimulus patterns and because they may assume the most bizarre forms It will be more convenient to describe some of these forms in the next chapter In the meantime, it will be helpful to say something about the relations between adjustment and personality

The word personality is commonly used in two different ways. On the one hand, it may refer to habits of thinking, feeling, and acting which have a particular social significance. When we say, for example, that one person is more honest than another, that one is more phlegmatic than another, or that one is more energetic than another, we mean to assert that the behavior patterns of different persons can be characterized in a way that is unique to each person. On the other hand, the word personality may refer to the richness and compactness of the total organization of all of the psychological functions of a person. One phase of this fact is to be found in the assertion that, through learning, a person's response to an immediate situation may be biased by his entire previous history Another part may be seen in the fact that when we awaken in the morning we still recognize ourselves to be the same person as we were on the day before These and other observations lie at the basis of the whole idea that psychology can be called a science of the self [35]

It is not necessary to decide at this point between the respective claims of these two points of view As a matter of fact, both may be correct. In either case it is easy to see what adjustment, on the one hand, and maladjustment, on the other, might mean with respect to them. If the particular mannerisms or traits of one person prove to be offensive to other persons or ineffective in helping one person to become a member of his group, it would certainly be fair to say that he is maladjusted. On the contrary, that person who possesses those traits or characteristics which make him likable and which enable him to do his appointed work in the social group would be well adjusted. It is from the point of view of total organ-

[35] Various ways of describing personality can be found in Hartshorne, H, *Character and Human Relations*, N Y, Scribner's, 1932, *passim* As an example of the self psychology, see Calkins, M W *A First Book in Psychology*, N Y, Macmillan 1914

ization that an even clearer concept of maladjustment can be derived. We have already referred to this fact in other places in this chapter where we have meant to say that maladjustment is, on many occasions, a product of conflict. If the self or the personality is defined in terms of compactness of integration among all of the traits of which a person is a sum, it would follow that any loss of integration or any division between one psychological function and another must be a sign of maladjustment.

Pending further study of this matter in the next chapter we may satisfy ourselves with a single illustration. Let us suppose that the student's normal desire for companionship runs into conflict with an acquired shyness, timidity, or awkwardness in the presence of other people and especially in the presence of persons of the opposite sex. Clearly, a conflict between these two particular functions of the student would stand in the way of his own happiness and in the way of successful adaptation to other people. Sometimes these conflicts become so serious as to result in the complete inhibition of desires or traits which are in and of themselves not only desirable but sometimes necessary It would follow that such a person might find himself distressingly at odds with himself and with others.[36]

9. *Is Adjustment Desirable?*—During this whole study of the nature of adjustment and maladjustment we have taken it for granted that complete and perfect adjustment, both to the physical and social environments, should be one of the aims of applied psychology and of education. With respect to certain kinds of psychological operation, this is probably the case. For example, we may assume that there would be fewer accidents, less effort in labor, and more general satisfaction if a person's habits and skills were always adequate to the task that had to be done. In spite of our acts to the contrary, we know that any normal person can acquire skill in most any one of the actions which take us through the average day. Then, too, it seems fair to say that every normal person should try to think as well as he can. There are some places, however, where perfect adjustment, either among the several traits of any single person or between a person and his environment, would lead to serious loss. As an example, we may take a person who is completely or perfectly adjusted in emotional types of action. This would mean that

[36] The development of conflicts and other types of maladjustment in personality traits is well described in Curti, M W, *Child Psychology*, N Y, Longmans Green, 1931, Chaps XIII and XIV.

such a person would never have any fear of objects or situations that should not be fear-exciting Perfect adjustment might be defined so as to say that a person should not even feel timid in the presence of other persons nor unduly impressed by the prestige of outstanding men. The same considerations hold true of anger. Perfect adjustment could be defined in such a way as to say that undue anger and resentment should be under such control that only the most vexing situations could induce a violent reaction. As a final illustration, we might say that a perfectly adjusted individual could never allow his affections to be expressed before any other persons than the members of his own family.

In each of these three cases, however, one might legitimately hope for exceptions. This hope can be seen to best advantage in the third example. Let us say that an otherwise normal person has not found it possible to expend his affections in a normal way or let us say that an otherwise normal person has found himself the center of a conflict involving the social mores, on the one hand, and his own personal affections, on the other. Society has long been inclined to say that such a person should be called immoral, and yet it is now recognized that conflicts of this type may result in compensations which are of the greatest value to society. In general, social mores have seen to it that the sex tendencies of a person shall be suppressed more effectively than is the case with any of the other tissue needs. Under these circumstances a person may often search for substitutional means of expression. And as we shall see in a later chapter, there are those who would say that the most fruitful substitutions take the form of creativeness in art, literature, painting, music, or religion.

If it can be shown that the addition of great pieces of art to the social heritage is sometimes made possible by the creation of a conflict and maladjustment, education will be faced with one of its most difficult problems. Everyone assumes that great pieces of art, intense examples of religious devotion, and heroic poems are desirable features of a mature culture. If they are desirable and if they are modes of escape from conflict, it would seem to follow that certain persons ought to be sacrificed to the common good by keeping them under constant suppression. The problem which we here raise is of such fundamental importance that we shall consider it in more detail in the following chapters and in Chapter Thirty-Five.

10. *Changing the Environment.*—There is one other aspect of the problems of adjustment which must not pass unnoticed. We have seemed to say everywhere in the present chapter that it is the busi-

ness of education to help people to adjust themselves to their environments and to one another. This is not the whole story of adjustment, however, for there are times when the environment itself must be changed while each person remains more or less as he is.[17] As a very homely illustration of the point we have in mind we may make use of a simple study of typewriting. Every student knows that the arrangement of the keys on the keyboard of a typewriter has been more or less a chance matter. It can be shown easily, however, that the standard keyboard places the heaviest load on the left hand. If the typist is right-handed, the ratio of the ability of the right hand to the left is as 100 to 88 87. It ought to follow, then, that the more competent hand should carry the greatest load. And yet, it actually turns out in normal typewriting that the left hand carries 48 7 per cent more load than the right hand carries The inference is that efficiency in the use of a typewriter could be increased if the keys and the keyboard were rearranged so as to fit more naturally the differential skill of the two hands and the differential skill of the fingers on either hand. Among the factors that may be studied in advance of any such change are the following: (1) the rate at which two adjacent fingers on one hand may be used as compared when the rate of the same fingers on either hand are used alternately, (2) the number of times any given combination of letters is apt to appear in actual print, and (3) the touch, that is to say, the feeling of lightness or heaviness in the operation of the keys.[18] Here is a case, then, where adjustment in a motor function could be brought about by changing the environment rather than by a change in the typist.

The instance we have used is very simple as compared with some of the larger problems of adjustment Other examples of the same order are to be found in rates of work in industry which may be either too fast or too slow for the worker. In our study of the relation between the leader and the led, we have found that persons who have the right qualities may not become leaders simply because their social context will not permit it. Likewise, we have found that a social context may actually create some leaders. In the next two chapters, we shall try to show that a great many different kinds of maladjustment are immediate products of the environment. As we have

[17] Cf Washburne, C , *Adjusting the School to the Child*, N Y , World Book Co , 1934

[18] Hoke, K E , "The improvement of accuracy and speed in typewriting," *Johns Hopkins Univ Stud in Educ* , 1922 (No 7), pp 35 ff

said before, some people are maladjusted because they have learned to be maladjusted. If they have acquired inadequate personal and social skills or attitudes and if these skills and attitudes persist, it may be because the environmental conditions persist. It not infrequently happens, therefore, that maladjustments and even more serious types of psychological ailment will automatically disappear when the patient is put into a wholly new environment.

With these remarks before us, we are in a position perhaps to see some of the meanings that can be summed up in the phrase "mental hygiene." This is a phrase which has enjoyed extensive use during recent years simply because it is recognized that bad psychological habits, may develop for the same reason that bad habits in personal hygiene may develop. There is no instinct which will keep giving a child the unintentional urge to brush its teeth, wash its hands and face, and otherwise take care of its body. Similarly, there is no instinct that will help him to balance his emotions against the situations to be met or put him in the right relation to other children. Brushing one's teeth is a habit that is acquired by practice. Similarly, methods of training which keep conduct normal and well balanced require practice The phrase "mental hygiene" sums up all of the methods and devices which will insure sound or normal conduct. If a person may be trained in poor conduct or if he may be educated in such a way as to become the seat of conflict and dissociation, he can also be trained to avoid conflict and all of the psychological difficulties that go along with it.

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CHAPTER TWENTY

THE MAJOR TYPES OF PSYCHOLOGICAL AILMENT

1. *Introduction.*—There is, perhaps, no branch of the field of applied psychology which has entered into daily conversation so quickly and so easily as has that which often goes by the name of medical or clinical psychology. Men have had to learn how to get the best of nature and how to rid themselves of fear, for nothing has contributed so much to their fits of despair, on the one hand, and to their love of sheer living, on the other, as the condition of their bodies and of their "minds" This fact is revealed by the twofold function of religion, the one being to suggest a way of life and the other to suggest a way toward health. During the last quarter-century, therefore, it has not been the facts of psychology which lead to good teaching or to good business that have been talked about over the tea table. On the contrary, it has been such facts as might lead to further relief from pain and suffering. These facts vary all the way from the latest religious nostrum to the researches of eminent physicians in their laboratories.

In view of these and other considerations, we turn in this chapter from the concept of normal adjustment to a consideration of the several ways in which human behavior may seriously go wrong. It has always been rather easy to know what a man means when he says that his body is ailing He knows, for example, that he is subject to certain kinds of injuries such as torn flesh, concussion, infection, or broken bones. Then, too, the human body may be attacked by poisons of various sorts Many of these poisons are created within the body itself whenever it becomes a host to certain kinds of bacilli. It is now recognized that a variety of feverish conditions and other symptoms of the so-called infectious diseases are caused by living organisms of the minutest dimensions. Some of these creatures are so small as to pass through the finest of filters, and they are described, therefore, as the non-filterable viruses. We have, then, two types of bodily affliction, viz, those that are traumatic in character and those that are bacterial in origin. Both of these types of ailment, however, can be called organic or structural ailments, for they mean

that one or more of the structures of the body have actually been impaired.[1]

In contrast to organic ailments, diseases, and traumata, there is a whole group of ailments which may be called functional. These ailments are characterized by the fact that it is not normally possible to find anything torn, infected, or broken in the body and neither is there any sign that the patient has become a host to bacilli. In spite of these facts, however, the machinery of the body does not seem to function in a normal way. There are times, for example, when apart from any discoverable organic cause the colon or the gall bladder may become sluggish, the digestive juices in the stomach fail to secrete in proper amount or in good balance with one another, and the glands of internal secretion fail to remain in that unique state of equilibrium in function which is so essential to normal health.

Without becoming too critical, then, we know whereof we speak when we say that a person is ill in his body. We mean that, for one reason or another, any one of the types of ailment just described has visited him. There are, however, other types of ailment that do not enter into this picture These ailments are of the kind known as mental or psychological ailments Instead of having a broken bone, a torn ligament, an active colony of typhoid germs, or an unstable acid-alkaline balance in his system, a man may have a "broken mind," an "infected mind," or a "disordered mind." What is meant by these terms? How may a mind become broken, or what are the conditions that bring it into disorder? How many different types of psychological ailment are there and how may they be detected early enough to prevent them, or accurately enough to suggest an adequate treatment for them? And if there is a way of mending a broken mind or of putting a disordered spirit into order again, how may this way be used and how effective and enduring is the treatment?

These are some of the questions that must be considered in this section of our study of applied psychology. In view of the prevalence of types of sickness which are loosely called mental, and in view of the fact that the parent science for just this kind of infliction is the science of psychology, we ought to make just as much use of it in the schoolroom, in hospitals, and in the consulting room as the ordinary physician makes use of the sciences of biology, anatomy, and parasitology.[2]

[1] Consult, for example, Clendenning, L., *Behind the Doctor*, N Y., Knopf, 1933

[2] This branch of medicine is known as psychiatry See Rosanoff, A J., *Manual of Psychiatry* (6th ed.), N Y., John Wiley 1927.

2. *The Nature of "Mental Disease."*—When we say that there are psychological diseases just as there are bodily diseases, we seem to mean that there is some kind of mental or spiritual stuff that can be broken, infected, or disordered. The commonly used phrase, "a broken mind," is certainly a direct carry-over from ordinary medicine. A bone is a piece of matter having a definite form and substance and to break it means to crack it or separate one part from another just as one might crack a nut or divide a stick into two parts. Are we to say, then, that a mind is also some kind of stuff which can be broken in this same manner? Are we to say, also, that minds are subject to certain kinds of infection just as the lungs or the tonsils may become infected? Furthermore, are we to say that a mind or the several parts that make it up can get out of balance with one another and thus lead to disorder rather than to order? [3]

A right answer to these questions clearly stands at the very beginning of any study of medical psychology, for all that we may have to say later on about types of psychological ailment and about methods of prevention or of treatment depends upon what can be said at the present moment about their nature. One answer to these questions has already been given. We have said in several places, and directly implied it in other places, that psychology is a science of the way in which human beings react to the objects and events around them. In short, psychology is a science of behavior. If this is the case, how can such a science say anything at all about minds, either when they are normal and healthy or when they are abnormal and diseased?

One way out of this difficulty runs as follows. We may argue that, if a mind is ailing, some sign of the ailment ought to appear sooner or later in behavior. It is hardly reasonable to suppose that a mind could be really sick without some manifestation of it in the way in which the patient adjusts himself to the objects and events around him. This way out of our difficulty does not help us a great deal, however, for we still have not found out what it means to have a broken mind. We may be led, then, to suspect that the phrase "a broken mind" is only a manner of speaking and that what we really mean is that such a person must be broken in the sense that he cannot function normally in his environment.

This suspicion leads us to a further consideration of that type of ailment described above as a functional ailment. We must grant, of course, at the very outset, that the brain—and other parts of the

[3] See Clendenning, L., *The Human Body*, N. Y., Knopf, 1928, Chap. XI.

nervous system as well—is a part of the body. No one has ever thought of the brain as a mind and neither has he confused the nerve cells in his brain with a memory or a skill. Brains, then, can be made a victim of the same kinds of ailment that attack other parts of the body. During an automobile accident, for example, a part of the brain may be crushed or torn. We know that, when such an event takes place, there are definite changes in the psychological functions of the patient. If the injury is not too severe and if it is located at some precise point in the brain, an equally precise and localizable disturbance in the behavior of the patient will often be discovered.[4] The same facts hold true, when the brain is attacked from any other source, but it is not of these matters that we speak when we turn to the concept of functional ailment. On the contrary, the term functional ailment means that the parts are all present but that these parts are not playing the game as they should. What does this mean with respect to the nature of psychological disease?

Almost everyone is now agreed that one of the primary functions of nerve tissue is described by the word integration.[5] There are, of course, several different kinds of integration in the body. The bones serve this purpose in the same way that the steel framework of a building keeps the building together. The blood also binds the body together, for it carries food to every cell and also takes away from each cell the worn-out residues of previous activity. From the point of view of the psychologist, however, nerve tissue is the chief integrating mechanism for, by means of it, all of the various organs of the body,—and especially the organs of response (the muscles and the glands),—are tied into a single cooperative machine. When some stimulus-situation acts upon one of the receptors, say the eye or the ear, an adequate response will be made to this situation whenever the nervous system can act as a successful negotiator between the two events. In short, then, the nervous system has certain functions to perform and these functions can be called normal only when every part has played the game according to the rules which nature, on the one hand, and the previous history of the individual, on the other, have laid down.

But let us suppose that some part does not play the game. We may

[4] The whole problem of the relation between mind and body has been ably discussed by McDougall, W., *Body and Mind*, N. Y., Macmillan, 1920. See also Troland, L. T., *Principles of Psychophysiology*, N. Y., Van Nostrand, 1932, Vol. III, Chap. XX.

[5] See Sherrington, C. S., *The Integrative Action of the Nervous System*, New Haven, Yale Univ. Press, 1906. Also Lashley, K. S., *Brain Mechanisms and Intelligence*, Chicago, Univ. of Chicago Press, 1929.

imagine that there is a dissension among the players so that the unity of the whole is lost. We know that, sometimes, a telephone connection may not be completed because a part of the line is already in use by some other subscriber. From the point of view of one of the subscribers, then, the system is temporarily out of order. It is some such idea as this which lies behind the concept of functional order and disorder. But a telephone connection may not be secured, also, because the current is weak, or because a given contact in one of the relays is not made, or because the number was not properly dialed. So, too, inadequate behavior may result when slight mishaps or slight maladjustments occur somewhere along the line.[6] As a matter of fact, one might even ask whether poor service on the part of the nervous system might not always be the result of some structural weakness somewhere in the system. In other words, may not the phrase functional ailment be useful only because one cannot find out just where the structural difficulty is that reveals itself in action? For, after all, functions cannot be exercised independently of structures.

It looks as though no one has enough information about the operations of the nervous system to answer this question. In spite of this fact, however, it has been profitable to hold to the distinction between organic ailments and functional ailments. We may give some suggestion of the nature of the distinction in the following experiment. The subject of the experiment was described as a hysterical patient. One of the symptoms of his condition appeared in the fact that he was blind in the outer portions of the retina. This blindness was called a functional blindness because the physician was not able to discover any structural disorder. Proof that the blindness was really functional came in the following way The reader knows that if two stimuli are presented simultaneously it will often happen that one of the stimuli will acquire the capacity to call out the response normally elicited only by the other[7] Let us suppose, for example, that a light is presented to the seeing portion of the retina just before a puff of air is directed against the cornea. The puff of air will, of course, cause a lid reflex. If, however, the two stimuli are presented together for a suitable number of times, the light alone will excite the lid reflex. In the study we are considering, it was shown that the same kind of conditioned

[6] This situation is closely related to the facts of inhibition and facilitation which we have already considered in Chapter Six See Skaggs, E B, *The Major Forms of Inhibition in Man*, Chicago, Univ of Chicago Press, 1931

[7] This type of learning has already been described as conditioning See Pavlov, I P, *Conditioned Reflexes*, London, Oxford Univ Press, 1931

response could be developed for a light which the patient himself did not report. That is, just as a light was thrown on the non-seeing part of the retina, a puff of air was blown against the cornea. After a few repetitions, the presentation of the light was sufficient to bring about the lid reflex. It was even possible to condition this patient to say the word "light" in response to the presentation of a light which he was sure he did not see.[8] These results are to be compared with a similar method applied to a person who was suffering from blindness (hemianopsia) following surgical resection of part of the occipital lobe in the brain.[9] It was not possible to condition this patient to an unseen light. We may infer, then, that there is a practical difference between functional and structural ailments [10]

There are several other ways in which true functional disorders can be distinguished from organic ailments. For example, functional disorders are not usually so persistent or continuous as organic disorders. If a person is diagnosed as feebleminded, he will always give the same picture, but a person who is subject to hysteria, to abnormal forgetfulness, to anxiety, or to unreasonable fears may reveal his disorder only on certain occasions. To be sure, there are some kinds of functional ailment which are just as persistent as organic ailments. Moreover, we shall find that epilepsy may be an organic ailment which is periodic in its appearance. One must, then, use this sign of difference with caution. In the second place, a truly organic ailment is more likely to have a definite developmental history. If a brain area has been destroyed leading to the paralysis of some member of the body, the paralysis will be fairly permanent. In the state called hysteria, however, paralysis may shift from one part of the body to another. In the third place, functional ailments are often modified rather easily by differences in the situation in which the patient is placed, by distraction, by excitement, or by any of the more common therapeutic devices. In the fourth place, functional ailments are likely to be distributed on the body according to popular notions of anatomy. In some types of hysteria, for example, a patient will become insensitive

[8] Cohen, L H, Hilgard, E R, and Wendt, G R, "Sensitivity to light in a case of hysterical blindness studied by reinforcement-inhibition and conditioning methods," *Yale J Biol and Med*, 1933, *6*, 61–67

[9] Hilgard, E R, and Wendt, G R, "The problem of reflex sensitivity to light studied in a case of hemianopsia," *Yale J. Biol and Med*, 1933, *5*, 373–385.

[10] Further evidence on this conclusion is to be found in Hilgard, E R, "Conditioned eyelid reactions to a light stimulus based on the reflex wink to sound," *Psychol Monog*, 1931, No 184 Sears, R R, and Cohen, L H, "Hysterical analgesia and astereognosis," *Arch Neur and Psychiat*, 1933, *29*, 260–271.

to contact in a part of the hand normally covered by a glove. In a true organic ailment, lack of sensitivity would be limited to areas served by some particular nerve or group of nerves. Finally, in line with the experiment mentioned above, the patient suffering from a functional ailment can be easily tricked into absurd action. If, for example, a patient has a glove anesthesia, he may be asked to say "yes" if he feels contact, and to say "no" if he does not feel it. As a rule, a patient will say "no" when pressure is applied to the anesthetic area. It is fair to ask, of course, how he could say "no" if he were totally unaware of contact. It is even possible to use a system of lenses which will reverse the position of the eyes A patient who reports blindness in the right eye can be made to see with this eye through such an instrument if he does not know that the instrument actually transposes the eyes.[11]

In addition to these general differences between functional and organic ailments there are a number of special signs which the practiced physician can use in the hospital We may conclude, then, that so far as practical work is concerned, there is a genuine difference between functional and organic ailments.

3. *Structural Ailments and Their Psychological Correlates.*—Since it is our main task in this book to show that the facts of psychology may be used in the maintenance of good health rather than to recite the facts for their own sake, we shall be able to give only the shortest possible description of some of the more common psychological ailments. We shall consider, first, and most briefly of all, the various types of psychological disfunction which are known to depend upon changes in the structure of the nervous system These ailments can be called functional only because actual destruction of nerve tissue means that a patient cannot react to his environment as a normal person would Such persons are functionally inept because those parts of the apparatus which make adequate behavior possible have gone awry The student will realize, of course, that our brief description of these ailments is based upon a common assumption in psychology to the effect that disturbances in the stream of behavior are closely correlated with the nervous apparatus

Among the organic or structural failures which give rise to major types of psychological disturbance we may mention, in particular, tumors, brain lesions, injuries to the brain, and a general form of

[11] Consult Hollingworth, H L , *Abnormal Psychology Its Concepts and Theories*, N. Y., Ronald Press, 1930, pp 218–222

deterioration in brain tissue which gives rise to a group of symptoms known as paresis. Other groups of symptoms may be induced by such drugs as alcohol, opium, morphine, and cocaine, by syphilis, and by disturbances of the glands of internal secretion. Epilepsy is to be distinguished from these organic ailments in the sense that it is sometimes thought to be dependent upon structural changes in the brain and sometimes upon purely functional circumstances. It looks too as though there might be some intimate relation between epilepsy and feeblemindedness In any case, the organic epilepsies are often associated with head or brain injuries, with certain diseases of the brain, and sometimes with glandular disturbances. Certain substances injected into the body may cause epileptic seizures.[12] The functional epilepsies are sometimes like the hysterias, although not very many studies have been made of this relationship.[13]

Because of injuries to the brain from gunshot wounds or as a consequence of automobile accidents it has been possible to find out a great many facts about the relation between various psychological functions and the distribution of given brain areas. For a long time it has been held that the correlation between given brain areas, on the one hand, and definite psychological functions, on the other, must be fairly high.[14] One of the clinical by-products of the World War was the opportunity to study a large number of cases of injury to the visual area in the occipital lobe of the brain. It has become clear from these studies that visual perception may be made up of a variety of functions, some having to do with simple sensorimotor reactions and others having to do with the processes frequently described by the word "meaning" In one series of experiments on subjects of this type it was shown that certain types of brain injury might block off definite sectors of visual function. It was discovered, for example, that the meaning which might accrue to a given visual object must depend, in part, upon the nature of the responses which the patient could make to the object. In normal adulthood, many of these meanings are closely related to verbal responses, either implicit or explicit, but certain types of injury to the brain will block off this possibility. The patient must, therefore, move some other part of the body, say

[12] Consult, however, Rossetti, I, "The mechanisms and fundamental cause of the epilepsies," *Arch Neur and Psychiat*, 1923, 9, 689–738

[13] Smith, W G, "Tests on epileptic and normal subjects," *Brit. J. Psychol*, 1905, 1, 240 ff

[14] For a general picture of the brain and its areas, see Dana, C. L, *Textbook of Nervous Diseases*, N Y, William Wood, 1892.

the hands, the feet, or the head, if he is to sense the meaning of the object presented to him. When all of these modes of reaction are taken away, visually perceived objects lose their meaning [15]

We refer to these experiments partly in order to show how the research man may take advantage of injuries in order to discover the relation between the brain, on the one hand, and psychological functions, on the other, and partly to show that psychological ailments may really issue out of brain injuries. The picture is not so simple as this, however, for more recent studies have thrown some doubt upon the notion that the brain is made up of a large number of more or less separate and distinct areas. In some of the studies on learning, a considerable amount of evidence has been gained which shows that rate of learning and degree of retention is just as significantly correlated with the whole amount of intact brain tissue as it is with special brain areas. At the present time the various problems raised by these experiments are far from being solved.[16]

Paresis (dementia paralytica) is a name given to a group of psychological symptoms created through gradual degeneration in the cortex of the brain. This degeneration is most frequently attributable to syphilitic infection. The symptoms may appear at almost any interval after infection and they consist at first of slovenliness, headache, loss of appetite, a general feeling of fatigue, some tendency toward nervous irritability, and increasing bodily tremor. As the deterioration of the cortex continues, the patient fatigues more and more readily, his memory becomes seriously impaired, and he is unable to carry out the rational solution of problems. Gradually, the symptoms spread to all of the psychological functions and especially to personality traits Toward the end of the disease the patient will lapse into a state of almost complete helplessness. This means that most of the psychological functions have become so impaired that the patient is reduced to a vegetative level of living.[17]

A picture which resembles paresis in some respects is presented by the so-called disease of old age, viz , senile dementia. The onset of this ailment is marked by increasing tardiness in action, increasing bluntness in the perceptual functions, the appearance of hallucinations,

[15] See Kluver, H , "Visual disturbances after cerebral lesions," *Psychol Bull*, 1927, *24*, 316–358

[16] Lashley, K S , *op cit* , *passim* See also Lashley, K S , "Studies of cerebral function in learning," *J Comp Neurol* , 1926, *41*, 1–58

[17] Campbell, C M , "Nature of dementia in dementia paralytica," *Psychiat Bull* , 1916, *9* (No 3), 316–322

gradual impairment of the memory functions, and greater irritability in emotional action Sometimes, in the later stages of this affliction, the patient may become delirious or fall an easy victim of fairly well-organized systems of delusion. A tumor growing upon the brain may produce a similar picture. Adequate descriptions of senescence, however, must wait upon further experimental work. Only a beginning has been made on these problems.[18]

In view of the fact that these various types of psychological disfunction are immediately contingent upon destruction or impairment of brain tissue, they come into medical psychology only as an illustration of the ways in which the psychological functions are dependent upon the integrity of brain tissue. There are no psychological methods which may be used either to delay the onset of these ailments or to effect any kind of a cure in them. On the contrary, treatment must always be surgical or pharmacological. In some cases, for example, brain tumors may be removed. If detected early enough, serious infection from syphilitic viruses may be prevented. For certain types of brain injury, where there is definite impairment of single functions, it may be possible to reeducate the patient It is quite well known that the nervous system has fairly large powers of vicarious function and even a badly mutilated person may hope, therefore, to find at least a small measure of compensation through special training [19]

We have brought these psychological symptoms of organic failure into our picture because the student will wholly miss the significance of functional disorders if he does not sense the following fact. If a certain brain area is destroyed by a gunshot wound, the patient may not be able to use his visual apparatus He will be totally blind or blind to certain kinds of objects or blind to objects in a certain part of the visual field, depending upon the nature of his injury. No one can doubt the reality of blindness created in this way. The patient, however, is not directly aware of his brain injury after his wounds have healed. He knows only that there are certain kinds of psychological function which he cannot carry out. The functionally blind person is in exactly the same situation so far as his own information goes. To be sure, his brain is not injured, but if he reports that he cannot see, his report is just as reliable as is the report of the other person. Nothing is gained by ridiculing functional blindness as though

[18] Cf Miles, W R , "Age and human ability," *Psychol Rev* , 1933, *40*, 99–123 ; Hall, G S, *Senescence The Last Half of Life*, N Y , Appleton, 1922

[19] See Franz, S I , *Nervous and Mental Reeducation*, N Y , Macmillan, 1923.

it were a figment of the imagination. If a person is blind, that settles the matter so far as that particular person is concerned. The only difference between him and the patient whose blindness is caused by organic failure is that under suitable conditions he can learn how to see again We shall return to this possibility in Chapter Twenty-Two.

4. *Neurasthenia* —We must now try to describe as briefly as we can some of the principal groups of psychological disorders. As we do so, we must keep three things in mind. In the first place, no one really undertakes to describe a disease as such. On the contrary, even in the case of bodily ailments, the physician describes a pattern of symptoms which are often called the syndrome. The syndrome of a common cold, for example, is made up of headache and sometimes of other bodily aches, congestion in the nasal passages, a slight fever, soreness in the throat, and general loss of energy In the same way, the syndrome of a psychological ailment is made up of a variety of symptoms. These symptoms may be limited to a small group of psychological functions or they may extend to every function of which a person is the sum. The variety of symptoms then will be just as wide as the psychological horizon of human nature. It happens, however, that certain clusters of symptoms appear more frequently than other clusters Moreover, separate symptoms of maladjustment are sometimes more apt to fall into some clusters than into others It is for these reasons that one may speak of specific psychological ailments. We could, of course, forget the medical side of the picture and try to show how each particular psychological function is impaired in any given set of circumstances. We might, for example, make a special analysis of reaction time, quickness in learning, or freedom of association among hysterical patients as opposed to normal persons.[20] It is more fruitful, however, to cut across the whole person so that we may see some of the distinguishing marks of each of the major psychological disturbances

In the second place, the reader must remember that there is a great amount of confusion in the field of psychological medicine, for the words and concepts that have been used have a great many different origins The chief confusion is created by the fact that physicians have

[20] Studies of this kind are growing rapidly in number See, for example, Bunch, C C, "Auditory acuity after removal of the entire right cerebral hemisphere," *J Amer Med Assoc*, 1928, *90*, 2102 Town, C H, "Language development in 285 idiots and imbeciles," *Psychol Clin*, 1913, *6*, 229–235 Lundholm, H, "Reaction time as an indication of emotional disturbances in manic-depressive psychosis," *J Abnorm Psychol*, 1922, *17*, 292–318 Saunders, E B, and Isaacs, S, "Tests of reaction time and motor inhibition in the psychoses," *Amer J Psychiat*, 1929, *9*, 79–112

sometimes been purely psychological and at other times purely neurological in their points of view. As we shall see in a moment, a distinction is commonly drawn between neurasthenia and psychasthenia, the inference being that neurasthenia is more directly related to the faulty operation of the nervous system while psychasthenia is more nearly a direct expression of mental impairment Then too, as we shall see in the next chapter, explanations of psychological ailments range all the way from those that are purely nervous in character to those that postulate a dynamic and active mental stuff For certain purposes it is helpful to emphasize at one time the nervous aspects of psychological disorder and then to emphasize the psychological aspects, but this is not to say that psychological ailments are ailments of minds as opposed to bodies.

In the third place, the reader must seek constantly to find examples in his own daily experience of the symptoms which we are about to describe If he does not do this, he will take the present chapter and other chapters in this section of our study of applied psychology as though he were reading about mental abnormalities rather than looking at ways and means by which he can improve his own psychological health. As we pass on to describe different forms of psychological disfunction, the student must be ever mindful of the fact that the symptoms we describe are in almost every case exaggerated cases of modes of behavior and attitude which are a part of anyone's daily life.

Neurasthenia is, perhaps, the most common of all of the psychological disorders. Moreover, it is a disorder which is almost normal in the sense that it does not often require the hospitalization of the patient. It is to be distinguished from some of the more serious ailments because it rarely involves all of the psychological functions. On the contrary, the person who is neurasthenic or psychasthenic betrays his ailment in only a few of his actions.[21]

The most characteristic feature of neurasthenia is a feeling of extreme fatigue. This fact is revealed in the word itself for neurasthenia means diminished nerve energy. The reader already knows what fatigue means in his daily life. He has met the fact that he will not uncommonly become more fatigued toward the end of the day, but in neurasthenia the patient feels fatigued throughout the entire day. He finds, moreover, that rest has little if any effect upon him In addition to this primary fact, there are a great many secondary symp-

[21] Dorcus, R M , and Shaffer, G W , *Textbook of Abnormal Psychology*, Baltimore, Williams and Wilkins, 1934, Chap X.

toms which are extremely variable in appearance. Among these we may mention frequent headaches associated with blurred vision, aches and pains distributed irregularly throughout the body, digestive disorders of a purely functional character, progressive loss of appetite, more or less persistent insomnia, and a variety of changes in the perceptual functions The patient may, for example, report buzzing in his ears or heightened sensitivity to lights, sounds, and other sources of stimulation. The patient may be easily distracted and he may show quick and variable changes in his prevailing moods and attitudes. As a rule, he will be irritable, depressed, pessimistic, and full of anxiety.

It is clear that every one of these symptoms is more or less common in the daily life of a student. He too may have his irritable days, and there are numberless occasions on which he will feel depressed even for a period of weeks. Sometimes a normal person will be subject to fits of foreboding in which some unnamed fear of failure or of oncoming sickness will distress him. The truly neurasthenic person differs from the normal person largely because these symptoms become much more intense and persistent in him. When, for example, the neurasthenic becomes anxious or worried, he will almost invariably seek some cause for his condition. It often happens that such a cause will be found in some of the bodily functions A patient can then easily turn his attention to his own condition and in extreme cases this act will convert him into a true hypochondriac. That is, he will become morbidly concerned about the state of his own health. There is some reason to believe that neurasthenia may develop most frequently among persons who are introverts In any case, the neurasthenic is often deeply concerned about himself and about the possible injury that he may have done to his body by overwork or by misusing some of his bodily parts.

There are several different ways in which the development of a neurasthenic condition can be explained It is said, for example, that it may have its origin in an excessive expenditure of the bodily energies. This may happen as a consequence of long periods of intense work or as a result of prolonged sleeplessness and of faithful attention during the illness of some member of the family. It turns out, however, that a good many cases of neurasthenia do not show a record of excessive work It looks, then, as though we must appeal to purely functional matters. We may turn, therefore, to the fact mentioned above, viz., that neurasthenia may be a product of an inferiority complex. If, for example, a person full of initiative or of a strong desire for self-assertion goes for a long time without satisfaction he may develop an attitude

of inferiority which will pass quickly to profound anxiety.[22] We will see in the next chapter how the normal expression of some of the primary tissue needs of the body may be blocked by social mores, by some personal defect, or by conflict with another tissue need. It is now recognized that any one of these circumstances may result in that sense of insufficiency or inadequacy which culminates in an inferiority complex As the neurasthenic symptoms develop and as the patient begins to pay closer attention to functional bodily disorders which appear to him to account for his insufficiency, they will soon be accepted as a sufficient cause for his condition. In other words, by talking about symptoms of bodily stress or disorder the patient will be able to compensate for his insufficiency by saying that he is truly ill. One of the clearest sources of neurasthenia lies in prolonged emotional strain over situations which do not admit of adequate expression. It is well recognized that emotional tensions of this kind may be more exhaustive than actual manual labor. There are, no doubt, other circumstances which would have the same effect [23]

5. *Psychasthenia.*—Just as neurasthenia is said to describe a state of lowered nervous energy, so psychasthenia is said to describe a state of diminished psychic or mental energy [24] One of the main students of this disorder thought that mental organization must depend upon a sufficient amount of mental energy If, then, this energy were to decline, the mind of the patient would move toward that disintegration which is so characteristic of the psychasthenic patient. If psychasthenia means that there is a kind of mental stuff or mental energy which can be stored up in larger or smaller amounts, one has committed one's self to the doctrine that mind stuff is different from body stuff. In other words, one has committed one's self to a doubtful theory. It is clear, however, that psychasthenia must manifest itself in failures of adjustment, just as neurasthenia does. We may then describe the psychasthenic patient in terms of the particular cluster of symptoms that distinguish him from the normal person. The symptoms which appear most frequently in psychasthenia are very much like those that appear in neurasthenia save that they are more nearly psychological in import Among other traits, there are unreasonable fears of a great many different objects, obsessions, compulsions, tremors in various

[22] This theory has been proposed by Adler, A, *The Neurotic Constitution*, N Y, Moffat Yard, 1917, *passim*

[23] Henderson, E K, and Gillespie, R D, *A Textbook of Psychiatry*, London, Oxford Univ Press, 1927

[24] Janet, P, *Les obsessions et la psychasthenie*, Paris, F Alcan, 1903.

parts of the body, doubts and anxieties, and diffuse feelings of unreality and inadequacy in social or in general environmental situations. The fears of which we have spoken are often called phobias They differ from normal fear by being much more intense, by coming as a result of stimulus-situations which normally should not arouse a fear reaction, and by the relative lack of control which the patient has over them. Among the fears which develop most frequently are fear of high places (acrophobia), fear of open places (agoraphobia), fear of confinement or of closed places (claustrophobia), fear of solitude (monophobia), fear of blood (hematophobia), fear of crowds (ochlophobia), and so on [25]

The very fact that there are so many of these fears suggests at once that they must be acquired for they are just as variable as the number of situations in which a person may be placed. It is now believed that most of these phobias are probably developed during early childhood through the method of learning known as conditioning We have already had occasion to refer to this fact. We have found that an athlete may have a fear of being tackled or a fear of hitting the ground because of some unfortunate experience when he was a child [26] If an experimenter uses his stimulus-situations properly, he may produce exactly opposite reactions in different persons to the same situation. In one such case, for example, the sound of a bell was conditioned to the iris reflex in such a way that the pupils of the eyes of one group could be contracted and the pupils of the eyes of another group relaxed without changing the conditioned stimulus.[27] It has long been recognized by animal trainers that dogs may be trained to react in a friendly manner to some persons and in a violently aggressive manner to other persons.

From one point of view, obsessions and compulsions are very much alike. The obsession has been defined as an irresistible and persistent association. Likewise, the compulsion is an equally persistent or irresistible urge to action.[28] The reader will see at once that these traits are also common in everyday life. Almost everyone has found a tune running persistently "through his head," or in walking along

[25] Bagby, E, "The etiology of phobias," *J Abnorm Psychol*, 1922, *17*, 16-18

[26] The wide variety of circumstances under which fears may be acquired have been described by Jones, M C, "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933, also Jones, M C, "The elimination of children's fears," *J Exper Psychol*, 1924, *7*, 382–390

[27] Cason, H, "The conditioned pupillary reaction," *J Exper Psychol*, 1922, *5*, 108–146

[28] Morgan, J J B, *The Psychology of Abnormal People*, N. Y, Longmans Green, 1928, pp 132 ff

the street he has found himself touching every picket in a fence. In a more extreme form, a compulsion may manifest itself in an irrational impulse to steal (kleptomania) or to set fire to buildings (pyromania). In all of these cases and in others that might be named, such as laughing or crying over a considerable period of time or of persistently washing one's hands, it looks as though some motive must be in operation independently of the total character of the stimulus-situation and independently of the previous training of the patient. If, for example, a psychasthenic person displays that constant type of motor agitation known as a tic, it is clear that some factor must be operative other than a normal environmental stimulus to action.

There are several theories as to the sources of the symptoms we have mentioned One of the more common theories runs as follows. If a person has a profound desire which cannot come to expression because of his training or because of the social mores, a compulsion or obsession will serve the purpose of diverting him from his desire. As we shall see in the next chapter, it may be argued that these unsatisfied desires are mostly sexual in character [29] It is not necessary, however, to take this point of view for every normal person is moved to action by a good many other urges than those of sex If we grant the presence of these urges, we may still argue that all of them cannot be satisfied and that an obsession or a compulsion would still be equally diverting.

We have already seen that psychasthenia can be described as a result of a lowering of those energies which keep a person well integrated or well balanced. This feature can be illustrated by the attitude of a patient in the face of a choice or a decision and by his occasional sense of the unreality of his surroundings. Here again we may begin with everyday experiences, for most persons have suffered periods of inadequacy when they are trying to "make up their minds." In these cases the student may feel his inadequacy rather keenly because a choice or a decision is the occasion for prolonged struggle and confusion rather than for quick and active appraisal of the options and an equally rapid integration of the alternatives preliminary to a decision In more extreme cases, a patient may enter into a prolonged debate with himself as to how to put on his shoes, whether or not to cross the street, how to turn off the water, and the like.[30]

It is almost certain that a person who cannot be aggressive enough to effect decisions and arrive at judgments would be obsessed by the

[29] Freud, S., *New Introductory Lectures on Psychoanalysis*, N Y., Norton, 1933

[30] Myerson, A., *The Psychology of Mental Disorders*, N Y., Macmillan, 1927, pp 62 ff.

unreality of the objects around him. He might, for example, look at the most familiar objects and yet have the strange feeling that he is seeing them for the first time This too is a type of experience more or less common in our everyday living.

6 *Hysteria* —Neurasthenia and psychasthenia can be distinguished from each other in the following ways. The former state is characterized by feelings of fatigue These feelings rarely take the form of a compulsion or an obsession That is, the patient does not feel that he must be tired. The psychasthenic, however, usually feels that he is not his own master. The movements that he makes come to him, so to speak, as a consequence of someone else's command. Things appear unreal to him because he cannot get hold of them and make them a part of his own action In short, the psychasthenic patient is on his way toward dissociation It is for this reason, in part, that psychasthenia has been treated more as a psychological disorder than is the case with neurasthenia.

We may now move farther along the road of dissociation toward a more complete shattering of attitude and action as in hysteria. We have already tried to say in several places that the nervous system is a peculiarly apt device for bringing about integration or patterning among a great many different functions. One of the principal theories of hysteria, for example, says that the condition is due to hereditary factors and to emotional stresses which prevent the patient from developing a normal synthesis among all of his action patterns [31] This would mean that a hysteric patient would be highly subject to suggestion for, as we have seen, suggestion means the ready acceptance of a stimulus to action without any attempt to integrate either the stimulus pattern or the response to other patterns and responses Hysteria, then, might be described as a state of increased suggestibility [32] A further theory argues that hysteria is the result of a conflict between a fundamental urge to action, on the one hand, and the obstacles placed in the way of such an urge, on the other Since such obstacles can never be wholly repressive, the fundamental urge will escape in a disguised form The symptoms which hysteria describes, then, are these substitutes for an unsatisfied urge [33]

The symptoms included under the word hysteria are extraordinarily

[31] Janet, P , *The Major Symptoms of Hysteria*, N Y , Macmillan, 1920, *passim*

[32] Babinski, J , "My conceptions of hysteria and hypnotism," *Alienist and Neurol* , 1908, *19*, 1 30

[33] Freud, S , "Selected papers on hysteria and other psychoneuroses," *Nerv and Ment Dis Monog* , 1909 (No 4)

variable They include loss of sensitivity in various parts of the body, apparent paralysis of some of the motor functions, the appearance of tics, tremors, and other spontaneous movements, various types of forgetfulness, an increase in suggestibility, a considerable amount of emotional instability, and sometimes a more or less complete separation of the personality traits into two or more distinct patterns. A number of minor disorders may appear such as extremes in mood, nausea, dizziness, extreme absentmindedness, and even the development of trance states. Forgetfulness as a symptom of hysteria has been made familiar to the public by newspaper accounts of persons who have forgotten who they were and who have, on that account, wandered away from home only to be discovered in some other place without any recollection of their past experience.[34]

The so-called anesthesias may take a great many different forms. Given areas of the body, for example, may lose their sensitivity, although the reflexes normally associated with these areas will persist. The patient himself may not be aware of such insensitive areas and neither will he know the exact form which they may take. In the field of vision, for example, objects focussed upon a given half of the retina may excite no response. One eye may remain functionally blind or the whole field of vision may be definitely narrowed. It is even possible for the patient to become functionally blind to certain colors or to certain kinds of objects. Since these functional disturbances may wander freely from one part of the body to the other, it seems fairly clear that they are the product of dissociation in neural function rather than an expression of a truly organic ailment.[35]

This same sort of dissociation appears in the use of various muscle groups The patient suffering from hysteria may be unable to move a single muscle group or some single member of the body (monoplegia), one side of the body (hemiplegia), the lower limbs (paraplegia), or even the whole body (diplegia). Paralysis of this kind differs from paralysis originating from a truly organic difficulty because the deeper reflexes are not affected and, moreover, the subject will still respond to electrical stimulation. Normal integration usually sees to it that a stimulus to move a member of the body in one direction means a balanced inhibition against movements in the other. In hysterical paralysis inhibitions of this type are not effective, which means that

[34] Janet, P., *op. cit., passim*

[35] Head, H., *Studies in Neurology*, London, Oxford Univ Press, 1920, pp 120 ff., 427 ff Also Hurst, A F., *The Psychology of the Special Senses and Their Functional Disorders*, London, Oxford Univ Press, 1920, *passim*

the patient will try to move a given member of his body in two directions at once. On occasion, the use of the limbs may be normal for some bodily positions but abnormal for others [36]

Lack of proper coordination reveals itself, also, in other types of motor reaction. We have already seen that twitchings of various muscle groups are a part of the picture presented in psychasthenia. In hysteria, these tics may become even more prominent, but they seem to differ in some respects from the tics of psychasthenia for they are now even more dissociated than before. A patient suffering from psychasthenia may display an exaggerated tic whenever his attention is directed to his twitching but the hysteric is much less apt to become aware of tics than the psychasthenic. Moreover, the tics of hysteria are apt to be more extensive for they may occur in the visceral muscles as well as in the general bodily muscles. It looks as though most tics of hysteria were meaningful in the sense that they represent a response to some isolated or dissociated stimulus-situation. A patient, for example, who has been accustomed to a given type of work may, in the hysteric condition, repeat some of the movements characteristic of this work, even though the working situation is not actually present.[37]

Aside from extreme suggestibility,—a psychological trait which we have discussed in more detail elsewhere,—the most prominent feature of hysteria is the multiplication of systems of personality traits One of the famous cases of this kind gave a history of five different personalities.[38] Some of the more fundamental habit systems of the original individual were common to all five of these personalities, but given types of emotional expression, of moral opinion, and the like, were segregated into groups in such a way that the same individual could alternate from one individuality to another. There are times when the multiplication of personality is truly alternative in the sense that one self-pattern follows another. In other cases, however, two or more personalities may appear side by side.[39]

The reader must not suppose that all multiplications of personality are truly hysterical or abnormal, for even a casual inspection of his own

[36] Sidis, B, *Symptomology, Psychognosis, and Diagnosis of Psychopathic Diseases*, Boston, Badger, 1914, pp 320–338, *passim*

[37] Janet, P, and Ross, T A, *The Common Neuroses*, London, E Arnold and Co, 1923, pp 200 ff

[38] Prince, M, "Miss Beauchamp—the theory and psychogenesis of multiple personality," *J Abnorm Psychol*, 1920, *15*, 82–85, 87–91, 96–98, 102–104

[39] Another case of this type has been described by Franz, S I, *Persons One and Three*, N Y, McGraw-Hill, 1933

daily life will show that he may display in a less extreme form the same sort of dissociation which appears in the hysterical patient. It not infrequently happens that a normal individual is one kind of a person in his office and quite another on the golf links. Dissociations of this order are most frequent with respect to opinions and beliefs. It is quite easy, for example, for one and the same person to be highly generous and sociable in his personal dealings with his neighbors but exceedingly anti-social and ungenerous in the conduct of his business. One of the most frequent forms of dissociation of this kind gives rise to what is commonly called the conflict between science and religion. Some persons act and believe as though their scientific beliefs must be exclusive of their religious beliefs.

7. *The Major Psychoses.*—All of the psychological ailments which have been discussed up to this point may represent only slight deviations from the normal. It is almost certainly true that no person is altogether free from occasional attacks of psychasthenia, neurasthenia, or hysteria. Moreover, it very rarely happens that all persons are wholly normal at all times in their sex behavior. These various types of disorder, then, may be called abnormal only when they take extreme forms.[40] There are three types of ailment, however, that are distinctively pathological. These are the manic-depressive psychoses, schizophrenia, and paranoia.

The manic-depressive psychoses are sometimes called the psychoses of emotional extremes.[41] The general symptoms of this psychological ailment are very much like the symptoms that have already been described save that the patient swings periodically back and forth between high joy and deep depression. In some cases, the exaggeration of emotional action may take the form of an actual delirium. It is during this stage that the so-called insane person assumes the rôle of a madman. The patient may attack other patients, sing, laugh, dance, and otherwise behave at an extreme level of frenzy. In the other stage, however, the level of depression and of stupor may be as low as the mania was high. During this part of the cycle they may weep, moan, or actually sit in a stuporous condition over long periods of time with head and body drooping and tears streaming down the face without interruption. It frequently happens that the melancholy periods of manic-depressive insanity are associated with some sense of deep guilt. A patient may assume, for example, that he has committed an

[40] Bagby, E., *The Psychology of Personality*, N. Y., Henry Holt, 1928.
[41] Dorcus, R. M., and Shaffer, G. W., *op. cit.*, Chap. IX, pp. 248–264.

unpardonable sin or that he has been solely responsible for some major disaster.[42]

There is some evidence to show that manic-depressive psychoses have a hereditary foundation. In one survey, for example, eighty per cent of the cases were known to come from families suffering from various types of abnormality, including chronic alcoholism, sexual irregularities, and the like.[43] It is doubtful, however, whether enough is known about the hereditary factors to support this view. There is more reason to believe that manic-depressive insanity is a product of disturbances among the glands of internal secretion.

Schizophrenia often goes by the name dementia praecox. It is, perhaps, the most frequent of all of the more serious ailments to which human beings are subject.[44] In general, the symptoms of schizophrenia are very much like the symptoms that we have described elsewhere save that one of the most prominent features is a profound emotional apathy and indifference. There are, of course, a good many signs of disintegration or dissociation, and these signs have a temporal course which is more or less distinctive of the disease. Just as manic-depressive insanity may be called the insanity of emotional extreme, so schizophrenia may be described as the disease of adolescence, for at almost any time after the adolescent period the normal processes of growth or development meet with obstacles which make them no longer effective. The result is a progressive mental deterioration involving hallucinations, delusions, and other types of dissociated function. Gradually, mental deterioration proceeds so far that the individual can carry on scarcely more than a vegetative existence while awaiting actual death.

There seem to be several different types of schizophrenia. The simple type involves a gradual loss of interest and enthusiasm, a developing emotional apathy, a gradual increase in the desire for seclusion, and a general tendency to revert to earlier or more infantile types of action. The paranoid type includes delusions of various types as well as a greater extreme of emotional apathy and indifference. We shall describe true paranoia in a moment. The catatonic type holds some similarity with the hysterical, and many of the symptoms are the same. The hebephrenic group is made up of a variety of special types which do not fit readily into the groups already named As in the case

[42] Beers, C W, *A Mind That Found Itself*, N Y, Longmans Green, 1908

[43] Pressey, S L, and Pressey, L C, *Mental Abnormality and Deficiency*, N Y, Macmillan, 1920

[44] Dorcus, R M, and Shaffer, G W, *op cit*, Chap VIII.

of manic-depressive insanities, schizophrenia is often referred to tainted heredity. It is more probable, however, that improper development of the glands of internal secretion may have something to do with it. As we shall see, however, in our description of the alleged explanations of psychological disease, it may be possible to appeal to still other causative factors.

The third major type of psychological ailment is known as paranoia It is, perhaps, the most frequent type of psychosis [45] The one characteristic feature of paranoia is the development of a systematized delusion. This means that the patient acts under the belief (i) that he is being persecuted by all of the individuals around him, (ii) that he is the one savior of the world against all of the efforts that might be made to destroy it, (iii) that he is an especially chosen agent of God in the creation of some new religious sect, (iv) that he is the chosen object of affection from some other person of the opposite sex, or (v) that he is the special victim of some particularly vicious organic defect. In addition to these major types of delusion there are a great many other less frequent types As a matter of fact, almost any belief or conviction may characterize this type of psychosis.

8 *Conclusion* —The student should not feel vexed with himself if he has to come to the end of this chapter with a sense of confusion as to what the chapter has been about. In a final paragraph, therefore, we must try to fix our attention upon the one thing to be remembered. For this purpose, we may ask the reader whether he has, during the course of the chapter, recalled and spoken the word "hippopotamus" The chances are that he has not. In view of this fact, we may ask why. The answer is fairly simple. The word "hippopotamus" has been temporarily blocked out of the reader's vocabulary because of the inhibitions raised against it by the contents of this chapter. From one point of view, then, we may say that the reader has been dissociated. From another point of view we may say that the word "hippopotamus" has been repressed. We mean, then, to lay emphasis upon two fundamental factors in all normal living, viz., integration and dissociation. If, pending the remarks we shall make in the next chapter, the student can believe that there are times and circumstances under which he would not be able to recall the word "hippopotamus" even though he were asked to recall it, he will get hold of one of the cardinal features of all psychological ailments. As we have seen during the present chapter, there are persons in whom sensitivity on various

[45] *Ibid*, Chap IX

parts of the body, memory for given objects, given classes of objects, or given periods of time, facility in making movements or loss of facility in making them, the advent of dissociated but intensive compulsions to think or to act, actual divisions in the whole stream of behavior, and other similar events are common experiences. Clearly, such persons are neither efficient as working instruments nor at rest with their environments. The function of the psychologist in medicine is to find out how these abnormalities in behavior arise and how they may be prevented, on the one hand, or treated after they have appeared, on the other.

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CHAPTER TWENTY-ONE

METHODS OF EXPLAINING PSYCHOLOGICAL AILMENTS

1. *Introduction.*—The last chapter has given us a rough but, let us hope, a sufficiently suggestive picture of some of the main groups of symptoms which have earned for themselves a special name and a special standing among disorders of the psychological functions. If the reader will look over the various facts that were presented, he will see that there are two or three dominant threads which run through the whole chapter. In the first place, most of the persons who are in psychological difficulties do not show serious impairment in their higher intellectual operations unless their disorder is far advanced On the contrary, there are times when the higher intellectual processes appear to be improved rather than retarded. This fact will appear to good advantage in our study of the conditions under which objects of art are created We must not, however, let occasional superiority cover up dissociation in behavior, the pervading sense of unreality which sometimes overtakes a person, and the dullness that may occur in the more serious ailments. In the second place, almost every group of symptoms we have named includes perversions of emotional action. On the one hand, a patient may suffer from marked apathy or lack of interest and, on the other, he may enjoy an equivalent heightening of emotional tension.. In either case, most of the psychological ailments seem to center around some strong perversion of moody and emotional action. In the third place, every one of the ailments which we have been describing reflects in some way or other the existence of conflict. This means that an explanation of psychological ailments and methods of treating them as well must depend upon a search for sources of conflict, together with some statement of the nature of conflict.

It is the purpose of the present chapter, then, to consider some of the more important theories that have been used to explain the origin and development of conflicts and hence of the several classes of symptoms described in the last chapter. In order to do this we must refer the reader again to Chapter Four where we considered the nature of

incentives to action We tried to show in that chapter that a large part of the conduct of a new-born infant is the outcome of stimulus-situations which arise within its own body and principally within its alimentary tract. These stimulus patterns are expressions of fundamental tissue needs. Among the more important needs we have named hunger, thirst, sex, desire for action, and the desire for rest There are some persons, of course, who mention a great many other needs. One author, for example, has given a list of nine, viz , alimentary, excretory, protection, activity, rest, amorousness, reproduction, pre-eminence, and conformity.[1] Our main question, however, does not touch the total number of tissue needs or native desires On the contrary, we must recognize the fact that all such needs are apt to be very intense in their stimulus value Moreover, it must be recognized that every one of the primary tissue needs is quickly modified by the processes of learning For example, some learning situations will increase the intensity of a desire, whereas others will apparently decrease their intensity or even repress them altogether No one knows as yet just how intense a desire can be and neither do we know which desires are the most intense As we shall see below, there is one theory of the nature of psychological ailment which argues that no one of the desires can compete with the sex urge. Another theory has it that the will to live is a predominant factor in all action Clearly there is a great need for experimental work in this field, especially among human subjects. The only evidence available at the present time comes from the lower animals where it appears that primary urges take the following order, viz., maternal, thirst, hunger, sex, and exploratory [2]

From the point of view of a single person it might be taken for granted that the greatest comfort would follow the unthwarted satisfaction of each of his primary tissue needs. It looks, however, as though there are at least three reasons why optimal satisfaction of this sort cannot be achieved In the first place, some of the tissue needs of the body are distinctively anti-social in character Hunger and sex, for example, are primary urges which cannot be satisfied to repletion without implicating some other person or even a whole group of persons In other words, the life of the group has made it inevitable that solid barriers shall be erected against actions and

[1] Dunlap, K , *Social Psychology*, Baltimore, Williams and Wilkins, 1925, pp 16 ff

[2] Warden, C J , *Animal Motivation Studies The Albino Rat*, N Y , Columbia Univ. Press, 1931 See also Tsai, C , "The relative strength of sex and hunger motives in the albino rat," *J Comp Psychol*, 1925, 5, 407-416

attitudes that, from the point of view of a single person, might seem wholly desirable if not actually necessary. Sometimes these barriers are expressed in the form of a law, but more often than not, they are expressed in a custom or in a tradition and in the systems of education which perpetuate social mores of this order. The institution of marriage, for example, is, in part, a social invention which defines the conditions and circumstances under which the primary sex urges may be expressed Likewise, economic principles and political organizations present some of the conditions under which desires for food may be satisfied. If it should turn out that some persons have a natural urge toward preeminence, one can easily name a large number of circumstances under which such a desire would be thwarted.[3]

There is one aspect of the suppression of the native desires which places the development of a great many maladjustments squarely in the hands of the educative process Because of circumstances which cannot be touched upon here, a great many of the customs of society have been translated into moral and ethical codes. These moral and ethical codes, in turn, have been supported by stern theological systems. One of the by-products of these systems has been the view that there is something shameful or degrading about the primary tissue needs and especially about sex A typical consequence of this attitude is to be found in types of training which keep a growing child away from all knowledge about its own nature. That is, certain types of education have striven desperately to repress as far as possible what is sometimes called the sinful nature of man. We shall look at some of the consequences of this sort of repression during the present chapter. In the meantime, it is worthy of remark that the primary tissue needs of the body are often diverted into substitutional modes of action which not only can but do secure the approval of the social group. It would seem, then, that escape from conflicts between the primary tissue needs, on the one hand, and social mores, on the other, can be effected through proper methods of training [4]

A second source of conflict is to be found in the fact that a normal exercise of some of the primary tissue needs may be blocked by a personal defect, either real or fancied. Lameness, the residual effects of certain types of diseases such as smallpox, smallness in stature, unattractiveness in bodily form, dullness in intellect, the early develop-

[3] Cf Dunlap, K , *op cit* , Chap III

[4] Dorcus, R M , and Shaffer, G W , *A Textbook of Abnormal Psychology*, Baltimore, Williams and Wilkins, 1934, Chap V

ment of inferiority attitudes, and other types of personal insufficiency are cases in point. Let us suppose, for example, that a person whose face is badly scarred from smallpox finds that his disfigurement stands in the way of normal social contacts. It is clear that even a "normal person" might be at war with himself on this account. As we have seen in the last chapter, an unexpressed desire may easily become the source of worry, doubt, shyness, embarrassment, moodiness, and even anxiety, or give rise to other unexpressed hopes and ambitions. If blocking from these sources becomes more intense, the symptoms of maladjustment will likewise become more intense and the patient will then present an advanced picture of abnormal psychological function.

In the third place, it frequently happens that two or more tissue needs will interfere with one another. Then, too, it is possible for a single tissue need to give rise to conflict because it may be directed toward more than one object. It is often observed, for example, that both of these situations attend most frequently the sex and parental desires of a person. The traditional case is found in a person who is attempting to express his affections to two other persons at the same time or in the case of the person who, having developed affection for another man's wife, finds himself in conflict with his ethical standards or with the mores of society in such matters.

It would be a mistake, of course, to suppose that these are the only sources of conflict in human nature.[5] As a matter of fact, we shall completely miss the significance of conflict if we do not realize that the devices which make it possible stand among the chief devices of normal living. In one of the very simplest cases, for example, no person can move a limb both forward and backward at the same moment.[6] Neither can any person recall everything that he has learned at one and the same moment. On the contrary, the attempt to recall some things may place a definite obstacle in the way of the recollection of others. Even in the case of learning, there is a relation of this type; for, as we have seen in Chapter Six, the attempt to learn a poem at the present moment interferes with what has just been learned and, in turn, suffers interference from the same source. The point is that all psychological operations are of such a character as to imply a certain amount of interference or conflict. It is only when

[5] Cf Luria, A R, *The Nature of Human Conflicts*, N Y, Liveright, 1932, *passim*

[6] Sherrington, C S, *The Integrative Action of the Nervous System*, New Haven, Yale Univ. Press, 1906, *passim*

conflicts become serious and when they are replete with emotional quality that they give rise to the more advanced types of maladjustment. As an example, we may compare the conflicts which some persons have over the relation between science and religion, with such conflicts as were described in the last chapter. A conflict between science and religion is created whenever two sets of information are presented in such a way as to make them logically and emotionally incompatible with one another. Some persons solve this conflict simply by disregarding it. That is, they keep their religion, so to speak, in one pocket and their science in another, or they have a simple set of rules to which they will appeal in every contingency. There are times, however, when both science and religion, and especially religion, become clothed with intense feelings and desires. When this happens, a person may develop doubts, anxieties, a sense of unreality, a feeling of fatigue, or a sense of insufficiency which are just as significant of loss of balance as are the symptoms which were described in the last chapter. That is, a person who is suffering from a conflict between desires regarding science and religion is in much the same position as is the person who, while being married to one woman, has fallen in love with another.

2. *Methods of Escape from Conflict.*—We have just said that some persons can escape from certain types of conflict simply by dividing themselves, so to speak, into two or more persons. A man may, for example, be critically scientific in his laboratory and in his teaching during the week and on Sunday morning be just as critically theological. It is as though he could not let his right hand know what his left hand was doing Unfortunately, however, there are very few conflicts that can be settled in this way. That is, all of the perplexing events even in normal living cannot be codified and reacted to by rule. We must, therefore, take into account a variety of other devices, some of which are wholly normal and to be desired, but others of which are abnormal and to be avoided.

It is the purpose of education or of training to help a person grow in such a way that he will possess a normal or approvable mode of response to as many of the situations around him as possible. This means, of course, that the teacher will have recognized the value of all kinds of stimulus-situations and particularly those that give expression to the primary tissue needs Moreover, it is important for the teacher to know, on the one hand, what objects and situations can serve as substitutes for the primary needs and, on the other hand,

what forms of response can be substituted for the more native forms. No teacher can be perfectly wise, however, and this means that the learner will often be left to his own devices. Let us suppose, for example, that a child is brought face to face with a problematic situation, that is, a situation for which he has no previously acquired habits or skills. In the face of such a situation a child will often respond by making a variety of tentative movements. As a rule, one of these tentative responses will settle the matter in a satisfactory way, whereupon the child can be said to have solved his difficulty or to have avoided further doubt and perplexity. Trial-and-error learning, then, is one of the most frequent methods of escaping from situations that might lead to conflict [7] It can be shown, however, that this method will sometimes fail. When, for example, an animal is placed in a situation which is too complex for it, no one of its tentative movements will be adequate Under these circumstances the animal will fall into a mode of behavior which has a great many similarities to hysteria [8] The same facts hold true of human beings At the moment of an accident, of a fire, or of some other complex and unexpected situation many persons will behave hysterically rather than rationally or by the trial-and-error method.

At a more mature level, sudden and unexpected situations will often be met by insight, thought, or an attempt at rational solution of the difficulty. This is certainly true of situations which are not unexpected but which are, nevertheless, confusing or problematic in character. It would seem, for example, that the proper way to handle the problems created by scientific discovery, on the one hand, and theological beliefs, on the other, would lie in a serious attempt at a synthesis of the two sets of information. Likewise, when a person finds that his behavior in a social group is insufficient because of his timidity and bashfulness, he ought to be able to solve his social problems by making a calm appraisal of his own attitudes and dispositions, on the one hand, and his social conduct, on the other. It turns out, however, in cases of this type that timidity and bashfulness are more deeply rooted than is the case with divergent sets of information As we have shown in Chapter Two, an athlete who is shy when being tackled cannot solve his problem simply by

[7] Cf Blatz, W E, and Bott, H, "Studies in mental hygiene of children," *J Genet Psychol*, 1927, *34*, 552–582

[8] It was the very randomness of the behavior of some of the lower animals in puzzle boxes that gave content to the phrase "trial-and-error" learning Cf Thorndike, E L, *Animal Intelligence*, N Y, Macmillan, 1911, *passim*

rational means. We must, therefore, turn to other modes of escape from conflict.

One of the most common of these other ways is sometimes called the non-adaptive reaction. If, for example, a person were driving an automobile, it would not be at all helpful were he to respond to a critical situation by becoming paralyzed with fear. In the same way, no normal person should habitually respond to a social situation by bashfulness, timidity, silence, or by other non-social types of action. These acts and attitudes are, however, rather common among so-called normal people. They become truly abnormal only when they persist over a long period of time or when they seriously impair the efficiency of a person. As we shall see later on in this chapter, Freudian psychology would say that non-adaptive emotional actions are usually apt to persist because they are a reflection of the sex energies. One might ask, however, whether perseveration of this kind may not be one phase of the learning process by means of which a type of action which has been chosen once is conditioned to specific situations. It is the feeling of a good many students of maladjustment that non-adjustive actions are acquired by training rather than a product of the sex urge. It is true, of course, that fundamental tissue needs may manifest themselves in a good many non-adjustive actions, but it is one thing to realize this and quite another to assert that all maladjustment is the product of a primary and universal sex urge.[9]

In addition to non-adjustive actions of the emotional sort, there are a great many actions in the presence of perplexing situations which are regressive in the sense that they mean the revival of earlier types of behavior.[10] Here, too, we touch upon one phase of the Freudian theory, for Freud has asserted that the *id* finds most comfort while it is still in the mother's womb. This means that the birth process is a climactic event in the life history of the *id* for now it must face what Freud calls reality. Regression would then mean the constant attempt on the part of the *id* to solve problems by returning to its prenatal condition. Regression may take, therefore, that form known as the flight from reality. It may also involve a return to earlier types of childhood activity. If, for example, deep affection for one's mother

[9] Hamilton, G V, "A study of perseverance reactions in primates and rodents," *Behav. Monog*, 1916, 3 (No 2)

[10] Wells, F L, "Mental regression, its conception and types," *Psychol Bull*, 1916, *9*, 445–492 See also Morgan, J J B, *The Psychopathology of Abnormal People*, N Y, Longmans Green, 1925, see pp 507 ff McDougall, W, "Four cases of 'regression' in soldiers," *J. Abnorm Psychol*, 1920, *15*, 136–156.

has been a prominent feature of the early years, a problematic situation may mean a revival of the sense of dependence or of helplessness which usually stand as a counterpart of such affections [11]

It is also true, however, that the learning processes of early infancy appear to be much more effective than later learning processes It is well recognized that the child is highly plastic. A prolonged period of infancy is one sign of this plasticity and the tendency of childhood experiences to persist through into old age might be taken as another evidence If, then, more recently acquired habits, that is, habits that are less firmly fixed, fail in any given situation, it might be reasonable to suppose that earlier and much more stabilized habits would be called upon In any case, this is a disability which might be examined in an experimental way [12]

Still other types of adjustment mechanisms are revealed in the various psychological ailments described in the last chapter One of the most prominent of these is known as compensation [13] As we have seen, adjustments sometimes are not possible because of personal defects in one's own makeup or because of unsuitable environmental situations. It may happen, therefore, that a failure in adjustment due to either of these or to any other factor may result in a compensatory reaction in some other direction This compensatory reaction usually means that the patient may behave with unusual intensity or with uncommon skill in a new pattern Among the substitute reactions that have been described, we may mention the over-evaluation of a physical or mental trait, identification of one's self with a superior person or organization, the attempt to belittle others, placing the blame for failure on other persons and things, daydreaming, creating and maintaining imaginary ills, and resorting to anti-social actions.[14] Although the evidence is not clear upon the point, it is sometimes asserted that persons like Helen Keller may enjoy an actual compensation in heightened tactual sensitivity because of the absence of vision, hearing, and speech.[15]

[11] A case is described by Morgan, J J B , *The Psychology of the Unadjusted School Child*, N Y , Macmillan, 1924, pp 145–146

[12] This fact is often reported in connection with the actions of mobs and of whole nations during time of war It is asserted that civilization is a veneer which can easily be thrown aside See, for example, Starche, A , "Psychoanalysis and psychiatry," *Internat J Psychoanal* , 1921, 2, pp 378 ff

[13] Robinson, E S , "A concept of compensation and its psychological setting," *J Abnorm. Psychol* , 1923, 17, 383–394

[14] Fisher, V E , *Introduction to Abnormal Psychology*, N Y , Macmillan, 1929, Chaps V, VI, and VII

[15] Cf Valley, P , *The World of the Blind*, N Y , Macmillan, 1930, pp 77–80 Also Renshaw, S , *et al* , *Readings in Experimental Psychology* (ed W S Valentine), N Y , Harper, 1931, pp 390–410.

One of the most common reactions to a failure in adjustment is sometimes described as an inferiority complex.[16] That is, if a person suffering from some bodily defect finds that this defect interferes with his normal contacts with other persons, he may extend his feeling to all types of situations and thus carry a diffident or unaggressive disposition throughout life. In pathological cases, diffidence of this sort may be compensated for by the appearance of functional ailments. Thus an initial physical difficulty will come to be supported by a number of other functional difficulties. The patient will then be in a position to make his inadequacies appear reasonable to the persons around him Obviously a person who is sick, that is, a person who has paralysis, functional indigestion, or even functional cancer, may be forgiven for his lack of proper initiative

In a great many other cases, however, compensation may be effected by excessive activity in some other type of behavior [17] Freud has made much use of this type of compensation As we have seen, the tissue need described by the word "sex" is a more or less permanent need. The whole pattern of social organization, however, denies to the individual an adequate expression of this need. Since the energies denoted by it cannot be destroyed, they are supposed to express themselves through some other outlet. It turns out, therefore, that art, music, literature, sculpture, religion, and over-activity in almost any other place are often interpreted as compensations for repressed sex urges or for other dominant urges.[18] Typical examples of this sort of substitution will be described in later chapters In Chapter Thirty-Five, for example, we shall show how various forms of artistic expression may be described as compensatory activity Moreover, in Chapter Forty a brief reference will be made to the compensatory function of religion.

In addition to these major types of compensation, there are many more normal types [19] It often happens, for example, that compensation will be effected by identifying one's self with some superior individual. This is often done among youngsters who seek to improve their own importance by describing the importance of their parents. One may even make use of particular groups of organizations for this

[16] Cf Adler, A, *The Neurotic Constitution*, N Y, Moffat Yard, 1917 Also *Organ Inferiority and Its Psychical Compensation*, N Y, Nerv and Ment Dis Pub Co, 1917

[17] Vaughan, W F, *The Lure of Superiority*, N Y, Henry Holt, 1928, pp 6–7

[18] Adler, A, *Problems and Neuroses*, N Y, Cosmopolitan Book Co, 1930, pp 78–79 and *passim*

[19] Cf Morgan, J J B, *Keeping a Sound Mind*, N Y, Macmillan, 1934, Chaps VIII and IX and *passim*

purpose. A person's respect for his own importance is always increased whenever he is able to say that he is a member of this or that organization. If one cannot gain satisfaction from these sources, it may be gained by attempting to belittle other persons. After all, one's own superiority is a relative matter. If one may raise one's self, therefore, by lowering another person, the effect is the same as would be the case if one had actually raised one's self. One phase of this type of compensation is found in the common practice of blaming other persons for one's own failures. If others cannot be blamed, it is fairly easy to push the load of responsibility off on a fatalistic philosophy or upon the laws of chance.

Daydreaming, perhaps, is one of the most common types of compensation. This type has been greatly aided by certain practical inventions such as the moving picture. If one's own daydreams are not adequate to compensate for one's actual failures in life, one may see one's self the hero of a plot, the sudden heir to riches, or the favorite lover by following a moving picture drama. In more extreme cases, daydreams or systematized delusions become more or less persistent. As we have seen, this is one of the special symptoms of paranoia [20]

In addition to regression and compensation which take place in conjunction with difficult situations, there are those types of adjustment which arise out of the conflict between motives. A normal education perhaps would result in the growth of a person in whom conflicts could not easily take place, but vague opinions and prejudices about the nature of human nature have made it easily possible for various systems of human action to enter into conflict with one another. Other things being equal, perhaps the stronger of two action systems may predominate but, as we have seen, there are some action systems which are completely inhibited or repressed. The fact of repression has been made much use of in Freudian psychology where so much emphasis is placed upon the sex urges. Society is generally agreed that the normal exercise of the sex functions shall come to maturity only after a suitable period of courtship has been brought to a culmination in a legally and religiously approved marriage ceremony. Even with respect to this course of events, however, there are all kinds of obstacles and barriers, some of which may hold true even after marriage. Not the least of these barriers is the careful attempt to develop a negative attitude toward sex matters, especially in the

[20] *Ibid*, Chap IV.

education of women.[21] Obviously, however, a problematic situation cannot be solved permanently simply by ignoring it. Since tissue needs must continue as persistent sources of stimuli to action, both inhibition and repression mean that substitutional forms of action must be discovered. The psychopathic individual differs from the normal individual because the former falls into substitutional actions that are neither socially desirable nor individually constructive.

As a last type of process in adjustment, we may take the concept of dissociation itself. This concept simply means that the action systems of a single individual fall apart, thus giving him a multiple personality or occasioning other abnormal symptoms.[22] The various ways in which this falling apart may take place have already been described in our study of hysteria. Dissociations range all the way from the simple anesthesias, paralyses, and aphasias, to a more or less complete and thoroughgoing dissociation of the major personality traits. As a typical illustration we may take the case of a soldier who is acting in an emotional way to a battle situation. Having some fear of such situations but at the same time having developed some respect for himself as a member of the group, the fears are repressed. Such an individual could escape from fear and at the same time maintain his standing among his fellows by suffering that kind of dissociation which would make him functionally blind, functionally paralyzed in some bodily member, and the like. As a result of dissociative situations of this kind a large number of functional hysterias which have commonly gone by the name of "shell-shock" have been described.[23]

3. *Heredity and Instinct.*—We are now ready to give a brief description of some of the theories that have been invented in order to explain the causes of the various psychological derangements described in the first part of this chapter and in the last chapter. In reviewing these theories it will be helpful if the student will keep in mind the general picture which has been presented of normality and abnormality in the psychological operations. Every human being is the sum of a vast number of tendencies to action, a part of which owe their origin to his own tissue needs and a part of which owe their origin to the effect of the stimulus-situations that have exercised an influence upon him. We may suppose that normal living occurs whenever all

[21] Dickinson, R. L., and Beam, L., *A Thousand Marriages A Medical Study of Sex Adjustment*, Baltimore, Williams and Wilkins, 1931

[22] Cf the discussion in Dorcus, R. M., and Shaffer, G. W., *op. cit.*, pp. 89–96

[23] Hurst, A. F., *The Psychology of the Special Senses and Their Functional Disorders*, London, Oxford Univ. Press, 1920.

of these action patterns are suitably integrated with one another and appropriately adjusted to the situations in which a person may find himself The illustrations of psychological perversion which have been described up to this point seem to imply a set of causes which will favor dissociation or lack of integration instead of suitable association and integration. In the place of an orderly sequence of behavior patterns, there supervenes in the lives of some persons an element of randomness which is somewhat like the randomness of a shuffled pack of cards. Instead of securing consistent sequences of behavior, the pathological person shows thoroughgoing inconsistency. What is it then that makes for consistency, on the one hand, and lack of consistency, on the other? Why, for example, should some people have a strange and unreasonable fear whenever they find themselves in an enclosed area? Why should some people become divided into two or more systems of action pattern? Why should one person act as though he were Napoleon Bonaparte, not only by taking the attitude required of this part but by assuming that his whole environment is Bonaparte's rather than his own? Why should still another person become so disintegrated in his behaviorial functions as to suppose that his neighbors are continuously plotting for his destruction? Why should we all have periods in which we fret, become anxious or worried, feel depressed and otherwise incompetent?

The first and the oldest of the answers to these questions asserts that the mind is a peculiar stuff which can be broken or infected, just as bones are broken and infected. This answer, however, has never been satisfactory because no proper definition of soul stuff can be secured. Moreover, it has never been satisfactory to suppose that psychological disorders can be explained through the presence in a person of demons [24] One of the most curious forms of demonology, a form that has given rise to a rather melancholy period in the history of culture, is known as witchcraft [25] It now seems fairly certain that a great many of the persons who were alleged to be witches were persons suffering from psychological ailments no more serious than hysteria. The so-called devil spots, for example, were obviously areas of insensitivity so characteristic of a typical hysterical person.

This period in the history of superstition about psychological ailments among men is now at an end in all civilized countries. The very

[24] Cf White, A D, *A History of the Warfare of Science with Theology*, N. Y, Appleton, 1929

[25] Summers, M, *The History of Witchcraft and Demonology*, N Y, Knopf, 1926

analysis which we have been able to make of psychological ailments is proof enough of the fact that medical men have achieved some success in their search for the natural conditions under which perversions may appear. There is some tendency, however, to explain these perversions in terms of specific hereditary and instinctive factors Just as the structure of the germ plasm appears to order the direction of the growth of the parts of the body, so given types of mental function are alleged to be determined by hereditary factors. Our principal discussion of the relation between heredity and environment will appear in a later chapter. In the meantime, it seems fair to say that research has by no means come to the end of the road so far as the effect of hereditary factors on pathological disturbances is concerned. There is some evidence, to be sure, that the children of families in which there has been a long history of psychological disorder are quite apt to show disorders on their own account.[26] The reader must remember, however, that there is a difference between those disorders which are obviously due to the improper development of the nervous system as compared with those disorders which are of the truly functional type. Concerning the former, the evidence is pretty clear that hereditary factors play an important part.[27] It may be true that factors of this same order predispose some people more than others to disorders of the functional type. This fact may hold true, in particular, where there are glandular difficulties. In general, however, it seems fair to say that the hereditary component in functional disorder has not been shown to have high significance.

This conclusion holds true also of that form of inheritance which depends upon the identification of specific instincts. The inferiority complex, for example, has sometimes been called an instinctive disposition or tendency. Then, too, when we speak of nervous temperaments and of those persons who are habitually depressed or moody, it is easy to suppose that some instinctive disposition must be implied as a basis of explanation. As we shall see in a moment, the doctrine of instincts in relation to psychological disorders has recently passed through a major series of changes. This transformation has been brought about largely by the work of Freud. Before we study this work, however, it will be fruitful to describe briefly several of the meanings that can be given to the word "subconscious."

[26] Cf., for example, Goddard, H. H., *The Kallikak Family*, N. Y., Macmillan, 1912.

[27] Cf. Pintner, R., "The feebleminded child," in *Handbook of Child Psychology* (ed. C. Murchison) Worcester, Mass., Clark Univ. Press, 1933, Chap. XX.

4. *The Subconscious.*—We have already had something to say about the nature of the subconscious and of the arguments which have led men to believe that there is such an entity. Let us assume, for example, that a person has suffered a violent blow on the head. Now it sometimes happens that blows of this type occasion a loss of memory for distinct classes of events or even for the whole past history of the person. On some subsequent occasion, however, circumstances may arise under which these lost memories will be regained. It seems appropriate to ask where the memories have been during the period of amnesia. One of the answers that can be given is to the effect that the memories have found refuge in a subconscious mind.

Several different varieties of subconscious mind have been described. The most frequent use of the word may be illustrated in this way. It frequently happens that a person who is deeply engrossed in a given activity will "subconsciously" note and react to a stimulus even though he is not aware of either the stimulus or of his own action.[25] Or it may happen that some of the judgments which a person makes, say his interpretation of a conversation over a telephone or his judgment of the relative position of two objects, may depend upon slight cues or hints of which he himself is not fully aware. In order to explain behavior of this type and in order to take account of the temporary disappearance of memories, the word "subconscious" may be used.

The term may be applied to abnormal behavior in the following way. Let us suppose that a patient suffering from hysteria cannot see anything outside of a limited visual area. Now let us bring a candle into the field of vision from the margin of what might be called a normal visual field. The chances are that the patient will react to the flame of the candle even though he reports that he cannot see it. In a similar way, one may pierce an anesthetic area on the body of a hysteric patient. If the patient is asked to say "no" when he feels nothing and to say "yes" when he does feel something, he will invariably respond by saying "no" at the proper time. He could not, of course, respond by either "yes" or "no" if he actually felt nothing upon being pricked with a pin. If we assume that there is both a conscious and a subconscious mind, it is easy to explain such behavior by saying that the subconscious might perceive the flame of the candle or the prick of the pin

[25] Prince, M., *The Unconscious*, N. Y., Macmillan, 1921, *passim*

whereas the conscious mind does not perceive these sources of stimulation.[29]

Another type of subconscious mind has been described by the word "co-conscious." It is well known among abnormal psychologists that certain persons can, while they are devoting their attention to a particular object, carry out a conversation, or produce writing, both of which seem to take place independently of the major direction of attention. One of the most famous of these cases has been known as Patience Worth.[30] A certain Mrs. Curran developed the ability so to dissociate herself that her fingers could write out sentences, paragraphs, and even whole books without the direct attention of Mrs. Curran and without her knowledge of what was taking place. It has even been possible under experimental conditions artificially to develop a dissociation of this sort. The subject of the experiment, while devoting his attention to one task, viz., the learning of poetry, was able to allow his fingers to write out arithmetical sums. These phenomena are known as the phenomena of automatic writing. They seem to say that two or more patterns of psychological function may become highly organized and persist side by side in the same individual. The word "co-conscious" has been used to identify this particular type of subconscious performance.[31]

There are a great many other theories about the nature of the subconscious and one, in particular, which we shall discuss in the next section. In the meantime, we may point out the use to which this concept may be put in the explanation of psychological difficulties. It is clear that if the subconscious describes a mind which does not enter into what we commonly call the field of awareness, it must, nevertheless, be the same kind of thing which awareness is. It follows, of course, that the subconscious could carry out all of the activities which are made possible by normal awareness. Let us suppose, for example, that a person is subject to one of the various forms of phobia, say fear of being buried alive. There is, of course, nothing about close quarters which would ordinarily suggest the possibility of being buried alive and yet the sight of such an object might easily work through the subconscious to revive emotional actions formerly experienced in connection with some childhood game. Under normal conditions no person likes to recognize that the

[29] Dorcus, R M, and Shaffer, G W, *op cit*, pp 280 ff
[30] Yost, C S, *Patience Worth*, N Y, Henry Holt, 1916.
[31] Prince, M, *op cit*, *passim*

childhood fear he experienced when being shut up in a dark closet while his playmates shouted "bear" has any bearing upon his adult behavior The subconscious, however, could easily store such an experience as this and make available to new situations all of the old emotional complexes.

These and other ways of defining the subconscious have exercised a powerful influence in psychological theory. Those who feel the need of such a concept can find, of course, plenty of data to support their contention and it is not possible, therefore, within the limits of this survey, to enter into a controversy over the matter. To be sure, no one can doubt the symptoms which are actually perceived in the behavior of psychologically deranged persons There are a good many people, however, who feel that nothing is added to observation by inventing a new name. It must be clear to the student that the subconscious is a concept which can be used for explanatory purposes in almost any psychological situation. It can be used in the same way that the word "instinct" has been used, viz, as a substitute for continued and patient examination of the facts. We shall try to show toward the end of this chapter that experimental psychology is now in possession of concepts and methods of research which are much more satisfactory than the concept of the subconscious Enough has already been said to show that not all portions of the nervous system can be in operation at any single moment. This means that some gesture toward the explanation of both normal psychological functioning and pathological functioning can be made even though the subconscious is dropped out of consideration.

5 *Freudianism.*—Concepts of the subconscious such as we have been considering up to the present time have had a fairly long history, but during the last generation the concept has passed through a number of major changes. Most of these changes are the result of the work of the Vienna physician, Sigmund Freud. It is for this reason, then, that Freudianism becomes not only a method of psychological treatment but a method of explaining the nature of psychological ailments as well.[32]

It is not easy to describe in a few short paragraphs the Freudian doctrine of the subconscious because this doctrine has undergone a

[32] One of the best descriptions of the Freudian point of view can be found in Woodworth, R S, *Contemporary Schools of Psychology*, N Y, Ronald Press, 1929 See also Jastrow, J, *The House That Freud Built*, N Y Greenberg, 1932.

veritable evolution since it was first framed. We may, however, suggest two or three of the most important features of the concept as it is now used. In general, Freud holds that the mind may appear in three different forms. There is, first, the normal consciousness which is primarily perceptual and rational in character and which is fundamentally like the mind which is described by normal psychology. In the second place, there is a foreconscious mind which accounts for most of the facts described in the last section The foreconscious is made up of all of those experiences which are quickly accessible to a person but of which he may not be conscious at any particular moment. The relation between the conscious and the foreconscious is such that free interchange may take place between the two at any time. In the third place, there is the truly unconscious mind. If the conscious and the foreconscious minds are more nearly related to thinking, then the unconscious mind is more nearly related to wishing That is, the unconscious is made up of two different urges, viz, the desire for food and the desire for sex. As we have seen, the desire for food may express itself in a great many socially approvable ways, but the desire for sex is early blocked off by social obstacles and by the development of moral concepts at the conscious level.

In opposition to a long tradition in psychology which has held that sex life does not really begin until the onset of puberty, Freud holds that every child is intensively and dynamically sexual from earliest infancy.[33] Its sexual nature passes through three stages. The first of these is called the autosexual stage in which the child gains sex pleasure from the stimulation of almost any parts of its body, but particularly from the erogenous zones. The second stage is sometimes called the bisexual stage or a stage in which the child may be called polymorphous perverse. This means that the sex urges of the child may be directed toward almost any object in the environment, but primarily toward some member of the family. A male child has a natural tendency to express its sexual urge toward its mother. When, in later development, this type of expression is hindered or thwarted, the child develops what is called an Oedipus complex. The natural direction of sexual urge for a female child is toward the father and the repression of this urge leads to what has been called the Electra complex. These two types of complexes receive their names from two Greek plays which center largely

[33] Freud, S, *New Introductory Lectures on Psychoanalysis*, N. Y, Norton, 1934.

around a son who murdered his father in order to marry his mother and of a daughter in whom intense jealousy was engendered by the presence of her mother.

The third stage in sex development is reached when the more natural and overt expression of sex urges has been fully inhibited by moral standards or by social barriers. The unconscious still retains its fundamental energies but the full repression of these energies makes up what is called the true unconscious. Since, however, the sex urge is essentially a form of energy, the repression of overt sex acts cannot mean the destruction of a fundamental driving force in the individual This driving force (the libido) may have been, at first, nothing more than a blind urge which will use any mechanism in order to express itself. During the second stage in sex development this blind urge becomes more or less rationalized or meaningful in the sense that it is consciously directed toward specified types of objects The more normal type of direction, of course, is toward a person of the other sex, but it often happens that the repressive influences brought to bear upon it make it turn to a variety of other objects In the case of the child, for example, it might be supposed that it feels wholly free during early infancy to express its sex impulses toward either one of its parents without any sense of shame or guilt. Shortly, however, social factors bring about a recognition of the meaning of such action, whereupon it is repressed and the exercise of the sex impulses is looked upon with deep shame or a deep sense of guilt.

More recently, the unconscious has gone through a stage of depersonalization. This fact is illustrated in the use of the word *id*. In this form the unconscious is a more or less scientific substitute for the older theological doctrine of innate sin. The *id*, for example, is fundamentally bestial in its character. The *id* strives to express itself or exhibit itself in what is called exhibitionism or to receive satisfaction from the inspection of sex organs of other persons. Moreover, it is characteristic of the *id* that it may receive sex pleasure by inflicting pain upon other persons (sadism) or by having pain inflicted upon itself (masochism).

The net result of Freud's theory of the unconscious is to say that all types of psychological ailments, including even ordinary worries, fears, doubts, marked ambitions, irrational pleasures, and even the total pattern of one's life work, are related in one way or another to the sex urge In so far as Freud's theory seems to emphasize the fact that

sex education has been particularly faulty, the physician and the teacher may be grateful to him. It is one thing, however, to point out the great variety of ways in which normal sex impulses may go wrong and quite another to argue, first, that the sex urge is the primary dynamic urge in individual life and, second, that every possible type of activity represents a sublimation of sex impulses.

There is space to point out only in the briefest manner possible the ways in which the libido may give rise to psychological disorders. Of the seventeen "mechanisms" which Freud has described, we shall mention only three, viz., repression, sublimation, and symbolization. Repression describes the fact that the normal activity of the libido is often thwarted. When the thwarting takes place in a normal way,—that is, when the energy of the libido is directed into modes of action which are compatible with the super-ego,—the outcome is a normal person. The neurotic person is the seat of operations of the same sort save that he is not successful in redirecting his urges and is forced, therefore, to repress them. They are repressed into the *id* but they continue, nevertheless, constantly to express themselves. Since expression cannot take place in a "natural" form, the energies of the libido must be sublimated If sublimation runs in the direction of perversion, then the patient becomes neurotic or pathological and a subject, therefore, for the medical psychologist. Where sublimations appear in socially approvable forms, one may say that these forms have really been motivated by the same factors that are operative in a pathological case. Sometimes the energies of the libido can be partially dissipated by expending themselves in symbols. It is for this reason that the analysis of the dream life of a patient has played such a large part in Freudian psychology, for all dreams, according to Freud, are symbolic fulfillments of sexual urges.[34] Other types of symbolism are found in art, and especially in primitive art, in totems, customs, and taboos.

Some modification of the Freudian principles has been offered by persons who were once his followers but who felt that too much emphasis had been placed on the strivings of the libido. These supplementary doctrines are, however, from the point of view of heredity and instinct, wholly similar to Freud's own point of view. Adler, for example, adds to the libido a pervasive feeling of inferiority, on the one hand, and a universal will to power, on the other. Feelings of

[34] Cf Freud, S., *A General Introduction to Psychoanalysis*, N Y., Boni and Liveright, 1920, pp. 101–162 and *passim*.

inferiority may center around poor vision, loss of limb, poor bodily development, sex deficiencies, or almost any other type of organ inferiority In the face of feelings of inferiority there is the will to power which drives the individual to find some compensation for his shortcomings [35] We have already described on a previous page some of the typical compensations that may be striven for. Jung has likewise modified the Freudian system by making the libido the source of all energies rather than the sex energies alone. Freud himself has accepted some of the modifications suggested by Jung.[36]

6. *Associative Mechanisms* — The student ought to be able to sense the fact clearly that such theories as have been offered in explanation of psychological disorders by Freud raise a rather important question concerning the nature of explanation. All of the fundamental concepts used in psychoanalytic literature have much of the mysterious about them. There is, for example, no experimental or logical reason for supposing that the mind can be divided into three parts Moreover, it is not easy to see how our own private view of our experiences can be both conscious and unconscious at the same time. If we may assume that the events that go on in the nervous system are more than coextensive with the events which we commonly recognize as a part of our own mental lives, it is a simple matter to suppose that the facts described by Freud can be interpreted in terms of normal neural mechanisms and without appealing to such imaginative concepts as *ids* and superegos

Another fundamental question raised by the Freudian psychologies is simply this Does psychology have to do with conscious stuff which can reveal itself only in the performances of the persons who happen to possess some of it or is it the business of psychology to examine stimulus patterns, behavior patterns, and the various operations of the nervous system which bring these two sets of patterns into significant relations with each other? The Freudians obviously appeal to explanatory concepts which are purely psychological in character. Granted the existence of minds, both conscious and subconscious, it becomes possible to make some new division of these minds or to attribute to them as many special instincts as are necessary to explain the behavior that is actually observed The history of science is full of instances which illustrate the futility of this procedure. Steady at-

[35] Adler, A., *Problems of Neurosis*, N Y., Cosmopolitan Book Co., 1930

[36] Jung, C G., *Psychology of the Unconscious* (trans by B M Hinkle), London, Kegan Paul, 1922

tempts have been made, therefore, by more experimentally minded psychologists to look at the normal mechanisms of association and integration in order to see whether the symptoms described by the medical psychologist may not be explained on the principle of parsimony, that is, the principle that no concepts shall be used in explanation which are more than absolutely essential to the task.[37]

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[37] These and other criticisms passed upon Freudian psychology can be found in Dunlap, K., *Mysticism, Freudianism, and Scientific Psychology*, St Louis, C V Mosby Co, 1920 Woodworth, R S, *op cit* Hollingworth, H L, *Abnormal Psychology*, N Y, Ronald Press, 1930. Jastrow, J, *op cit*, and Wohlegemuth, G A, *A Critical Examination of Psycho-analysis*, London, Allen and Unwin, 1923.

CHAPTER TWENTY-TWO

PSYCHOLOGICAL METHODS OF HEALING

1. *Introduction.*—If the student has not been able to get a clear picture of the distinctions that are commonly drawn between structural failures and organic diseases, on the one hand, and the truly functional ailments, on the other, he will simply not be able to see how it happens that these disorders can be treated by psychological methods. Not the least of his troubles will be created by the fact that physical or structural ailments always seem very real, whereas psychological disorders appear to be imaginary or highly fanciful In truth, it is odd that a person could be sick, as the saying goes, simply because he "thinks" he is sick and that his recovery may depend upon the fairly easy process of "changing his mind" about the matter Of course the psychological arts of healing are by no means so simple as this, but psychological disorders appear to have no other meaning for persons who are not acquainted with the way in which their modes of thought, feeling, and action may enter into conflict with one another.

Partly in order to review the discussions of the last two chapters and partly in order to see again the distinction between structural and functional ailments we may make use of a notable case of alteration or of doubling of personality The reader already has a literary knowledge of double personalities through Stevenson's famous story of Dr Jekyll and Mr Hyde He may also possess examples from his own experience, for he knows that he is not the same type of person in the football bleachers as he is in the classroom Were he to compare his attitudes and actions at the one moment with those that occur at the other, he would be inclined to say that there is, even in normal life, a marked tendency for the average person to behave as though he were really a multiple self rather than a single self. This is very much the situation that developed into a more extreme form in the case of Miss Beauchamp. This case involved, in addition to the normal personality (called B), three other personalities called B_1, B_3, and B_4.[1] B_3, more often known as Sally, was an impish, childish person who did not

[1] Prince, M , *The Unconscious*, N Y , Macmillan, 1921 The student may find it more convenient to read McDougall's admirable summary of the case in McDougall, W , *Outline of Abnormal Psychology*, N Y , Scribner's, 1926

change much in character during the six years of her active career. Although she inhabited the same body with B, B_1, and B_4, she always spoke of herself as a person entirely distinct from these other persons, and especially from B_1. Sally claimed that, during the interval when she was not dominant, she led a subconscious existence and that she could know and remember what went on in the mind of B_1. She tried frequently to express her dislike for B_1 by forcing upon her a number of abnormal types of action. The original person out of which B_1, B_3, and B_4 were generated was a nervous and impressionable child given much to daydreaming. Her home life was unhappy and during the three years from thirteen to sixteen she suffered many emotional shocks. After a major emotional crisis at the age of sixteen, a new personality emerged known as B_1. This personality seems to have been made up of character traits which were left over after those that were to make up B_4 had been blocked off from the whole stream of behavior. B_1 was fairly dominant for the six-year period during which the patient led an active life in a college environment. B_1 was hampered by poor health, however, and by the vagaries of Sally, that is, of B_3. B_4 did not become dominant until near the end of this six-year period. At this time, a further emotional shock caused the almost complete disappearance of B_1 and the temporary dominance of B_4. B_4 had no recollection of the preceding six years, although she could recall events in B's life up to the time of the shock which brought about the creation of B_1. For nearly a year B_1 and B_4 led a life of alternating personalities, each personality being wholly forgetful of the experiences of the other, although each held in common with the other some of the memories from the life of B. B_1 was a humble, weak, suggestible, shy, retiring, studious, religious, submissive, amiable, and altruistic person, whereas B_4 was self-assertive, intolerant, quarrelsome, vain, sociable, irreligious, and given to quick and violent fits of anger. It was during this period that this case came under the direction of the physician and during deep hypnosis a fusion of the two personalities, B_1 and B_4, was effected. This new personality, although closely resembling B_1, was nevertheless a fusion of B_1 and B_4. The fusion could not be maintained partly because of the opposition of Sally (B_3) who felt herself being squeezed out of the picture and by the opposition of B_4. Finally, as treatment continued, a healthy and normal Miss B became dominant over the other personalities.

There are, to be sure, a great many relations between these several personalities, the description of which lies beyond the limits of our

present task. The striking point is that, within a single body, systems of action patterns or character traits did emerge which were functionally separated from one another and alternated with one another in the control of Miss B's bodily functions Sally, for example, was obviously a set of action patterns split off from the main personality and organized into a secondary personality. If we may think of each human being as being made up of a very large number of action patterns, some of which can be called personality or character traits and if we think of a normal person as one in whom all such patterns are integrated into a single, coherent pattern, we should then be in a position to see what it means to say that sub-patterns may develop during periods of emotional crisis when dissociation rather than integration is present. The description of Miss Beauchamp in her several alterations of personality seems, of course, bizarre and wholly beyond the domain of the characters which we normally see around us. And yet, as we have already implied, a good argument can be made out for the proposition that Miss Beauchamp represents a more complicated and a more exaggerated picture of a shift in emphasis from one group of traits to another which is a common feature even of highly integrated personalities As we have seen in the last two chapters, dissociation may often occur without becoming as complete as it was in the case of Miss Beauchamp Nevertheless, hysterias, amnesias, tics, delusions, obsessions, and a great many other complexes must have somewhat the same general origin

In human behavior those stimulus-reaction patterns which are uppermost at any moment gain their dominant position because of a large number of circumstances. It is possible to name only a few of these. There is, first of all, the character and quality of the stimulus-situations which surround a person By virtue of their intensity, their rate of movement, or their unique quality, some situations easily become prepotent in determining behavior. In the second place, there are a vast number of factors within the nervous system itself which act as selective agencies [2] Previous training will allow some systems to become dominant even though the stimulus-situations which gave rise to them are no longer as effective as they may have been on some previous occasion Whenever it happens that a particular behavior pattern is repressed, and whenever it happens that, like a valve which

[2] A sample is to be found in the relation between the mid part of the sympathetic system as opposed to the cranial and sacral parts See Cannon, W B, *Bodily Changes in Pain, Hunger, Fear, and Rage*, N Y, Appleton (2nd ed), 1929, pp 32 ff Washburn, M F, *Movement and Mental Imagery*, Boston, Houghton Mifflin, 1916, Chap II and *passim*.

has stuck, it remains repressed while the rest of the machinery continues to work, those complexes which are described by the words "amnesia," "anesthesia," "inhibition," and "repression" will appear. On the contrary, if such a system gains the upper hand, and if, again, like a valve that has stuck, it maintains its position, the events described by the words "fixed ideas," "hypersensitivity," "obsessions," and the like, will appear. In the third place, Freud and others have argued that some behavior patterns may be inhibited through the operation of a special inhibiting agent. This agent has sometimes been called the "censor" or the super-ego. The inference is that behavior patterns are like forces which may work against one another In any case, the censor is a theoretical addition to the various conditions which govern the revival and orderly arrangement of past experiences.

The inference to be drawn from this brief reference to alterations of personality is that a great many different types of functional ailment are simply an expression of the way in which the action patterns which make up the total life of a person may fail to be properly coordinated with one another In so far as this is true, it ought to follow that psychological methods of healing would mean the use of those devices that will revive forgotten or repressed behavior systems, put exaggerated behavior systems back in their places, or lead to coordination where there has been lack of coordination It makes no difference to the psychologist whether the methods adopted to accomplish these aims have been used intentionally or unintentionally The main point is that success in reintegrating all of the action patterns of a person has been and can be achieved through psychological rather than pharmacological and surgical methods It has been the hope of the medical psychologist that he could find out more about psychological ailments and the means that can be used to correct them so that he may play his proper part in promoting the welfare of each person.[3]

2. *Psychology in Normal Medical Practice*—Before we turn to the more specific methods used in psychological healing, it will be fruitful to describe briefly some of the ways in which facts about human nature can be used in normal medical practice In this connection it is curious to note that many methods of psychological healing are at one and the same time methods of diagnosis This truth is borne out by the importance commonly attached to the bedside manner of a physician or a surgeon. It is easy to find out how dextrous a surgeon

[3] A recent and highly instructive study of alteration of personality is to be found in Franz, S. I *Persons One and Three*, N Y, McGraw-Hill, 1933

is with his fingers and in the long run one might discover, too, how well trained a physician is. But none of these facts will have a bearing upon the way in which two personalities will interact with each other. A medical man may be able to name and describe a large number of the specific traits of his patient. After he meets the patient, however, both his own traits and those of the patient will be set into a total situation which may be so intricate in character that a knowledge of special traits can have no particular bearing upon the way in which a particular physician ought to handle a particular patient The patient is anxious, depressed, hopeful, or courageous. The physician must give the appearance of knowing his business and yet he may be doubtful or perplexed Both persons, then, stand as the focal point of a vast number of moods and attitudes which must fit neatly into one another if the physician is to handle the patient effectively and if the patient is to accept his treatment or his operation in a confident manner. In spite of all that has been done in the field of medicine and surgery, the average person still has a deep-running fear of illness and death. He may be open to a quick acceptance of almost any kind of a suggestion and the attitude that will emerge out of the sickroom situation can make for or against his quick recovery. It is well known that an initial fear on the part of a patient may become a prolific source of other fears and anxieties and that these, in turn, may bring about functional disorders far removed from the initial difficulty.

As a single example, we may take the following case [4] It concerns a soldier who was, just prior to an engagement, particularly anxious lest he be blinded. When he regained consciousness in a hospital after having been buried by a high explosive shell, he discovered that his eyes were bandaged and that his most severe distress came from his seared face We may suppose that his previous anxiety has already prepared the way for the ready acceptance of any suggestion concerning blindness. In any case, an ill-advised response of a nurse or of a physician at this point may make the difference between true functional blindness and normal recovery. As it happened, the whole situation at the moment of returning consciousness was of such a character as to strengthen the patient's belief that he had been blinded Upon leaving the hospital there was nothing about the injury of his eyes to suggest that the visual areas had actually been destroyed and yet, so far as actual function was con-

[4] Hurst, A F, *The Psychology of the Special Senses and Their Functional Disorders*, London, Oxford Univ Press, 1920, Chap X

cerned, the patient became a blind beggar on the streets. Further study of the case revealed that this particular patient was actually suffering from functional blindness rather than from any traumatic injury to his nervous system. Some of the methods to be described later on in this chapter quickly restored his vision to him.

The fact we wish to point out, so far as the above case is concerned, is the relation between functional blindness and the suggestions that were made to the patient during a time when he was particularly ready to believe that life-long blindness was his lot. In less extreme cases, every physician can report instances of an initial tendency toward a more serious disease turning into a series of functional aches and pains which make the latter state of the patient much more serious than his former state. Cases of this type illustrate the quick and intimate way in which even the initial contact between a physician and his patient may lead either to recovery or to prolonged groping on the part of the patient for the help that his own attitude may have deprived him of [5] Were it possible to predict in advance what the effect of a meeting between two persons will be, the whole problem of the relation between a physician and his patient would be much simpler. Patients with attitudes and temperaments of a given type could be easily and quickly adapted to physicians with complementary traits. In the absence of knowledge which would lead to this result, every physician makes what use he can of his knowledge of human nature in order to improve his bedside mannerisms and in order to establish the sort of rapport between himself and his patient as will lead to the best results.

There is, however, another important phase of the relation between psychology and the normal practice of medicine, for the diagnoses which a physician may make of certain types of ailments depends rather closely upon the knowledge that the physician ought to have of the normal reactions of the average person. As we have seen, the phrase "normal reaction" simply means that, given a large number of subjects and a large number of reactions, a normal probability curve can be plotted. The high point on such a curve is ordinarily used to define a normal reaction. It is of this phase of the relation between psychology and normal medical practice that we shall write briefly.

[5] We have already referred to the major rôle which high nervous tension may play in some ailments Consult again Jacobson, E , *Progressive Relaxation*, Chicago, Univ. of Chicago Press, 1930

As an illustration of the way in which diagnosis may depend upon the facts of "normal" psychology, we may take some of the studies that have been made on association Let us suppose that 1,000 people have been asked to name the first word that occurs to them after a given stimulus word has been presented to them. Among the stimulus words that have been used are such common terms as "dark," "man," "soft," "black," "sour," and "lamp" It has been shown that approximately 427 people out of 1,000 will respond to the word "dark" by saying the word "light." The word "light" will also be given in answer to the word "lamp." This time, however, it will be given approximately 650 times out of 1,000. The usual or normal response to the word "man" is "woman," to the word "soft" is "hard," to the word "black" is "white," and so on If, then, in certain classes of ailments it were desirable to know whether associations were normal or abnormal, the physician could turn to tables of normal expectancy which would tell him how far from the average his patient happens to fall [6]

For another illustration of this situation we may turn to some of the studies that have been made upon tactual sensitivity We have already seen that there are a great many types of infliction which betray themselves by marked changes in sensitivity The very fact that one can use the word "change" in this connection means that a normal type of sensitivity has already been established It was the psychologist rather than the physician who discovered that sensations of contact on various parts of the skin might be separated into various types. It looks, for example, as though some of the sensations which arise when the skin is lightly touched differ greatly from the sensations which arise when the skin is more severely touched. The first type are called "epicritic" sensations, whereas the others are called "protopathic" sensations. It looks as though these two classes of sensation qualities were dependent upon different kinds of sense organs in and just below the skin [7]

Still another illustration comes from the study of some of the higher psychological functions. In the case of rote memory, for example, it is possible to say what a normal rate of learning would be. So, too, for other types of learning and for such items as accuracy in movement, steadiness in movement, speed in perception, following

[6] Jung, C G, "The association method," *Amer J Psychol*, 1910, *21*, 219-269

[7] See Boring, E G, "Cutaneous sensation after nerve division," *Quart J Exper Physiol*, 1916, *10*, pp. 1 ff

directions, and so on. If, now, a patient suffering from some ailment were given the same test that had been given to normal persons, one could compute the amount of deviation from the expected and thus identify more accurately the symptom in question. In the case of rote memory, for example, it has shown that only fifty-six per cent of psychoneurotics can reach or exceed the median performance of normal persons. Similarly, it has been shown that only fourteen per cent of psychoneurotics can reach or exceed the median reached by normal subjects in a test for following directions. The intelligence quotient and other modes of establishing norms for different persons can be used in the same way. For example, in one study of 1,172 cases of psychological difficulty in army hospitals it was shown that the median mental age of the whole group was 11.7 years, whereas the median for normal groups of equivalent type should have been approximately 14 years.[8]

Data of this sort can be used not only in order to compare normal persons with afflicted persons but in order to show the progressive changes that are characteristic of so many diseases. This fact holds true both of diseases of the body and of those ailments that can be called psychological. A study has been made, for example, of the effects of hookworm disease on the mental and physical development of children. The one group of subjects was made up of persons infected by hookworm and the control group was made up of healthy children living under the same general conditions. A third group consisted of persons who were infected with hookworm but who were, at the time of the study, not under medical treatment. A suitable battery of psychological tests was administered to each of the three groups. It was shown clearly enough that hookworm disease does have an effect upon the psychological development of the patient and that the amount of the effect varies with the amount of treatment. It was clear also that prolonged infection might result in conditions from which the patient could not recover.[9]

This time-wise approach to problems of medical practice has been of particular value in detecting the early onset of diseases which may result in a progressive deterioration of various structures and functions. As we have seen, all of the dementias show a history of in-

[8] See Tendler, A. D., "The mental status of psychoneurotics," *Arch. Psychol.*, 1923 (No. 60). Also Wells, F. L., and Kelley, C. M., "Intelligence and psychosis," *Amer. J. Insan.*, 1920, 77, pp. 17 ff.

[9] Strong, E. K., "Effects of hookworm disease on the mental and physical development of children," *Internat. Health Commis.*, 1916, No. 4.

creasing deterioration It is now known that if some of these diseases can be discovered early enough they will, like bodily diseases, submit more or less readily to treatment. A physician could not hope to detect the early stages of any psychological difficulty unless he had available some norm or standard with respect to which he could compare the suspect.

3. *Religious Healing.*—We have, of course, treated in very simple fashion the many ramifications of the relations between psychology and normal medical practice. Now, however, we must turn to methods of treatment that are particularly psychological rather than surgical or pharmacological. The oldest examples of psychological healing are to be found in the religious literature of all peoples. As we have said just above, it makes no difference either to the patient or to the healer whether intention or chance lies behind the methods used. It is simply a plain fact that many religious men have been highly successful in the treatment of psychological disorders. This is one of the features of a religion which gives it so great an appeal.[10]

We have seemed to say that religious healing is, in and of itself, a special type of healing. It would be more correct to say that religious healing marks the unintentional or uninformed use of normal psychological methods by persons who suppose that they have actually used a supernatural method. It is now clear, for example, that Mesmer, the inventor of mesmerism, was a past master in the use of suggestion but at no time does it appear that he knew the character of the method he was using [11] So long as men believed that psychological and even physical ailments were the result of the presence in the diseased individual of demons, it was almost necessary to suppose that some supernatural agent or force must be used to exorcise these demons. Moreover, so long as men have believed that there is a soul and that this soul can become sick just as the body becomes sick, they have been forced to conclude that divine healing has a special place in medicine. Since souls are not made of such stuff as bodies are made of, and since there are no drugs that can be manufactured out of soul stuff, the normal methods of medical practice have not been accepted as an adequate procedure by various theologies.

The physician and the surgeon have long since been able to dis-

[10] Janet, P., *Psychological Methods of Healing* (3 vols.), N. Y., Macmillan, 1923, *passim.* See White, A. D., *A History of the Warfare between Science and Theology*, N. Y., Appleton, 1910

[11] Tourneur, N., "A prince of medical charlatans," *Med. Rev. of Rev.* 1915, *21*, 210–219.

miss the idea of demons and the necessity for supernatural methods of healing.[12] In all of these cases it has been found that broken bones, torn flesh, inflammations, infections, and other physical disorders are "normal" afflictions to which human flesh is an involuntary heir. It has been found, too, that each of these afflictions can be attacked either by way of prevention through the removal of sources of infection or by way of cure through the use of drugs, serums, and surgical attack. Psychological ailments are scarcely out of the stage in which all ailments were once placed, that is, lack of knowledge about psychological ailments and improper control over methods of prevention, on the one hand, and methods of cure, on the other, have kept such disorders in the supernatural realm. It is now known, however, that the methods used by the religious healer are the same as the methods that can be used in normal medical practice It still remains true, of course, that any method of healing which is put into a religious setting may have its curative value increased because of an especially favorable attitude both on the part of the patient and on the part of the healer. As we shall see in a moment, suggestion plays a very large part in all methods of healing and its effectiveness is mightily increased whenever it is supported by religious fervor. We must pass on, then, to truly psychological methods of treating psychological disorders

4. *Psychoanalysis.*—We have already remarked the fact that the diagnosis of a psychological difficulty may be almost equivalent to an immediate cure. This fact appears nowhere to better advantage than in the use of the method of diagnosis known as the psychoanalytic method. The main factor involved in the use of the method is simply this. As we have seen in the last chapter, a great many ailments are alleged to have, as their predisposing cause, the repression of some past experience which may have been unusually unpleasant in character. If the physician can get a patient to talk frankly about this past experience, the effect is to remove from the patient most, if not quite all, of his neurasthenic, psychasthenic, or hysterical symptoms In other words, the method acts very much as does an intimate confession between friends. It has long been recognized that no person can successfully bury a bitter disappointment, a profound emotional shock, or any other type of major emotional experience simply by refusing to recognize its existence. If, however, such a person can talk over his experience with a confidant, he is often able to escape a large measure of

[12] Haggard, H M , *Devils, Drugs, and Doctors*, N Y , Harper, 1929, *passim*

the pressure which will be exerted upon him by his secrecy The result is that his experience will often gradually take its normal place among other experiences [13]

Let us suppose, for example, that we are traveling with a person who cannot retire to his berth with the same comfort or sense of safety as is common to the average person. On attempting to get into his berth, we find that the person of whom we are speaking breaks out into a cold sweat, that his hands are trembling, that his speech is halting, and that he is giving other signs of a profound emotional upset. Rather than enter into his berth he paces nervously back and forth along the aisle After we become better acquainted with this person we find that he cannot even stand at his ease in the dressing room The same symptoms appear when he is closely surrounded by a crowd, when he is in a small room, or when he is in any other way caught up in close quarters.

It has been shown that such persons may owe their emotional reactions to closed spaces to a kind of functional dissociation which has been induced by some earlier unfortunate experience. Let us say, for example, that our friend, while still a small child, has been locked by his playmates in a dark closet and has then been badly frightened by loud sounds and other suggestions of impending hurt. In some cases, an experience of this type will be more or less temporary in the sense that the child quickly gets over its fear by incorporating it in the total range of his daily affairs In other cases, however, the experience may be so terrifying that the child undertakes to wipe it out of remembrance by divorcing it from other events worthy of recall This might be possible if he could literally cut away a part of his nervous system or, to use the older phraseology, a part of his mind, from the rest. Actual physical separation of this kind, however, is not possible. The experience is repressed. It becomes a terror which the child does not like to recall. For reasons which have not yet been made clear, such an event may persist in a repressed state through long periods of time. Under suitable circumstances, however, it may still betray its presence. We have just mentioned some of these circumstances. That is, when the child has become an adult, any type of confinement may serve as a signal for the revival of all of the emotional actions which were produced during the initial period of fright. The significant point is

[13] Jung, C G , "The theory of psychoanalysis," *Nerv and Ment Dis Monog*, 1915, *19* Freud, S , *An Introduction to Psychoanalysis*, N Y , Boni and Liveright, 1920 See also some of the other references listed under General Readings at the end of this chapter

that the emotional accompaniments of the experience and not the experience itself will be revived. In other words, the emotional accompaniments of the original experience will have become attached to other objects, persons, or events

In view of the fact that repressions of this type may become almost, if not quite, complete, and in view of the fact that they commonly give rise to hysterias and other signs of conflict, a cure cannot be effected until repression has been removed. It is at this point that Freud introduced the modern concept of psychoanalysis In simple terms, Freud argued that the physician must help the patient to recall forgotten events In other words, the patient must be invited to remember not only those events which are forgotten but those which have been, if we may use the analogy described at the beginning of the chapter, "stuck" in the vale of forgetting If repression has gone so far that a more ancient experience is wholly dissociated from the common run of events, a means must be found for bridging the gap between normal behavior and those behavior patterns which have become dissociated.

One way to overcome the barrier created by dissociation lies in the use of the method of hypnosis We shall discuss this method in a moment Freud himself dispensed with the method for he found that, by stimulating his patients with special words, he could get them to respond with all of the words suggested by the stimulus word. After a sufficient degree of rapport had been established between the physician and the patient, Freud found that sooner or later the responses of his patients would give him clews as to the nature of the repressed experience As soon as the physician came upon these clews he was able to reconstruct the past experience of his patient and then proceed to integrate this experience with the daily life of his patient.[14]

In the beginning, then, psychoanalysis was primarily a method of diagnosis It quickly became, however, a method of cure as well, for many of the symptoms of psychological disorder disappeared as soon as the patient recognized the source of his difficulties. As we have seen in the last chapter, however, a diagnostic method has now been transformed into a major theory as to the nature of human nature. It is Freud's conviction that most of the psychological ailments are fundamentally sexual in character and that they have their origin in the improper adjustment of each person to the plain facts of living Since

[14] Cf Ferenczi, S, *Theory and Technique of Psychoanalysis*, N Y, Boni and Liveright, 1927

research into the dynamic properties of the nervous system has not gone far enough to lend support either for or against the Freudian theory, we shall leave it at this point.

5. *Suggestion* —For a long time it has been customary in psychology to distinguish between those acts which are commonly called "willed" or "voluntary" as opposed to those which are called "unwilled" or "automatic." After a person has driven an automobile for several months he will handle the brake, the steering wheel, the clutch, and other instruments in a purely automatic way. Given an object on the highway to be avoided, the driver will turn the wheel properly even though he may be engaged in an active conversation with a friend. The first time he drove the car, however, the proper use of the wheel or of the clutch was probably associated with distinct feelings of effort or of determination.

Now it happens that this distinction runs all the way through human action. If a person is told to go to a certain place or is invited to participate in a given activity, he may do so with the feeling that he has somehow willed to do so or that he has personally desired to do so. On the other hand, however, it frequently happens that an invitation or a command will be acted upon without this feeling of volition. From the studies which have been made on various types of action and on the relation between action and stimulus-situations, it has been concluded that the term "suggestion" must refer to the second set of circumstances just described. That is, a suggestion is a stimulus to action which is accepted and acted upon without being accompanied by the sense of willing the act or by a personal desire to do so. Voluntary action, on the other hand, would be an action which does include a desire or a feeling of self-determined choice [15]

There are two things that one might say about this distinction. In the first place, it is not implied that voluntary actions are, in the long run, any more free from the past history of the acting person than are modes of behavior which result from suggestion. Everything that we know about human and animal behavior shows that it is always a product, in part, of the immediate stimulus-situation, in part, of the present state of the organism, and, in part, of the previous history of the person. In the second place, the difference between a suggestion and a voluntary action appears to be a difference created by the use which the acting person may make of implicit verbal instructions.

[15] Hudgins, C. V., "Conditioning and the voluntary control of the pupillary light reflex," *J. Gen. Psychol.*, 1933, *8*, 3–31.

Animals and small children are not subject to suggestion. The inference is that children become suggestible just as fast as they learn how to use words and other substitutes in the place of external stimulus-situations.[16] In saying this, we begin to move toward a rather knotty problem in theoretical psychology, but it is not necessary to solve this problem in order to understand that a response to a suggestion does differ in certain respects from a voluntary action. The important fact is that suggestion has brought to medical practice a very powerful instrument for the cure of psychological ailments.

If we are to understand the use of suggestion in the treatment of psychological disorders, it is important to realize that suggestions may be both direct and indirect. If, for example, one person suggests to another that a half-hour might well be spent in discussing a problem, the suggestion has taken a more or less direct form. On the other hand, many persons will act in a suggestible way under the influence of minor changes in the total pattern of a situation or because of vague and unrecognized portions of it which have attracted the attention neither of the physician nor of the patient. As we shall see in a moment, the use of indirect suggestions has been a source of a great deal of confusion both with respect to the nature of suggestion itself and with respect to the nature of hypnosis.[17]

It can be seen from this brief description of suggestion that it might be used as a tremendously effective instrument in the analysis and treatment of most of the psychological disorders In the case of amnesia, for example, a direct command or even a direct stimulus to recall the forgotten experience often serves to increase the barriers against recall. A series of suggestions, however, both of the direct and of the indirect types might lead to a response which the patient had not intended but which could be used as an entering wedge toward the revival of an entire experience.

In order to show how effectively a suggestion may be used in medical practice, we shall refer again to the case of functional blindness cited above. This patient was blind, apparently, because all of the psychological operations which have to do with vision had been dissociated from other modes of operation. If we think of these visual functions in terms of the rough analogy furnished by an automobile engine, we

[16] Aveling, F, and Hargreaves, H L, "Suggestibility with and without prestige in children," *Brit J Psychol*, 1921–1922, *12*, 53–75 Messerschmidt, R O, *A Suggestibility Scale*, thesis presented for the M A degree, Ohio State University, 1927

[17] Cf Hull, C L, *Hypnosis and Suggestibility*, N Y, Century, 1933, Chap XIV and *passim*.

may say that they represent a "down position" of one of the pistons. Instead of rising again as the piston normally does, they have been forced out of the whole behavior pattern of the patient by the mechanisms of repression. Under these circumstances, nothing would be gained by commanding the patient to see and neither would it be helpful simply to present him with a visual stimulus By definition, a visual stimulus cannot become effective in producing action. The physician, however, can arrange a subtle stimulus-situation in which the suggestion is offered that seeing is possible. This was done by placing a chair in the way of the patient as he walked down the aisle between the hospital beds. As a matter of fact, the patient did not stumble over the chair but he did walk around it. Beginning with this inconsistency in behavior and by increasing and multiplying suggestions concerning the functions of vision, the physician was soon able to reestablish these functions in their normal place among the other functions [18]

6. *Hypnosis.*—No account of the phenomena of suggestion can be complete until something is said about the nature of hypnosis and about the relation betwen hypnosis and suggestion. For a long time, the phenomena of hypnosis have stood among the borderline problems of psychology. It has been urged over and over again that hypnosis must describe a special state of affairs, both like and unlike normal sleep, but more often than not occult or even supernatural in character Fortunately, both for psychology and for the applications of psychology to medical practice, the phenomena of hypnosis have now been brought into the experimental laboratory Already the experimenter has been able to discard many unsound beliefs about the nature of hypnosis and discover some of the properties that are really intrinsic to this condition.[19]

The chief characteristic of hypnosis is increased suggestibility. Some of the experiments warrant the assumption that, during the period of hypnosis, a normal person is approximately twice as suggestible as he is in the waking state. This fact implies that all persons are more or less suggestible. It now looks as though suggestibility is a trait which, when measured for a large number of suggestions, will fall into a normal distribution curve. Marked deviations from a normal distribution are created, perhaps, by those persons who depend to an unusual extent upon voluntary types of action As we have seen, this means that some persons act more frequently under

[18] Hurst, A. F. *op. cit.*, pp. 97 ff.
[19] Cf. Hull, C. L., *op. cit.*, *passim*

the influence of implicit and self-administered verbal instructions If the average person is approximately twice as suggestible during hypnosis, it must follow that suggestions offered during the hypnotic condition could reach forgotten experiences somewhat more readily than in the normal waking state

Among the facts which are now known about hypnosis, we may mention the following In the first place, there is no reason to believe that recent experiences can be recalled any more easily during hypnosis than they can be under normal waking conditions Childhood experiences, however, can be revived more readily when a patient is hypnotized.[20] In the second place, it seems to be quite clear that patients cannot be made more sensitive to various types of stimulus.[21] On the other hand, there is some evidence to show that sensitivity to pain and to other types of stimulus can be decreased [22] This fact has been shown to hold true not only for verbal and facial expressions of pain but for some of the organic accompaniments as well. An exception among these organic accompaniments has been found in the case of changes in pulse. There is, then, some foundation for the common belief that anesthesia sufficient for minor surgical operations can be produced by hypnotic methods In the third place, it seems to be fairly clear that hypnosis holds a good many characteristics in common with habituation [23] That is, a patient may learn how to fall into a hypnotic condition just as he learns how to acquire any other skill. Moreover, he learns how to use what are known as post-hypnotic suggestions. That is, if, during the period of hypnosis, it is suggested that the patient will, at a given time after awakening, carry out a suggestion offered by the physician, the suggestion will become effective at the time designated. Suggestions of this type, however, are no more effective than a waking suggestion. The situation is somewhat different when such suggestions are repeated during successive states of hypnosis. It looks as though such repetitions may have greater value in producing effective action than they will have if they are given under normal waking conditions.[24]

[20] Stalnaker, J M, and Riddle, E E, "The effect of hypnosis on long delayed recall," *J. Gen Psychol*, 1932, *6*, 429–440

[21] Young, P C, "An experimental study of mental and physical functions in the normal and hypnotic states," *Amer J Psychol*, 1925, *36*, 214–232

[22] Sears, R R, "An experimental study of hypnotic anaesthesia," *J Exper Psychol*, 1932, *15*, 1–22

[23] Cf Hull, C L, *op cit*, Chap XIV.

[24] Williams, G W, "The effect of hypnosis on muscular fatigue," *J. Abnorm. and Soc Psychol*, 1929, *24*, 318–329

7. *Psychotherapy.*—There are, of course, a good many other devices which may be used in order to help those who are suffering from psychological ailments. In view of the fact that both psychasthenia and neurasthenia may be called fatigue neuroses, it would seem to follow that escape from some of the symptoms of psychological disorder might be found in rest.[25] As we have seen in an earlier chapter, the word "rest" may signify either a lengthy period of sound sleep, the development of special skill in progressive relaxation, or a total change in the stimulus-situations which surround a person Of these three the last is, perhaps, the most effective because the fatigue neuroses often hold certain factors in common with monotony. To take a patient out of a monotonous situation and give him new interests and activities often opens the way to a quick and thorough recreation of the patient. The rest cure may be effective in direct proportion as it makes use of simpler and more fundamental types of interest and action.

It is now common practice to refer to this type of therapy as occupational therapy or recreational therapy. The argument is that persons who are in a run-down condition can be asked to play games, enjoy dramatics or singing, and otherwise participate in action that will give them an intense interest outside of themselves. Patients who are excitable, restless, distractible, and over-active ought to be given sedative occupations. Rhythmic movements, for example, have a lulling effect on such persons Depressed patients, on the contrary, ought to be invited into stimulating activity. This may require patience and considerable ingenuity on the part of the physician but the results are usually worth the effort. Still a third procedure is necessary with the schizophrenic who is, as we have seen, introverted and asocial. Such a patient must be led gradually into group activities and every effort be made to help him to establish contact with reality again. That is, phantasies and daydreaming must be replaced by a hobby, a form of recreation, or some other type of real activity that will gain and keep the interest of the patient [26]

We have already tried to show that the psychological treatment of functional disorders cannot be divorced from physiological considerations. When a person is ill, it is the whole person that must be considered and not some particular dimension of him. For this reason,

[25] Jacobson, E., *You Must Relax*, N Y., McGraw-Hill, 1934

[26] These and other procedures have been described by Dunton, W. R (ed.), *Occupational Therapy and Rehabilitation* Baltimore, Williams and Wilkins, 1922.

a special type of therapy often called hydrotherapy has a special value. Hydrotherapy includes the use of water in all of its forms for the treatment both of organic and of functional disorders. It has long been known that warm baths have a sedative effect, whereas cold baths are markedly stimulating. Excited patients, for example, may be quieted by long-continued neutral baths and by cold wet packs. In the same way, low tonus and apathy may be attacked by the stimulus of alternating hot and cold baths and by other procedures. Not the least serviceable function of water is, of course, its use internally as well as externally.[27]

We may now bring this discussion to a close by taking a larger perspective upon all of the problems that have been considered in the last three chapters. It must be clear to the student that a great problem in the field of medical psychology should be the problem of prevention rather than the problem of cure. Aside from pathological conditions, it seems to be quite clear that psychological disorders are essentially dissociative in character. Dissociation may be effected either because of poor training or because of an extreme depletion in the store of bodily energies. To say these same things in another way, sound health at the psychological level implies sufficient rest and complete organization or integration among a wide variety of behavior patterns. He who would escape from psychological ailment ought, then, to surround himself with those stimulus-situations which would make for integration rather than against it. He ought also to avoid, so far as possible, those extreme expenditures of nervous energy which lead so quickly to disintegration.

We shall know, perhaps, within another generation whether the forces and agents which are working against leisure and stability are actually making a change in our sensitivity to maladjustment and nervousness. The evidence, at the present time, is largely circumstantial. As the student knows, the psychopathic hospital is a modern institution. It may be modern either because psychopathic cases have just recently been recognized as demanding hospital care or because the number of such cases is on the increase. Indirect data looking toward this second possibility can be found, so some would assert, in the fact that that form of maladjustment frequently called "shell shock" constituted a minor phase of war casualties in the middle and late parts of the nineteenth century but a major phase of all wars in

[27] Cf Dorcus, R M, and Shaffer, G W, *Textbook of Abnormal Psychology*, Baltimore, Williams and Wilkins, 1934, Chap. XII.

the twentieth century,—especially of the World War. It has been said that the great medical problem of the next war will rest upon the psychiatrist rather than upon the surgeon and the physician. In any case, the student cannot afford to neglect the problems created by maladjustments and mental hygiene.

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PART FIVE

PSYCHOLOGY AND EDUCATION

more apt to be the outcome of original nature than of training. It now seems certain that learning situations may become effective with respect to general attitudes and dispositions just as quickly, if not more so, than with specific skills.

When we say, then, that education is a kind of growth, we mean to argue, first, that it is growth of the biological kind rather than of the physical kind.[11] In the second place, we mean to say that the growth of the psychological functions of a child is, in large part, more closely dependent upon the way in which learning situations are used than has commonly been thought. It is, in short, one of the functions of the field of educational psychology to determine just how far human nature is subject to training [12] It goes almost without saying that any information that can be gained about this problem must have a very great practical value, for society depends upon education not only that it may maintain itself in its present form but that it may change itself for the better. This is done in order that greater ease and contentment in all of its activities will be achieved.

3. *Formal and Informal Education* —We have just said that that kind of growth which we call education leads to two distinctions. On the one hand, we may distinguish between the specific skills of a person and his more general postures and attitudes, including emotionalized forms of conduct. On the other hand, we may distinguish between specific learning situations and the general environmental context of the learner. These two distinctions have led unintentionally to two forms of education, the one known as formal education and the other known as informal education.

Formal education means that multiplied numbers of men have described a large number of exact learning situations together with the psychological traits that are known to grow under the influence of these situations. When such information as this is available, it is possible to group similar learning situations together in a single course and then to create as many courses as there are different classes of things to be learned. Each one of these courses, including as it does a variety of learning situations of the same general character, makes up what one may call a single unit in the curriculum. The facts of history, for example, are apt to be more like one another than they are like the facts of mathematics or of civics. One may, therefore, bring

[11] See Dewey, J., *Democracy and Education*, N. Y., Macmillan, 1916, Chap. IV.

[12] Some writers go so far as to say that everything that man may become must be attributed to education. See Watson, J. B., *Behaviorism*, N. Y., Norton, 1928, *passim*.

together a long series of learning situations which have as their goal the development of knowledge and skill with respect to history. When this is done, one will have described one of the common courses in the high school curriculum.[13]

Informal education, on the contrary, depending as it does upon general environmental situations, leads most frequently to the development of the more general traits and dispositions. Since generalities are not specific, it is commonly supposed that they cannot be controlled. Informal education describes, therefore, all of those ways of promoting and guiding human development which are unintentional or undefined. As we have said above, the very lack of intention or planning which is characteristic of informal education has led some persons to suppose that education or training could take place only where someone intended that it should take place. In view of the fact that all human beings gain traits and attitudes which were not intended, or for which there has been no thoughtful planning, it is supposed that such traits or attitudes must be explained by the original nature of the child.[14]

From this contrast between formal and informal education we may draw a great many curious inferences. We may wish to know, for example, whether the skills and aptitudes which are trained in a formal way are more important than those which are trained in an informal way. Almost by common consent we act as though the growth products of the schoolroom were the more important. This sense of values may be suggested, in part, by the fact that the operation of schoolrooms in the United States costs somewhere around three billion dollars a year. No one has yet computed, however, how much it costs to maintain our particular kind of informal environment, that is, our socio-economic or cultural level. We take it for granted, therefore, that the informal environment costs nothing and yet it is easy to see that an uncontrolled environment of a child living today is immensely more costly than the uncontrolled environment which surrounds a child in a very primitive society.

Some men are now beginning to argue that they may have been placing value upon the wrong side of education, for the general traits and dispositions of a mature person—say, his sense of social values, his gentility, his devotion, his motives, or his habitual moods and

[13] Babbitt, F., *The Curriculum*, Boston, Houghton Mifflin, 1918

[14] The most impressive list of such native traits has been given by Thorndike, E. L., *Educational Psychology*, N. Y., Columbia Univ. Press, 1913, Vol. I.

dispositions,—may count for much more toward his success as a member of society than any of the specific skills that he may have acquired in the schoolroom. A recent writer has said, for example, that an educated man is one who is master of himself, who is free from herd opinion, who has a capacity for self-criticism and suspended judgment, and who can place himself above rather than remain within, the domain of his own beliefs and ideals [15] When such definitions of an educated man are offered, it is often said that they are unscientific and therefore useless! They can be unscientific, however, only because we persistently refuse to believe that values may lie in things that come haphazardly or without expense Since we pay large sums in order that children may gain some skill in the use of the three R's, it ought to follow that an educated man should be defined in terms of his skill in these respects. It will take no argument, perhaps, to convince the student that this is very poor logic indeed.

Escape from the contrast between formal and informal education might have been impossible were it not for the fact that the experimental laboratory has now been able to find out something about the origin and development of the more general traits and dispositions of a child. This fact holds true, in particular, of personality or character traits, of the origin and development of motives, of the ways in which the primary emotions may become tied up with almost any kind of stimulus-situation, and of many other socialized forms of behavior. In other words, it is now being seen that one of the tasks of education is to promote the growth of the child not only with respect to his specific skills but with respect to the general attitudes which stand behind these skills. It is this fact more than any other which has made the problems of modern education take on new importance. Were society limited in its use of the facts of psychology to the field of education alone, there would be sufficient justification for the writing of books on applied psychology. Such books would, of course, be called educational psychologies.

4. *The Social Functions of Education.*—A new-born infant, taken as it stands, has no particular value to society. It certainly has no value to itself and its value to its own parents can be measured solely by the extent to which it promotes bonds of affection and of human interest in the parents. Education means that the growth of the infant may be so promoted and directed that it will come to

[15] Martin, E D, *The Meaning of a Liberal Education*, N Y, Norton, 1930, pp vii–viii

have certain values which will remain its own and a great many other values which are social in character. For one thing, it has always been thought worth while to preserve individual human life as long as possible and to preserve at least the *status quo* in social organization and function. If, then, society is to save what has been won, each of its oncoming members must learn to do what the more mature members have done and to know the meaning or significance of this accumulated information. A part of this task could be accomplished by putting all the information into books or encyclopedias, into monuments, and into other types of permanent record. The very fact that this has been done in the past now gives about the only means we have of finding out how older civilizations lived and what they knew.[16] If, however, nothing more than this is done, the average social group will have set the date for its own burial.

At the very least, learning to use information and to keep up a semblance of a culture means learning to read, to understand, and to interpret the work of others. Social groups have always hoped, however, that they might go even further than this. They have hoped that somewhere in the getting of information they could find out enough about themselves and about the world in which they live so that the processes of decay which have successfully attacked every previous social group could be delayed or even eliminated at the present time. This means that education must go beyond the training of those skills which might favor a mere perpetuation of an attained level of culture. It means that education should aim toward the development of those traits and skills which make further research and investigation possible. This is not only a matter of comfort in immediate living, but an expression of a deep-running desire on the part of every parent so to increase comfort and safety that the next generation will get more out of life than the present generation has [17]

With this assertion, we come upon a rather obscure point in the view which society has taken of education, for there are some things which a social group does not like to see changed. As we have already found, social living means the regulation of conduct today in terms of those accumulations of previous conduct which have been called tradition, custom, authority, and social mores. Then too, there are all kinds of institutions, both sacred and secular, around which the

[16] Judd, C H, *Psychology of Social Institutions*, N Y, Macmillan, 1926
[17] Cf Whitehead, A N, *The Aims of Education*, N Y, Macmillan, 1928.

very safety of individual and social living seems to hang. Social groups have always been willing, therefore, to train the oncoming members of society in such a way that they could find out more about life and matter and thus promote the physical comfort of members of the group, but it has never been very cordial toward that kind of a study which would examine traditions, social institutions, and other established phases of culture. In other words, it has not been very cordial toward social inventions and discoveries. On occasion, to be sure, it has been thought worth while quickly to change a whole set of traditions During times of war, for example. a certain amount of censorship is placed over public information, that is, over the kind of education known as propaganda, so that some opinions will be weakened and others strengthened This is done in order to make the judgments of the temporary leaders of the group the concensus of opinion of a very large number. Propaganda of this type, however, has not offered itself as a permanent answer to the free and open study of those facts about human nature and about society which would promote the growth of society in the same way that control over physical nature has been promoted.

In recent times, it has been said that the answer to this problem is to be had through what may be called adult education. Here again, however, adult education is being used primarily for the purpose of putting into the context of adults facts that have to do with the physical and medical side of life The use of the automobile, for example, displacing as it did the use of the horse and the carriage, brought a very great problem to those persons who, from childhood on, had not acquired the types of skill and the degree of alertness which are most desirable on a high-speed thoroughfare. A great many other instruments have now been added to the automobile and, moreover, tremendous progress is being made in the study of hygiene and medicine. It is natural that some means should be found for giving to adults the kind of training in these matters which they could not have had as children. It is clear, however, that no social group can depend upon adult education for proper training in those traits and attitudes which would mean progressive change in social organization and outlook. On the contrary, the only method of approach to this use of teaching method lies in the early guidance of the child. As we have tried to say above, the traits which a child acquires during its early years are very apt to remain a permanent part of its total character.

It is easy to see, then, that education is, perhaps, the most important of all of the various activities of a social group. At the present time, society faces as many perplexing problems as it has ever faced before. There are the problems of war versus peace, the problems of culture versus technical skill, the problems of capitalism versus socialism, the problems of marriage versus companionship, the problems of democracy versus dictatorship, the problems of religion versus science, the problems of individualism versus cooperation, the problems of nationalism versus internationalism, and so on. None of these problems concern very definitely the kind of education which will make a man a better typist, a better machinist, a better dramatist, a better physicist, or a better chemist All of them do, however, concern a kind of education which may make or break the whole future of the race. It is this fact, perhaps, which gives to education its great social significance [18]

5 *The Problems of Educational Psychology*—The field of educational psychology is almost as wide as the field of psychology itself, but those who deal with these matters have found it convenient to divide the whole domain into separate parts. In the first place, there is a problem which is fundamental to the whole art of education, viz, the problem of the relation between original nature and training How many of the specific traits of an individual come to him from his parents and how many of them come to him from the educative process itself? These questions are so significant not only to education but to every other kind of applied psychology that we shall consider them in detail in Chapter Thirty-Seven.

It goes almost without saying that no matter what his origin, every trait of a human being can be modified in some way or other by training A second task of educational psychology, then, is to show how training may be made most effective. In other words, what is learning and how may the learning process be made most effective? When general information about learning is available, it then becomes possible to go to each one of the psychological functions in order to show how these functions make specific use of the learning process. This phase of educational psychology also reaches beyond education itself The learning process touches industry, in

[18] Some of the background materials for the problems of education are furnished in a monumental survey of recent social trends in the United States See *Recent Social Trends*, N Y , McGraw-Hill, 1933

particular, for industry requires that a great many skills, some of them intricate in character, must be gained before the worker can act as an efficient unit in an industrial system. We shall, therefore, examine the learning process in more detail in Chapter Thirty-Eight. Some of the principles that may be used to make the learning process more effective, especially in academic matters, have already been described in Chapter Six.

In addition to these general problems of educational psychology there are a number of special topics. For example, it is important that the teacher know how to teach,—that is, how to present different kinds of material to different kinds of children. There is the problem of the bright and the dull child. This problem could not arise, of course, until some way had been found for identifying brightness and dullness Educational psychology makes use of the concept of the intelligence quotient for this purpose. The concept of intelligence, however, has a great many other values for education. Almost of equal importance to original nature and training is the problem of the transfer of training That is, having acquired a special skill in one group of functions, how general may one expect this skill to be? Or, to use the situation described at the beginning of this chapter, is education, after all, a kind of discipline which leads to a quantitative growth in the traits already possessed by the individual or does it mean the simple acquisition of as many new skills and attitudes as there are different stimulus-situations?

We cannot, of course, write a treatise on educational psychology, but some of the topics just mentioned will serve better than any others to show how the facts and principles of psychology can be applied in the promotion and guidance of human growth. We shall, therefore, in the chapters that follow study with more care the relation between education and age differences, the nature of intelligence, the problem of brightness and dullness in children, the psychology of teaching, and the problem of the transfer of training.

During this discussion, the student should remember that the interests of educational psychology are best served when the teacher and the parent take a thoroughly genetic view of the growth pattern. That is, education is an art which has to do with events which are placed in a time-wise sequence. The problems and difficulties of the present moment, therefore, take on a wholly different character when they can be placed within a configuration which is essentially genetic rather than static. One may, to be sure, assume that a teaching prob-

lem which has just arisen has no antecedents which are particularly relevant to it, but the increasing number of studies in animal and child psychology indicate that the person who takes this attitude will almost certainly miss the mark.

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CHAPTER TWENTY-FOUR

EDUCATION AND AGE DIFFERENCES

1. *Introduction.*—There is, in the United States Bureau of Standards, a bar of a given length made up of different kinds of metals. It is the purpose of this bar to set a standard for all of the measuring sticks that are used throughout the country. It is necessary, of course, that such a bar shall be kept at a fairly constant temperature and that it shall be made of different metals in order that uncontrollable variations in temperature may be taken care of by differences in expansion and contraction of the materials of which the standard is made. Other yardsticks may be made of wood, of tape, of steel, or of almost any other substance, but their value as measuring instruments depends upon the way in which they compare with the master stick in the Bureau of Standards.

It used to be thought that the mind of the typical or normal human adult could be handled in this way. It was set down as the standard of comparison. When, therefore, the psychologist studied the mind of a new-born infant, of a child, of the adolescent, of the senescent, or of any of the lower animals, these minds at various stages of development were compared with the master copy,—the mind of the mature adult. It was asserted that one might, then, take a cross-section at various points along a whole series of minds much as the student of neurology can take a cross-section of the spinal cord at each of twenty or thirty different places. With these sections before him, he is able to show how the spinal cord changes from level to level. Were he to assume that a section taken nearest the brain was the typical or normal section, then all other sections could be compared with this standard in order to say in which respects they were similar and in which respects they were dissimilar to it.

When, however, the student of psychology uses infants or animals as his subjects, another factor enters into the picture which does not concern either the relation between the master stick in the Bureau of Standards and the copy of the stick in the carpenter's shop or the master section of the spinal cord and all of the other sections from lower levels. The child is not only related to the adult

in the sense that it may be a smaller copy of the adult, but in the sense that it is a genetic predecessor of the adult. This means, of course, that every cross-section that is made of the child must be a cross-section that stands in a longitudinal or a time-wise relationship to the adult section. It would follow that any study of a child and of a mature adult would mean that likenesses and differences between these two sections might not only be likenesses and differences in size but likenesses and differences which have a time-wise or genetic significance.

It used to be thought that this time-wise or genetic significance was more or less irrelevant to education since all of the traits of an adult must be present in the child, save in smaller size. It is now known, however, that the child does certain kinds of things in ways which distinguish it from an adult and that the adult likewise uses functions which the child does not possess. In short, the difference between a child and an adult is more than a mere difference in quantity. There are differences in quality or kind as well, and it is this fact which has made the study of child psychology so important a feature of modern education.

As an illustration of the difference between a child and an adult, we may cite some facts about the nature of learning in the two cases. One of the students of these differences has described the situation as follows. Since children are growing very rapidly under the influence of factors which are inherent within it, learning must be understood in part, at least, in terms of these growth processes rather than in terms of specific practice. It is also known that children fatigue much more quickly than their elders and that their motives or incentives to long-continued work have not been developed to the point where interests can be maintained for any considerable period of time. Moreover, the motives of children are much more closely related to specific tissue needs than to such large situations as are suggested by financial, professional, and social obligations. In the learning processes which are closely related to fundamental tissue needs, there may be long-continued activity, but activity elsewhere is just as brief as the other is long. Furthermore, in view of the fact that children have not learned how to permit the making of one movement to become an adequate stimulus for a whole series of movements, their learning is much more plastic than is the learning of adults. Finally, because of the absence of verbal means of reaction and, also, because of the absence of the higher functions which de-

pend upon these reactions, their learning processes proceed to better advantage at the manual level than at the rational level.[1]

In view of the differences in quality between the child level and the adult level, the question of age differences has become a very important question to education. It is clear that, if there are differences in quality, then there must be differences in teaching methods. That is, learning situations must be presented to children in such a way as to meet them on their own level. These situations cannot be logical simplifications of the situations which may be presented to adults. On the contrary, they must keep pace with what we may call the growth pattern of the child. It has not been possible, as yet, to write out very many of the general characteristics of this growth pattern, and both the educator and the psychologist, therefore, are more or less limited to cross-sections of the child taken at various ages As these cross-sections become more numerous, they will almost naturally fall into a truly genetic picture of age differences, a picture which will be set into a time-wise or longitudinal framework.[2]

If we take the sections which have been studied most frequently along the developmental path of a child, we shall get a fairly good picture of what is meant by age differences. These sections pick up the child at various moments before he is born and immediately after birth, during the period of infancy, during the period of childhood, and during the period of adolescence Then comes all of the information that is known about the mature person. More recently, it has been possible to get more accurate information than we have had before concerning the changes in psychological function which take place during old age. In order to get the facts of child psychology before us, we shall try briefly to characterize each of these stages.[3]

2. *Prenatal Development.*—There was a time when any question about prenatal development would lead almost directly to a long and perhaps bitter argument concerning the precise moment at which the child acquired its soul. There are those who will say that the child gets its soul at the moment of birth, whereas others will be equally sure that the soul arrives at the moment of conception.

[1] Peterson, J., "Learning in children," in *Handbook of Child Psychology* (ed. C Murchison), Worcester, Mass., Clark Univ Press, 1933, p 417

[2] Some of the general principles of development have been suggested by Hollingworth, H L, *Mental Growth and Decline*, N Y, Appleton, 1927, Chap VII

[3] A recital of the main characteristics of children at various age levels can be found in Wagoner, L C, *The Development of Learning in Children*, N Y, McGraw-Hill, 1933. Chap VI

Fortunately, psychology does not have to answer this question simply because it is interested in other things. It will ask, for example, what types of stimulus-situations can become effective at any moment in exciting significant behavior in the unborn infant. It will also ask what this behavior is and what it signifies for the psychological side of infant development.

A very brief story of development for the first nine months might run as follows.[1] Toward the end of the first month the heart has begun to beat, small buds which are to form the limbs have appeared, and the spinal cord and the eye cup have taken their initial form. Throughout the period, of course, there is a tremendous amount of cell division which continues on through the subsequent months. At about the end of the second month muscle fibers in various parts of the body can be made to contract by electrical stimulation. The growing limb buds and the trunk, as well, have begun to make slow responses, although it is not certain that these responses are the result of the stimulation of sense organs Somewhat the same situation holds throughout the third month, although it may be that stimulation, say of the sole of the foot, will result in movement in the foot. This response may be either the result of direct muscle stimulation or of connections between the sense organs in the skin, on the one hand, and true muscle, on the other. It is almost certain that the cerebrum exercises no control over general bodily activity during these early stages. On or about the fourth month some of the movements made by the growing individual do become directly related to specific sources of stimulation. A good many of the reflexes with which the child will be born begin to take a more precise form during this period. Neither in this nor in the fifth month will direct stimulation of the brain lead to any kind of a response. If, however, some of the lower brain centers are stimulated, certain changes will take place in heart action, chest movements, and in the head and neck muscles.

During the sixth month the reflexes with which the child will be born grow more and more specific in character. Moreover, there is a greatly increased tendency for specific stimuli to result in specific types of movement If, for example, the mouth and the tongue are stimulated, the response will be very much like a true sucking reflex. This general pattern of development continues through the seventh

[1] Most of the literature bearing on this problem has been summarized by Carmichael, L., "Origin and prenatal growth of behavior," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass., Clark Univ Press, 1933

month and all of the organs and structures of the growing individual have taken much the form they will have at the time of birth. It is well known, of course, that infants born at the end of the seventh month have a very good chance of surviving. During the eighth and ninth months a still larger number of reflex movements will have become firmly established. There is as yet, however, a great amount of what may be called mass or generalized movement in response to stimulation. All the way along, these mass movements have been fairly common and it looks very much as though specific reflex movements emerge out of these more generalized responses. It used to be thought that simple reflexes were probably the first types of movement made by a child and that the more mass-like movements were combinations of the simpler reflex movements. It now looks, however, as though development during these early stages proceeds in the other direction [5]

It goes almost without saying that studies of this kind have a direct bearing upon a number of problems which have concerned both psychology and education It is one of the natural properties of muscle tissue to contract. Likewise it is one of the natural properties of nerve tissue to conduct impulses from one place to another. The location of the cerebrum with reference to other parts of the brain makes it possible for this structure to exercise a great amount of control over what is happening at the lower brain centers. When the whole picture of the dynamic events which take place during the early period of growth has been drawn, it will appear, no doubt, that changes will have to be made in our ordinary conception of such terms as "original nature," "maturation," and "learning." The prenatal development of the individual is a kind of development which does not take place independently of stimulation. As we have seen, stimulation is one of the factors which may guide and promote the growth of the individual. In more senses than one, the new-born child is in an environment. Moreover, it is reacting in various ways to this environment. The problem of the genetic psychologist, then, is clear. He must trace behavior patterns, which he has been accustomed to see for the first time at the birth of the child, back into their previous history. It is only in this way that further data can be gained on the perplexing problem of the relation between original nature and learning.

[5] Irwin, O C, "The amount and nature of activities of newborn infants under constant external stimulating conditions during the first ten days of life," *Genet Psychol Monog*, 1930, *8*, 1–92 Also Pratt, K C, "Specificity and generalization of behavior in new-born infants a critique," *Psychol Rev*, 1934, *41*, 265–284.

3. *The Neonate.*—We have already seen that there are two ways in which one may look at the act of birth. On the one hand, one may say that the changes which take place at this time are mostly physiological in character since the infant must quickly begin to breathe for itself, to take its food by way of the mouth rather than by way of placental connections, and so on. On the other hand, it could be argued that the act of birth is much more than a physiological change. If we assume that the new-born infant has the sort of mind of which Freud speaks, then the infant may be described as having lived very comfortably during the foetal period. At birth the child is roughly torn away from this comfort and thrown into a situation where it must finally search for its own food, adjust itself to the objects and events around it, and otherwise adapt its daily life to what has been called reality. As we have seen, this interpretation of the birth of a child implies that the birth act is one of the major experiences of the child.

The significant thing about birth for the psychologist is the fact that the infant is now open to direct experimental study. Heretofore, he has been limited to prematurely delivered infants which can be kept alive for only a short period of time. Now the infant is mature enough in its physiological processes to stand a good chance of survival and to be open to all kinds of examinations. Studies that have been made show clearly enough that the first movements of the new-born infant are direct continuations of its prenatal modes of behavior.[6] There is a great deal of mass movement in response to stimulation; but as learning goes forward, this mass movement is gradually broken down into a large number of more specific types of movement More-over, these specific movements become associated more and more directly with specific kinds of stimulus-situations In general, new-born infants are sensitive to variations in the intensity of light, to the more intense sounds, and principally the more highly pitched sounds, to rough changes in objects which are in contact with the skin or which might excite pain, to various chemicals such as salt, sour and bitter solutions, to fairly large changes in temperature conditions, and so on. The responses which are made to these various objects and situations are more or less specific, such as closing the eyes, moving various parts of the body, or changes in facial expression. It appears that unexpected

[6] Much of the experimental material has been summarized by Pratt, K C., "The neonate," in *Handbook of Child Psychology* (ed C. Murchison), Worcester, Mass., Clark Univ Press, 1933.

or very intense stimuli of different kinds may excite large scale responses having some of the traits of an emotional response It is not possible, however, at this early stage to distinguish kinds of emotions by noting the kind of the response made. Several months must pass before these general bodily responses to unexpected situations take on a total pattern which is specific enough to suggest a specific emotion.[7]

One of the chief characteristics of the neonate stage is, of course, the tremendous rate at which modification of behavior takes place by learning The stimulus-situations to which the child is subjected lead to a very rapid increase in the specificity of movement and to the development of quite a variety of physiological habits such as sleeping habits, eating habits, and habits of elimination.

4 *The Infant*.—The distinction between the neonate or the new-born and the infant is more for the purpose of locating periods of development than for the purpose of saying that the two stages differ fundamentally from one another Growth is a continuous process and it is just a matter of convenience to speak in one place of the new-born child and in another of the processes of growth that may take place during the first two years Neither time nor space will permit a full description of the changes that occur during the first two years and we must, therefore, limit ourselves to one or two typical examples of growth [8]

As we have seen, almost all types of specific movement emerge out of a more general mass movement If an object is placed before a child, the reaching movement will consist not only of movements of the hand and arm but of the whole body as well These movements have been studied with great care, but since changes in them take place so rapidly it has been necessary to use the moving picture camera [9] The development of grasping means two things, first, a gradual dropping out of those movements which are not necessary to the act,—such as leg movements,—and the gradual refinement of the movements that are actually necessary for getting hold of an object. This refinement appears to start with the larger groups of muscles

[7] Sherman, M , and Sherman, I C , *The Process of Human Behavior*, N Y , Norton, 1929, Chap I

[8] Shirley, M M , "Locomotor and visual-manual functions in the first two years," in *Handbook of Child Psychology* (ed C. Murchison), Worcester, Mass , Clark Univ Press, 1933

[9] Halverson, H M , "An experimental study of prehension in infants by means of systematic cinema records," *Genet Psychol Monog* , 1931, *10*, 107–286 Hazard, F W , "Development of an infant in grasping, reaching, and body movements," *Child Develop* , 1931, *2*, 158–160 Halverson, H M , "A further study of grasping," *J Gen Psychol* , 1932, *7*, 34–64.

around the shoulder and the forearm. The course of development proceeds downward to the final types of movement in the wrists, the thumb, and the forefinger. At first the thumb of the hand plays the same functional part as do the fingers, as is the case with the chimpanzee, but gradually the thumb shifts in its position so that it comes to be opposed to the fingers.

For convenience in a study of this phase of development it has been found helpful to describe various stages in the act of grasping. These stages stand in close relation to other phases of development as, for example, the period of fixation upon the object and the relation between these periods of fixation and those directed toward the hand itself. For example, fixation shifts from the object which is being grasped to the hand more often than from the hand to the object. At first, the object is brought directly into the palm of the hand, but later on the thumb and the first finger come to act as a pair of pincers.

Further studies of this same sort have been made upon the development of walking, of speech, and of other special kinds of action. There are, of course, great differences from individual to individual in the rate at which development takes place, but it is almost certain that the order of development will remain the same from child to child. In grasping, for example, one child will not reach a stage which is more advanced for another child before it has gone through the preliminary stages. The two children may, however, go through the various stages at very different rates.

All of these studies have direct bearing upon such vexing problems as the relation between original nature and training, but studies of the so-called higher functions have still more value. We may take, for instance, the origin and development of what we may call emotional types of action. It seems to be fairly clear that this type of action occurs when a stimulus-situation is very intense or when it is more or less unexpected.[10] The movements made by the child are not specific to the situation. As time goes on, however, they become more and more specific. Moreover, they become tied up with an increasing variety of stimulus-situations. Let us say, for example, that a very loud sound is sufficient to excite what may be called an emotional action It appears that the emotional action produced in this case may come to be associated with other relevant

[10] Jones, M C, "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933

features of the total stimulus-situation. If, for example, a furry object is presented simultaneously with the loud sound, the furry object itself may cause an emotional reaction at some later time [11]

It goes almost without saying that this fact is of immense significance to education Throughout adulthood, most persons will show all kinds of emotional reactions to all kinds of situations. It has been supposed that the majority of these must be instinctive. The studies that have been made on the development of the emotions, however, show clearly enough that an emotional reaction to any given stimulus-situation is almost certainly a product of training. It has not been established, of course, that human beings possess absolutely no instinctive tendencies toward fear or anger, but it is one thing to say that human beings have a large number of such instincts and quite another to say that the whole matter is open to experimental study It appears to be true that direct stimulation of certain areas of the body and especially those near the sex organs have a considerable preference over other types of stimulation It has been said that this fact marks the beginning of that whole range of behavior described by the words "love," "affection," "parental instinct," and the like. Even in this case, however, the objects and events to which a particular stimulus-situation pattern may become associated are largely a product of training The inference is plain enough. If society is to exercise any adequate control over emotional types of action and especially those types which lead to social attitudes of various kinds, it must begin its educative processes during the early years.[12]

Of all of the processes of development which can be studied in childhood, those which have to do with the conversion of simple verbal movements into language responses have, perhaps, the greatest value both for psychology and for education [13] Every normal child is born with the equipment which makes language possible. There is, however, nothing about the first verbal action of a child to suggest the future social value of language. At birth and sometimes even before birth sounds are being made. It looks as though these sounds are the mechanical result of the passage of air over the vocal apparatus In any case, the first sounds which an infant makes

[11] Watson, J B , and Rayner, R , "Conditioned emotional reactions," *J Exper Psychol*, 1920, 3, 1–14

[12] Watson, J B , *Psychological Care of Infant and Child*, N Y , Norton, 1928

[13] McCarthy, D , "Language development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass , Clark Univ Press, 1933

are those which might be expected were a person simply to open his mouth and let outgoing and incoming air set the vocal cords into vibration It is not even possible to tell whether the crying of infants is a cry of pain, of anger, of hunger, or of any other bodily condition. Gradually, however, the sounds which the child makes, like its other movements, become more and more individual in character and more specifically related to specific stimuli.

It has not been easy to show how verbal actions of this kind actually come by their social or symbolic value. We may, however, imagine some such situation as the following An object being presented to a small child will excite a reaching movement It may be that the child will also move its vocal apparatus If it should happen that the sound made by the child strikes the fancy of the nurse or the parent, this sound will also be spoken in connection with the object being reached for. The process of learning would inevitably see to it that the sight of the box and the hearing of a spoken word would come to be associated with each other. We do not need to suppose, however, that children must always invent their own words, for adults already have acquired a vast number of words which are substitutes for objects or for their various properties and for various relations to one another If then an object were presented to a child simultaneously with a spoken word, the same sort of association as described above would be established. This fact might be described as the first stage in the development of a language It is marked by the fact that sounds of various kinds can actually be used as substitutes for objects.[14]

If a child were to speak in connection with a given object, it would clearly hear its own language responses. The very responses that the child makes, however, have become the source of stimulation to further response either of a manual or of the verbal sort. At a simpler level we may describe the situation as follows Let us suppose that a white rat is learning to run through a maze In order to find its way from the entrance to the food box a number of turns have to be made The behavior of the white rat is clearly subject to two sources of stimulation On the one hand, there will be the floor over which the subject is running, the walls which define the pathway, slight changes in illumination, sounds of various kinds, and perhaps a variety of odors These sources of stimulation which

[14] Hunter, W S, "The symbolic process," *Psychol Rev*, 1924, *31*, 475–407 *Human Behavior*, Chicago, Univ of Chicago Press, 1928, *passim*

are called exterioceptive stimuli act as a continuous series of guides to the performance. At any given stage in the run through the maze, however, the actual movements which the animal makes become a source of stimulation because of the presence in the muscles and tendons of the animal of sense organs which exercise this function. The making of any single movement might then become an adequate stimulus for the making of the next movement. We do not need to say at this point whether these internal sources of stimulation,—that is, proprioceptive stimuli,—are sufficient in and of themselves to carry the rat through the maze once they have been set going by an initial stimulus-situation, viz, the entrance to the maze. It is possible that proprioceptive and exterioceptive stimuli form an integrated pattern of stimuli, the total effect of which is to lead the rat quickly and directly from one point to another

If now we apply these facts to the development of language, we can see how it is that verbal responses may become substitutes for objects and events, for various aspects of objects and events, or for relations between them. We may also see that these verbal substitutes for objects could become adequate sources of stimulation for the making of other responses, either verbal or manual. That is, given the sight of a box and a response in the form of the word "box," the very saying of the word either explicitly or implicitly might lead to a search for the box. In short, a gradually increasing use of words would mean a gradual transfer of objects and events from the outer world into the action patterns of the individual himself. This process goes so far that two adults may come together in a room which is devoid of almost every source of outer stimulation for the purpose of discussing at length the nature of almost any kind of an object.[15]

In order to see how far the psychologist might actually go in describing the origins of more mature psychological functions, we shall take one more instance, viz., the development of a specific reaction to likenesses among differences. Let us say, for example, that a group of colored and ornamented cards together with a group of fifteen black cards are laid before some small children. The black cards differ from one another in the sense that five of them are smaller than the other ten. The experimenter deals out these cards one by one, asking the child to note which of the cards are called "K" cards. As the cards are dealt out, all of the large black

[15] Cf Curti, M W, *op cit*, Chap VIII.

cards (the "K" cards) are laid to the subject's right and all of the rest to his left. Then the cards are reshuffled and dealt out again, the subjects being asked to name the "K" cards. It is clear that this task depends upon the ability of the subjects to react to those respects in which certain cards are similar to one another amid a large number of differences. There are, for example, colored and ornamented cards of the same size as the "K" cards. Moreover, the "K" cards are the same as other black cards save that they are larger. The child must then distinguish large black cards from all of the others. In this experiment it was shown that even very young children could make the distinction even though they could not tell just how or why the distinction should be drawn. Moreover, it seemed that the recognition of sameness amid differences was a skill that came more or less suddenly to the child.[16]

In this simple experiment we get a suggestion of the way in which the student of child psychology may go about it to examine the origin and development of a large number of the more complex psychological functions It is not necessary, however, to limit one's self to the study of children, for the same kind of experimental method may be used with some of the higher animals. As a matter of fact, it is not impossible to study the most complex operation of all, viz., problem-solving, not only in very young children but in other animals as well. It is clear that it will take just such studies as these to fill out the whole picture of psychological development and hence to lay the proper foundations for that vast enterprise in social engineering known as education.[17]

5. *The Adolescent.*—We have given a larger amount of space to the development of the child than we have to other periods of development because the experimental methods that hold true in this stage continue to be of value throughout the whole period of childhood. Moreover, the tempo of development which has been set for each individual by the time he is five or six years old continues almost unchanged until he has reached the early twenties. This means that progressive changes will take place in all of the various psychological operations of which he is a sum. His responses will become quicker and better coordinated, the total range of his effective environment will continue to increase, there will be an in-

[16] Hazlett, V., "Children's thinking," *Brit J Psychol*, 1930, *20*, 354–361

[17] Cf Koffka, K., *The Growth of the Mind*, N Y, Harcourt Brace, 1924 (trans. by R. M. Ogden)

creasing refinement of his powers of discrimination, he will keep on learning more readily and more avidly, the periods of what are commonly called "voluntary attention" will become longer and more frequent, a much better control will be secured over emotional types of action and over their relation to stimulus-situations, the number and difficulty of problems that can be solved will greatly increase, the primary motives will become more and more diverse from the original tissue needs, and the total character of the individual as a self or personality will become definable either in terms of specific personality traits or in terms of a total integration of all of its functions one with another.[18]

As we have implied; it looks as though curves of growth will show a continuous upward movement until the age of twenty or thereabouts. It has been supposed, however, that normal rates of growth pass through a major change during the period known as adolescence. For a long time adults have believed that growth processes were greatly accelerated at the onset of adolescence and that a totally new variety of psychological function became possible at that time. One of the first serious students of adolescence, for example, has said that this is a period in which the individual is born again. Heretofore, the developing child has been a more or less direct echo of the stages through which the race has passed, but now growth is saltatory rather than gradual. Moreover, adolescence is said to be a period of storm and stress during which old ties are broken and a new and much higher level of psychological function is reached.[19]

Of all of the notable changes which have been alleged to take place during adolescence, only one can be supported by direct evidence. It is true that at some age between twelve and fifteen the sex functions arrive more or less quickly at functional maturity. The exact time for this event varies with the sex, race, type of occupation, and general tempo of the preceding period of growth. The sex functions mature earlier in girls than in boys, earlier in races which live in tropical climates, earlier among Jews than among Gentiles, and earlier among those who work out of doors rather than indoors. It also looks as though the intellectually superior mature earlier than the intellectually inferior. The development of the sex functions means, of course, that every child must learn to occupy a

[18] The student can consult any one of the general child psychologies listed among the General Readings for the details.

[19] Hall, G S, *Adolescence* (2 vols.), N Y, Appleton, 1904, *passim*

different place in the whole social group than it may have occupied heretofore. Since social groups have seen fit to draw a greater number of barriers around the use of the sex functions than around any other normal tissue need, the maturation of these functions could not help but mean a certain shift in social attitude and behavior. It is one thing, however, to take note of shifts of this kind and quite another to suppose that sex maturity means notable changes in the rate of development of other kinds of functions or the sudden acquisition of wholly new forms of function [20]

In view of the imaginative statements which have been made about the period of adolescence, the growth curves of large numbers of children have been studied before, during, and after this period with unusual care It now appears that there are no distinctive changes in any of the fundamental psychological functions immediately before, during, or after the onset of puberty. It is true, of course, that the maturation of the primary sex functions brings with it the maturation of what are commonly known as the secondary sex differences. There are changes in voice, changes in body form, and some changes, perhaps, in coordination which are to be attributed to the fundamental maturation of the organs of response. In the traits that can be measured in such a way as to make proper comparisons with other age levels possible, however, no significant changes have been observed. Studies on the rate of tapping, on strength of grip, and on speed of canceling letters out of printed matter, give developmental curves which rise more or less steadily from the early years through to the early twenties The same thing is true of such studies of the higher psychological functions as have been made.[21]

In view of the discrepancy between experimental facts about growth during adolescence, on the one hand, and general opinion and prejudice concerning a period of storm and stress, on the other hand, some explanation is demanded. It looks now as though most of the emotional and social disturbances which go along with adolescence are a product of the nature of pre-adolescent training. The development of the sex functions means, of course, that certain changes in physical traits will call for a change in the relations between the sexes. If there has been nothing in the previous training

[20] Consult Brooks, F D, *Psychology of Adolescence*, Boston, Houghton Mifflin, 1929, *passim* Also Schwab, S T, and Veeder, B S, *The Adolescent, His Conflicts and Escapes*, N Y, Appleton, 1929

[21] Cf Brooks, F D, *op cit*, Chaps 2 and 3.

of a growing person to warn him of his new social attitudes and obligations, he or she may become as greatly disturbed as will have been the case with any other new or unexpected situation. There is, however, still another aspect of the question, for adults have long taken it for granted that the exercise of the sex functions must have a moral and social value which cannot be attached to other types of tissue need On that account it has not been possible for children to become as intelligent in social situations of a sexual character as they are in other types of situations They have been reminded of the fact that there is something shameful and perhaps unhuman about a very human and normal type of physiological function. This has been particularly true in the education of girls. Without warning, then, and without any preliminary training on substitutional modes of expression, young people in the early teens have suddenly been brought face-to-face with a group of facts which lie beyond their competence.

To describe a situation is not equivalent to a statement of how education should proceed in order that the storm and stress features of adolescence may be avoided Of one thing, however, we may be certain The number of persons who actually pass through all of the violent emotions and imaginary romanticisms of adolescence is relatively small. In other words, a large number of persons have moved just as continuously from their juvenile social world into an adult social group as they have in their strength, their speed of movement, their coordination, their rate of learning, or their ability to solve problems. It looks, then, as though some of the complexities of adolescence were complexities made by inadequate types of education One of the answers made to this fact appears in the modern tendency to give proper sex instruction to children in advance of the actual onset of puberty This instruction concerns, of course, not only the primary functions of sex itself but all of the social attitudes and dispositions which are not in any way related to the differences between the sexes. It is still too early to say what the results of early sex instruction will be. When, however, a problem has been defined, a long step has been made towards its solution. If the psychology of adolescence were to remain at the common-sense level, the extreme maladjustments into which some individuals fall would have to be accepted as the normal result of the dangers that attend any growing process. Neither teachers nor parents have been satisfied with this sort of explanation and the result has

been an intensive examination at the experimental level of the adolescent period [22]

6. *Maturity*.—We have spoken in several places of the fact that applied psychology, like a great many other branches of psychology, takes its start from the psychological functions of the typical or normal adult. In saying this, we have assumed that experimental psychology has studied such an adult and that it has laid out the norm for all of its functions. Curiously enough, however, no such study has been made and it is not easy to say, therefore, just what maturity means. The child certainly differs from the mature individual, and an adult human being certainly differs from an animal. Some of these differences can be described but they must be described in relative rather than absolute terms.

In the absence of rigid definitions of what the term "mature" may mean with respect to the psychological functions, we may suggest the following facts. As we have seen, the growth curves of all of the functions which have been carefully examined begin to run into a plateau shortly after the twentieth year. This plateau may be reached for either one of two reasons. In the first place, one may say that those incentives toward growth which are intrinsic to the individual during his earlier years exhaust themselves just as the dynamic events which bring about cell division cease at a given time. On the other hand, it is possible to say that growth slows up at or near the twentieth year because the individual has reached a certain practical limit in development. He has come to the place where he can use all of his muscles in a way that will satisfy every practical requirement. Likewise, he may have developed his perceptual functions to the same practical level.

However this may be, it does seem possible to say that the mature individual can be described in the following manner. So far as action is concerned, he will have reached a practical limit in reaction time, in motor coordination, in flexibility of movement, and in the development of speech skills. It is not known that such traits as reaction time can be further improved by practice but motor coordination, flexibility, and the development of speech skills may, under special incentive, continue to much higher levels. The same thing holds true of the exercise of the perceptual functions. It may be that a mature individual cannot actually increase his rate of reading or his rate of comprehension very much, but this does not mean

[22] Cf. Gilliland, A. R., *Genetic Psychology*, N. Y., Ronald Press, 1933, Chap. 17

that he shall stop using these functions at whatever level they have attained. He may proceed, therefore, to increase the total range of his effective environment by perceiving more of it and reading more about it.

A mature individual will, perhaps, have trained himself to the point where some given type of subject matter will be a never-ending source of interest to him. With respect to this subject matter and to a great many related materials, as well, he may exercise his voluntary attention not only frequently but for long periods of time. The actual methods which a mature individual may use in learning a new skill or becoming familiar with a new set of facts may be more or less habitualized, but there is no reason to suppose that new periods of learning or new learning situations may not be continued indefinitely. That is, the rate of learning may have become stabilized, but the total amount of possible learning remains unlimited.[23] The same sort of stability would probably have been reached in fundamental types of motivation and in all of the various forms which emotional reactions may take

There is, perhaps, some reason to believe that the concept of the practical limit in development holds more truly of the problem-solving functions of an individual and of that total organization of his functions which goes by the name of self or personality than of any other group of functions. An adult will solve problems only so frequently as he feels the need for doing so. Moreover, he will have just so much of a total character as accidental circumstances have demanded of him. It seems to be clear that if a mature individual were to continue the art of study in the sense that he would keep new books and new scenes constantly flowing around him, and if, with respect to this new material, he were to continue to take what may be called a problem-solving attitude, no limit to growth or development could reasonably be set.

7. *Senescence.*—So many people have grown old that it would seem that the changes which take place at the end of life should long ago have been the subject of more exact study. It turns out, however, that the first truly experimental studies of senescence are a product of the present decade. As in the case of adolescence, so with senescence, there has been a large amount of common-sense information. The most of this is to the effect that old age often

[23] Cf Thorndike, E L, *Human Learning*, N Y, Century, 1931, *Adult Learning*, N Y, Macmillan, 1928

turns into a kind of second childhood during which there is a deterioration of all of the psychological functions.

Among the traits which have actually been studied in the laboratory we may mention visual perception, reaction time and muscular coordination, learning, imagination, comparison and judgment, abstraction, and self.[24] In the case of visual perception it is clear that, after the plateau of acuity has been reached, this function declines steadily and continuously up to the age of sixty and then falls off rapidly from this point onwards. In the case of some of the simpler motor functions, the situation is as follows. There is a small decline in reaction time which makes its first appearance near the half-century mark and which persists into later maturity and old age Certain types of motor coordination, however, show a smaller decline with advancing age than is the case with reaction time Common report has it that learning ability is one of the first psychological functions to slow up in maturity and in old age. This opinion is supported by the experiments that have been made, both on immediate memory and upon rate of learning It appears that immediate memory declines very rapidly, especially when the material to be learned is complex. It has been difficult to invent a test which would be adequate for the study of imagination, but the ones that have been used up to this point seem to show that this function does not show the same kind of decline as appears elsewhere.

The various phases of problem-solving which are named by the words comparison, judgment, combination, and abstraction are known to mature relatively late. The first evidences of decline are found in later maturity but the total decline of old age does not seem to take the individual much lower than the level that had been reached during the adolescent period.

There is, of course, a great deal yet to be done before one may draw any general conclusions concerning the exact differences between the psychological traits of the senescent as compared with the psychological traits of other age levels. There can be no doubt about a decline in some of the fundamental psychological functions and yet it still holds true that a certain kind of stability and a certain perspective over the whole lifetime of experience must have

[24] Miles, W R, "Correlation of reaction and coordination of speed with age in adults," *Amer J Psychol*, 1931, *43*, 377 391, "Measures of certain human abilities throughout the life span," *Proc Nat Acad Sci*, 1931, *17*, 627-633, "Age and human ability," *Psychol. Rev*, 1933, *40*, 99–123

some sort of social value.[25] If there are any such values, they might reasonably be used as compensation for an actual decline in the rate or in the quality of specific psychological functions.

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CHAPTER TWENTY-FIVE

THE NATURE OF INTELLIGENCE

1. *Introduction.*—If we were to write a complete story of age differences we should have to use not only a whole volume but it would be possible to put into the volume a large number of drawings showing variable rates of growth in a great many particular functions. Theoretically, it ought some time to be possible to draw a growth curve for every one of the thousandfold functions of a psychological sort. As a single example, we might take reaction time. When all of the researches are in, science ought to be able to say how reaction time changes with age for all of the major members of the body and even for specific groups of muscles. The same detail might be pictured with reference to degrees of coordination, for all forms of perceptual acuity, for differential rates of learning, for different types of material under a wide variety of conditions, for rates of change in each of the special skills, for quantitative and qualitative differences in the problems that can be solved, for the total number of derived motives, and for all classes of attitudes and dispositions.[1]

When all of this material is on hand, education will be able to say that it has a solid experimental foundation upon which the art of teaching may be based. It has not been necessary, however, to wait for the completion of this experimental program since quicker methods can be used to get a general picture of the child and of its talents at any particular time. At each age level, one may take a more or less general or cross-sectional picture of the way in which the child is getting along in its environment, much as a geologist might sample the outer rind of the earth at various places and thus get a general picture not only of superficial, but of underlying, conformations.

There are now two ways in which these general pictures of the rate of development can be secured. On the one hand, there is the concept of the self or of the personality which, as we have seen, is

[1] This is the task that is set before genetic or developmental psychology See, for example, Goodenough, F L, *Developmental Psychology*, N Y, Century, 1934

used to describe either the general pattern of organization of the stream of behavior at some particular time or the nature and character of specific personality traits.[2] There is, on the other hand, a concept of more recent origin which is usually described by the word "intelligence." Psychology and education have long spoken of the intellect as a prominent feature of human nature but the intellect, on the one hand, and intelligence or the intelligence quotient, on the other, represent slightly different views of human nature. From the older point of view, intellect was a special property or trait of the mind, and especially its faculty for rational thought. The modern concept of intelligence is a more general concept than this. It represents, so to speak, an appraisal made of one person by another rather than a special faculty which a person is alleged to possess. In other words, intelligence is not a thing or a force which men have, but a certain level of functional excellence which they display when they are actually put into a wide variety of stimulus-situations. It is easy to see that small children do not adjust themselves to their environments quite so competently as adults do, and this difference may be described as a difference in intelligence.[3]

It would not be worth while, either to psychology or to education, however, to stop at rough estimates of this sort. The educator has proposed, therefore, to standardize and specify some of the conditions under which actions that are characterized as more or less intelligent shall be produced. In direct proportion as such situations can be manufactured and the reactions to them measured, values will be gained which are said to represent the mental age of a person. These standard situations make up what is called an intelligence test. The performance of the child is measured by suitable scores. These scores may be brought into proper relation with the chronological age of the subject whereupon an intelligence quotient is derived. It will not be possible, however, to sense the significance of this procedure until we examine more closely the concept of intelligence itself. This is the task of the next section.

2. *What Is Intelligence?*—The word intelligence has been used as an equivalent for almost every one of the psychological functions of a person. We may run over a few of these usages in order to see how variable the concept has been. In the first place, there are those who would say that intelligence can be defined in terms of the character

[2] Review the discussion of the development of social traits in Chapter Eight.
[3] Cf. Freeman, F. N., *Mental Tests*, Boston, Houghton Mifflin, 1926, Chap XVIII.

and quality of motor skill. The phrase "mechanical intelligence" is only one example of this tendency.[4] Thus phrase says that human beings differ greatly in their capacity to handle mechanical situations successfully. It is not necessary, however, to limit the term to the manipulation of pieces of apparatus, for the various organs and structures of the body may be used more or less cleverly in adjusting a person to a great many other situations. The athlete, for example, is sometimes said to use his various skills in an intelligent way on the athletic field.[5] Moreover, the doctrine of evolution has laid emphasis upon the survival value of certain kinds of motor adjustments, and it might be inferred, therefore, that where survival value is increased, behavior must display some of the qualities of intelligence.[6]

In the second place, intelligence has often been applied to excellence in the use of the perceptual apparatus.[7] Common language has it that any person who has had a wide range of experience,—that is, who has read freely and traveled widely,—must be more intelligent than less experienced persons There have even been times when the growth of intelligence was thought to depend upon increased skill in the use of the perceptual apparatus. Some of the earliest tests of intelligence were based upon various kinds of perceptual discrimination such as noting the difference between very small varieties in weights, accuracy in the judgment of color, and so on.

In the third place, intelligence has often stood in close relation to the phenomena of attention.[8] It has been said, for example, that persons who have the power of sustaining their attention to a situation over long periods of time are, on that account, more intelligent than persons whose attention is sporadic or fluctuating. Sustained attention stands, as we have seen, in close relation to the development of interests Any person, then, who has a wide range of interests and who can let his behavior remain, for considerable periods of time, under the direction of some dominant interest, must on that account be highly intelligent Since interests of this sort border closely upon the persistence of secondary or derived motives, it might even be said that a wide range of persistent motives or incentives would likewise betray differences in intelligence.

[4] Cf Dashiell, J F, *Fundamentals of Objective Psychology*, Boston, Houghton Mifflin, 1928, pp 318–319

[5] Cf McCloy, C H, *The Measurement of Athletic Power*, N Y, Barnes, 1932

[6] Pintner, R, "An empirical view of intelligence," *J Educ Psychol*, 1926, *17*, 608–616.

[7] This tendency dates from Cattell, J McK, "Mental tests and measurements," *Mind*, 1890, *15*, 373–380

[8] Binet, A, "Attention et adaptation," *L'Année psychol*, 1899, *6*, 248–404

In the fourth place, intelligence has sometimes been used synonymously with learning ability.[9] It is clear, of course, that the average person might well be expected to adjust himself more or less cleverly to the objects and events around him in direct proportion as he has acquired a large number of skills and a fairly rich supply of information. In other words, it would be possible to say that a person is intelligent in so far as he has learned how or can learn how to adjust himself to his environment We ought not to say, then, that intelligence can be identified with learning On the contrary, learning is a specialized kind of growth which might lead to a larger number of intelligent modes of action.

In the fifth place, intelligence is said to be equivalent to problem-solving, thinking, or reasoning As we have seen, this notion comes very close to the classical doctrine of intelligence. To use the word in this way implies, first, that intelligence should be limited to those functions which are intellectual in character or, second, that it should not include those functions which are emotional and personal. As a matter of fact, some educators have gone so far as to say that the word intelligence should not have anything to do with emotion, mood, motivation, or character traits [10]

3. *The Measurement of Intelligence* —Up to this point we have considered some of the ways in which various types of educational psychology have defined intelligence. We shall not be able either to criticize or to put a proper value upon these definitions until we see whether the tests that are made of intelligence can actually lend themselves to these various modes of interpretation. So far as measurement is concerned, one thing appears certain A mental test or an intelligence test is not a way of putting a unique kind of substance on a pair of balances as the physicist or the chemist might do Neither is it a way of taking a sample of some substance in order that it may be treated in a test tube. In short, no one of the definitions of intelligence cited above implies for a moment that intelligence is a stuff or an object that can be handled as the physicist and the chemist handle their materials. On the contrary, mental tests are tests of performances. They are measures of the way in which persons react to the various situations that are presented to them.

We may now ask what these situations are, how they stand related

[9] Woodrow, H., "Intelligence and its measurement a symposium" *J Educ Psychol*, 1921, *12*, pp 207 ff

[10] Edwards, A S, "Intelligence as the capacity for variability or versatility of response," *Psychol Rev*, 1928, *35*, 198–210

to all other situations, and how the reactions to them differ from the reactions that the subject might make in a truly psychological experiment. The man on the street might suppose that an intelligence test must be manufactured out of situations and of responses which differ from other stimulus-response patterns in the sense that they have, so to speak, the word "intelligent" written across them. This is certainly not the case. On the contrary, the problem stands somewhat as follows. Let us say that we have as our subject a three-year-old child. Theoretically, it might be possible, within a week or ten days, providing the child could hold out that long, to lay before him every situation which the average or typical human being is ever called upon to meet. In other words, we could present to him all of the objects and events which are more or less familiar in the environments of adults, with all of the words which an adult normally uses in his conversation and in his writing, and with all of the poems, essays, formulae, general principles, and other materials that are learned by heart. It is clear that a three-year-old child would be able to respond effectively,—that is, in an adult way,—only to a very small number of all of these items. It would be able to point to its nose, or to its eyes when asked to do so, it would be able to count a few pennies placed in a row, it might be able to tell time on the clock, and it would be able to tell the meaning of a few words. With respect, then, to the adult, it would be untrained or undeveloped. A six-year-old child, on the contrary, would be able to meet a good many more of these situations rather effectively, although not so effectively nor over so wide a range as is the case with the adult.

This would, perhaps, be the ideal way to test the intelligence of a child. That is, before a tester could be absolutely accurate in his measurements, it would be necessary to possess a list of all of the situations which a normal adult can meet in an adult way. It would be necessary, too, that a child, at any given age level, will have been required to meet all of these situations and will have tried to respond to them. If there were 10,000 such situations and a three-year-old child were able to respond to only 100 of them, the relation between the child and the adult could be pretty accurately established. It is clear, however, that a complete survey of this type would take an enormous amount of time. In saying this, we assume that it is not only theoretically but practically possible to frame a set of stimulus-situations commensurate with the possibility for achievement of an adult. In view of the impossibility of framing such a set and in view of the

tremendous amount of time it would take to make an appraisal of each child, the psychologist has used another method.

The actual process of creating an intelligence test runs somewhat as follows. In the first place, either of two assumptions must be made. On the one hand, we may assume that the environment of a group of children is constant enough so that growth or development will take place at about the same speed in each of the members in the group. Where there are differences in rate of growth, they must be attributed to differences in hereditary quality rather than to differences in the functional value of the environment for promoting growth. At any given age level, therefore, the various psychological traits of a number of children will have reached a given point on a growth curve. Now it happens that there are certain fundamental things which all normal children ought, under normal or average conditions, to learn. They will, for example, learn how to use their perceptual apparatus in noting the details of a picture or of some other object. They will learn how to count, they will learn that they have a pair of eyes, a right and a left side, and so on. They will learn the meanings of certain words. In addition to these common denominators of the growth pattern, there will be variable amounts of differential factors. Let us say, then, that instead of appraising every dimension of learning, the experimenter selects typical stimulus-response patterns from among the common denominators of experience. If we may assume that all children have had an equal chance to become acquainted with these common denominators and if we may assume that they differ from one another in hereditary ability, then some of the children will have learned more of the common denominators at any single age than others have. In any test made up of typical samples from the common denominators of experience, some children will get higher scores than others. On the face of it, such children might be called more intelligent than the others.

The creator of a mental test, however, is not yet out of the woods when he reaches this point. The results that he gets cannot be surely interpreted until he knows how many of these common denominators a typical or average child is actually able to meet effectively at any given age. Since he cannot say beforehand how many accurate responses to various situations ought to be made at any given age, this fact has to be determined by the results which come from the initial forms of a test. Let us say that, out of the hundred items which might be met effectively by a three-year-old, the experimenter has

chosen five as the nucleus of his test situation. Let us say, also, that all three-year-old children handle these five situations effectively, that is, as the experimenter thinks they should be handled. It would not be possible, however, to say that these five children are exceptionally intelligent On the contrary, the tester can only say that the situations he has chosen are too simple or too easy. He proceeds, therefore, to make them harder. He will finally gain a nucleus of test material which gives the following results If the test material is given to a large number of subjects and if the performances of these subjects fall into what is called a normal probability curve, then the tester can say that his test material is diagnostic in its effect This means that the test material contains some items which every child at a given age can react to, other items which a part of the children cannot react to, and a few items which only a very small number of subjects can react to

In order to illustrate this fact, we may take one of the most common intelligence tests, viz, the Stanford revision of the original Binet-Simon test [11] At three years of age, a subject ought to be able to point to its nose, to its eyes, and to its mouth, repeat after the tester two digits, enumerate a certain number of objects in a picture, give his family name, and repeat a sentence of six syllables If all two-year-old children could earn a perfect score on these performances, it is clear that they would not be a measure of the intelligence of three-year-olds. It has been arranged, however, that the average child can get a perfect score on these performances whereas the retarded child does only part of them. The superior child, on the contrary, can do not only these but some of the performances required of a four-year-old, and perhaps of a five-year-old, as well. In short, then, the nucleus of tests presented at any given age is made up of those tests which, as a result of actual statistical comparisons, are just typical or normal for a given age level If the average three-year-old can pass all of the tests for the three-year-old level, then he has an I.Q. of 100. If, on the contrary, the three-year-old can pass all of his own age level tests and some of the tests for the four-year-old and five-year-old age levels as well, then his I.Q. runs over 100 On the contrary, if he cannot pass all of the tests for his own age level or if he misses a test of still simpler character, his I Q. would fall below 100 In short, the I Q is the ratio between the score on the intelligence test and chronological age.[12]

[11] Cf Terman, L M, *The Measurement of Intelligence*, Boston, Houghton Mifflin, 1916.
[12] *Ibid*, p 79

In order to illustrate the procedure of the mental tester in still another way, let us suppose that a super-eugenicist were given the power to eliminate from society all persons who had an I.Q of 80 or less. At first sight, one might think that this heroic measure would immediately increase the level of intelligence of the whole group. It is clear, however, that current concepts of intelligence and of the intelligence quotient would immediately lose their meaning, for the I.Q. is a statistical matter and not an objective description of inherent power. The educator would find it necessary forthwith to revise all of his tests by increasing them in difficulty so that he would reach once again that more or less stable equilibrium between difficulty in performance and age level. If the new tests were standardized and made fully reliable, there would still be differences in intelligence just as variable as are the differences at the present time. In short, then, the concept of intelligence is a concept which arises out of the fact that, given a nucleus of test situations which are fairly representative of all of the situations which might be effectively met at any given age level, a rating scheme can be devised which will show how one person compares in performance with a whole group of similarly trained persons. In other words, it is not conceivable that the intelligence of a single isolated person could ever be measured This means that the concept of intelligence is a product of statistics. The score which any single child earns depends for its meaning upon a normal probability curve which pictures the performance of a very large number of subjects.

4. *The Growth of Intelligence.*—We shall not be able to say what the phrase, "the growth of intelligence," means, unless we sense clearly the assumption upon which measurements of intelligence rest. It was stated at the beginning of the last section that one of these assumptions runs as follows. There are presumably two factors which enter into growth. These two factors are heredity and environment. The predictive value of intelligence tests is based upon the assumption that the learning situations which are used to guide and to promote the growth of a large number of subjects living at the same general socio-economic level are reasonably constant. This assumption refers not only to all specific types of formal education but to the general educative value of informal training as well. In other words, it has to be assumed that the phrase "socio-economic level" or the phrase "cultural background" means that every child grows in the same way that other children grow. When these assumptions are made, then it can be asserted that differences in I.Q. must reveal differences

in native ability. In other words, the educator can say that he has measured the hereditary factor in intelligence.

There are certain aspects of the measurement of intelligence which support this conclusion. There is, first, a fact known as the constancy of the I Q. [13] It can be shown, for example, that a child who earns, at the age of three, an I.Q. of 125 will be able to earn approximately the same I Q at any subsequent age level. That is, if a given child is tested every year from his third to his twelfth year, the chances are that his I Q. will not vary by more than ten or twelve points in either direction from this average. The constancy of the I.Q. means, then, that all children tend to remain at their particular place on the normal probability curve. In the second place, it has been shown that children who differ from one another in any particular trait at one age level do not tend to become more or less like one another even though some of them are given special types of practice.[14] Let us say, for example, that one-half of a whole group of subjects are given special training on some phase at the beginning of the experiment. Within limits, however, no amount of training will diminish the size of these individual differences. This fact, then, seems to support the contention that tests of intelligence and other types of achievement test really measure a hereditary or innate factor.

The most convincing evidence in this direction comes from the study of identical twins, that is, twins which have developed out of the same ovum [15] Such twins may be compared with fraternal twins, that is, twins which have developed from two ova but which are born at the same time, and with siblings, that is, ordinary brothers and sisters All of the tests that have been used so far show clearly enough that identical twins are much more nearly alike in various psychological traits (and in physical traits, as well) than are fraternal twins, and that fraternal twins are very much more alike than siblings. Siblings, in turn, are very much more alike than first cousins. Since these similarities stand in such a close relationship to degree of blood relationship, it has seemed fair to say that they are a reflection of heredity.

[13] There is a large literature on this topic See Kuhlman, F, "The results of repeated mental examination of 639 feebleminded children over a period of ten years," *J Appl Psychol*, 1921, *5*, 195–224 Gray, P L, and Marsden, R E, "The constancy of the intelligence quotient final results," *Brit J Psychol*, 1926, *17*, 20–26 Wellman, B L, "Some new bases of interpretation of the I Q," *J Genet Psychol*, 1932, *41*, 116–126

[14] Gates, A I, "The nature and limits of improvement due to training," *27th Yearbook, Nat Soc for the Study of Educ*, 1928, Part I, pp 441–460

[15] Gesell, A, "The developmental psychology of twins," in the *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ. Press, 1931, pp 158–203 (1st ed).

The reader must remember, however, that all of these facts rest upon a broad assumption, viz., that in spite of special training, the total impact of the environment is more or less stable or constant. In order to get the full implications of this statement, let us assume for a moment that the environment is not stable. It would then follow that differences in tests of intelligence could be attributed just as easily to differences in the environment as to differences in heredity. As a matter of fact, in view of the great plasticity of the human infancy it might even be argued that differences in intelligence are due altogether to environmental factors.

It becomes necessary at this point to examine a little more closely what can be meant by the statement that an environment may be stable or that it may be differential and highly specific in its effect on growth. When we say that two children are brought up in the same environment, we may mean that the objects and events which make up this environment are fairly constant.[16] Twins, for example, live in the same environment in the sense that each has the same mother and father, each sleeps in a room where the same objects are present, each is clothed with the identical clothing, fed the same food, spoken to in the same way, and played with at the same time. It must be clear, however, that an identity of this sort may have no significance at all so far as the growth of the twins is concerned. Sameness in environment is not sameness in object and event but sameness in what we may call the functional value of these objects and events. That is, a ball and a doll are not similar as objects but they may have a similar functional value for a child so far as the development of accuracy in throwing is concerned. Both objects may be thrown. In other ways, too, both objects may have the same meaning. In short, then, before any assumption is made about identical environments it is necessary that the psychologist and the educator go as far in the study of environments as they have gone in the study of response or action. It seems fair to say that practically nothing is known at the present time of the functional value of different kinds of environmental situations for promoting growth.[17]

Further light may be thrown upon the importance of this kind of study by taking note of the following circumstances. The functional

[16] This whole problem has been admirably surveyed by Schwesinger, G C, *Heredity and Environment*, N Y, Macmillan, 1933.

[17] There is, however, a beginning See Lewin, K, "Environmental forces," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933, Chap. XIV (2nd ed).

value, that is, the growth-promoting value of an environmental situation may be less significantly dependent upon the actual presence or absence of certain kinds of objects or events than upon the order in which such objects or events are presented. The growth pattern of any child describes a genetic sequence of events. This genetic sequence can almost be described as a chance result of the environment as it actually stands. Some objects may become effective in promoting the growth of one person because other objects have already been effective. These same objects might be useless in promoting the growth of another child simply because they have not been preceded by reactions to other objects

There are, at the present time, only faint suggestions as to what the effects of intelligent changes in the environment may be. In one study, for example, it has been shown that the I Q 's of a group of children brought up in a nursery school were improved by as much as twenty-five points [18] Since these children were compared with children from similar socio-economic and cultural conditions,—the only differentiating factor being the nursery school environment itself,—it has seemed fair to say that the change in I Q rating was a product of environmental factors rather than of hereditary factors Clearly, it is highly important that psychology and education should go a long way in the examination of this whole group of problems. At the present time, there is a strong tendency on the part of some educators to dismiss the whole matter by asserting that intelligence scores stand as a direct measure of an innate or hereditary factor.

As a practical matter, semi-accurate measures of differences in I.Q. become of importance to the educator, for they enable him to put children into different groups so far as teaching methods are concerned This could be done irrespective of whether intelligence scores were dependent upon heredity or upon environment. From a theoretical point of view, however, the situation is wholly different. If intelligence is a product of heredity and if I.Q 's tend to remain relatively constant irrespective of the type of training, education must content itself with a doctrine of determinism which will forever define the limits within which it may be effective. On the other hand, if I Q 's are in any way a reflection of stability in the environment, it ought to be possible experimentally to modify this stability to the advantage

[18] Cf Wellman, B L , *op cit*

of the individual and, consequently, to the advantage of the social group as a whole [19]

5. *General Intelligence*—There is one aspect of this whole problem which has not been mentioned. Learning is a type of growth which normally leads to specific responses to specific stimulus-situations. In general, we believe that the greater the amount of practice the more fixed a response will become. It might be supposed, therefore, that intelligence is a sort of cross-section or average value which has been struck across a very large number of specific abilities This belief, however, would stand in direct contrast with the older view that the mind is characterized by a general ability which can express itself in a wide variety of specific actions. We are led to ask, therefore, which of these two points of view is correct, for there are those who still insist that intelligence is general in its operation, whereas others insist that, in the place of general intelligence, we must think of a great variety of special intelligences

One of the first arguments in favor of the doctrine of special intelligences, that is, in favor of the multiple-factor theory of intelligence, is drawn from a whole series of studies which seem to show that excellence in one particular type of achievement cannot be transferred to any great extent to other types of achievement. The doctrine of formal discipline had it that the exercise of the mind would do for the mind what the exercise of the body does for strength and endurance. Given endurance as a result of long-distance running, an athlete can expect to use his endurance in boxing as well. Given a rapid rate of learning in a motor skill, however, and one cannot expect to learn a bit of poetry any more rapidly.[20]

We shall consider this problem of the transfer of training in a later chapter In the meantime, it may be pointed out that the multiple-factor theory of intelligence goes back of the problem of the transfer of training to a general assumption about the nature of human nature. This assumption runs as follows. Every human performance can be described as a situation and a response which are held together by definite and fairly localized connections in the nervous system This assumption has been asserted not only with respect to specific perceptual-motor types of action but with respect to the more complex

[19] Bagley, W C., "Educational determinism, or democracy and the I Q," *School and Soc*, 1022, *15*, pp 373 ff See also Dearborn, W F, *Intelligence Tests*, Boston, Houghton Mifflin, 1928, Chap IX

[20] Much of the literature in this field has been commented upon critically by Orata, P, *The Theory of Identical Elements*, Columbus, Ohio, Ohio State Univ Press, 1928

types of psychological function as well. That is, the higher forms of psychological function are asserted to differ from the lower forms only in the sense that a great many more connections between stimulus and response are demanded. It is clear that only one inference may be drawn from this assumption, viz., that intelligence is a sort of average struck across a great many specific stimulus-response patterns.[21]

A second theory of intelligence has come to be known as the two-factor theory.[22] This theory has arisen out of a mathematical treatment of coefficients of correlation between different psychological functions. Let us suppose, for example, that a person has been tested for excellence in four different tests, viz , an opposites test, a discrimination test, a completion test, and a cancellation test. It turns out that the correlation between the opposites test and the completion test multiplied by the correlation between the discrimination test and the cancellation test minus the correlation between the opposites test and the cancellation test multiplied by the correlation between the discrimination test and the completion test will approximate zero. Because of statistical considerations which are somewhat out of place here, this fact has been interpreted to say that degrees of excellence in these four tests depend, in part, upon a general factor which may be called "g" and upon specific factors which may be called "s" factors. The "g" factor is a factor which is common to all kinds of achievement, whereas the "s" factors are factors that are specific to each kind of achievement. It has been said that the "g" factor must owe its existence to a general fund of nervous energy which may become operative in any kind of psychological function. In other words, the "g" factor would be the hereditary component of intelligence, whereas the "s" factors might be, in part, at least, the environmental components. It is not possible, at the present time, to make a choice between the multiple-factor theory and the two-factor theory, for not all of the facts are in.[23] There is a general tendency, however, on the part of educators to lean toward the two-factor theory. Since we have said that both of these theories are tied up with the problem of the transfer of training, we shall leave further discussion of them to the next chapter.

[21] For a popular discussion, see Thorndike, E L , "Intelligence and its uses," *Harper's Mag* , 1920, *140*, pp 227 ff Also Thorndike, E. L., *The Measurement of Intelligence*, N. Y., Columbia Univ. Press, 1927

[22] Spearman, C , *The Nature of Intelligence and the Principles of Cognition*, N. Y., Macmillan, 1927; *The Abilities of Man*, N Y , Macmillan, 1927

[23] It begins to look as though further changes must be made in these theories of intelligence. See, for example, Thurstone, L L , "The vectors of mind," *Psychol. Rev* , 1934, *41*, 1–32.

There is one further phase of intelligence which has brought forth a fairly large literature. This phase is marked by the contrasts and comparisons that may be drawn between such words as speed, power, and altitude. The first means simply that a part of the excellence which may be secured by a student on an intelligence test must be due to the speed at which he works.[24] Power is variously defined, but probably refers to the quality of the creative effort displayed or to the excellence or poorness with which one may work at any given task. At the present time, the evidence is a little confusing, but it looks as though there are certain tests in which power rather than speed is measured.[25] The reader will see at once that this problem is closely related to the more general problem of the relation between speed and accuracy. We shall, accordingly, return to it in Chapter Thirty.[26]

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[24] McLeod, L S , The interrelations of speed, accuracy and difficulty," *J Exper Psychol* , 1920, *12*, 431–443 Peak, H , and Boring, E G , "The factor of speed in intelligence," *J Exper Psychol* , 1926, *9*, 71–94 Farnsworth, P R , Seashore, R H , and Tinker, M A , "Speed in simple serial action as related to performance in certain 'intelligence' tests," *J Genet Psychol* , 1927, *34*, 537–551

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[26] Chapman, J C , "Persistence, success, and speed in a mental task," *Ped Sem* , 1924, *31*, 276–284 Garrett, H E , "A study of the relation of speed to accuracy," *Arch Psychol* , 1922, *8* (No 56) Henmon, V A C , "The relation of the time of a judgment to its accuracy," *Psychol Rev* , 1911, *18*, 186–201 Hunsicker, L M , "A study of the relationship between rate and ability," *Teachers College Contrib to Educ* , 1925 (No. 185). King, I., "A comparison of fast and slow readers," *School and Soc* , 1916, *4*, 830–834.

CHAPTER TWENTY-SIX

THE PSYCHOLOGY OF TEACHING

1. *Introduction.*—If the reader has caught the main argument behind the facts described in Chapter Twenty-Four, he will know that human growth or development is a very complex process which leads not only to the gradual maturation of some traits and functions but to the continuous appearance of new and unexpected functions as well. If we had not seen children grow older so many times, the chances are that our first sight of the process would fill us with amazement since there is certainly nothing about a new-born infant to suggest what it is to become.

The growth pattern which any child follows is dependent, in part, upon growth factors which are innate to it and, in part, upon the promoting and guiding influence of its environment. It hardly need be said that no child can grow up without an environment, and yet it is often implied that this must be the case because children who do not have the benefit of what we would call our general social context or the benefit of special parental or schoolroom teaching are said to be untrained or untutored. They are, of course, untrained only with respect to some previously defined concept of training. The very fact that they are in an environment means that this environment has had its effect upon them or that they are a product of their surroundings.

Everyone would agree that different levels of training can be reached and that these levels must depend, in part, upon the promoting and guiding influence of the environment. If the environment includes parents who are specifically interested in the development of their children, or of teachers whose special business it is to promote and guide individual growth, a level of training may be reached which we all would call a higher level. In order to illustrate this fact, we may take one of the famous cases of alleged lack of training. In 1799 a child was found in one of the French forests who had, apparently, never been in contact with a formal school system nor even with the normal social environment that surrounds the average child. This homeless waif had wandered aimlessly about in the forest for a number of years, getting such food as it could in its wanderings and sleep-

ing as an animal. Although it had a human form, it was dirty, scarred, unable to use any language save grunts and gestures, mindless of the character of its food, and shy of other human beings. It happened that a young student by the name of Itard saw this child and came to the conclusion that its condition was a result of the nature of its environment rather than of some incurable psychological ailment. Itard prepared, therefore, to bring the boy into contact with a normal human environment and to see what could be done for him through the specific use of educational processes. Although the lad did not learn how to speak, he did, nevertheless, acquire some of the other traits and skills which are said to be the product of direct training.[1]

This case is of interest to education, partly, because it shows that no child can escape from its context and, partly, because it shows that the total context of any growing person may become focalized in a single person who is called a teacher A teacher is, of course, a part of the environment of a child, but it becomes of great interest to know just how and when this part may be used most effectively for promoting and guiding the growth of a child. In other words, what kind of a person does it take to make a teacher and what kind of functions may properly be ascribed to such a person? These are some of the questions that must be commented upon in this chapter.

2. *The Functions of the Teacher.*—As we have implied above, it used to be thought that a teacher, either in the form of the person who stands behind the desk in the schoolroom or in the form of a parent or friend, must be the center of the educative process. It was felt either that all training of every sort must be dependent upon the presence of a person who could dispense learning or that the child must make all of its contacts with its entire environment through this person. The phrase "the art of teaching" had meaning, then, only in so far as the functions of the teacher himself were concerned. Now, however, there has been a marked shift in emphasis in the teacher-pupil relationship This shift is revealed by such phrases as the "child-centered school" [2] Whereas formerly the child looked and heard, now he is invited to act. In other words, every learning situation is bipolar in the sense that the teacher stands in more or less opposition to the student.

It is clear, from these two types of emphasis, that one may take various points of view toward the functions of a teacher. As we have

[1] Humphrey G., and Humphrey, M., *Itard's Wild Boy of Aveyron*, N Y., Century, 1932.
[2] Rugg, H O., and Shumaker, A., *The Child-Centered School*, N Y., World Book Co., 1928.

said, there lies at the one extreme the notion that the child must make all of its contacts with its environment through the person at the head of the class. This means that the teacher renders the following services. He must know that kind of material which is called content. That is, he must know the kind of fact which the child ought to know. In his daily experiences, a child can easily pick up a great many bits of information which will not be particularly useful to him. It would be the function of the teacher, therefore, to correct this information, supplant it, and otherwise add to it. The child, in its turn, would be the recipient of the information made known by the teacher. Moreover, it would be necessary for the child to become master of this information in the sense that it would drill itself to the point where it might be equally competent with the teacher.

At the other extreme, we may think of a teacher who stands behind the scenes, so to speak, only for the purpose of manipulating the learning situations to which the child is to respond. If this were the primary function of the teacher, it would not be necessary that he occupy a focal point in the teaching process but only that he be able, with the aid of a classroom, a textbook or manual, and of suitable apparatus, to stimulate the learner into those activities which might be thought to be most useful in promoting its growth. In this extreme form, it would not even be necessary for the teacher himself to be the source of any content. On the contrary, content would be a by-product of the activities in which the child is asked to engage.[3]

There are, of course, several types of teaching function which stand between these two extremes. For example, a teacher can be thought of as a person who provides a certain amount of content which must be learned but who also furnishes this content in such a way as to bring about a suitable amount of spontaneous activity in the child. In addition to this function and looking a little more toward the other extreme, the teacher might seek to motivate the conduct of the growing child so that more of the teaching processes would center in the child itself. That is, the teacher would not be solely a drillmaster demanding continuous practice in certain learning functions, but a stimulating agent behind the interests of the child.[4]

Another way to look at the functions of the teacher comes out of the following question, viz., what should be the primary results of teaching

[3] Demiashkevich, M J, *The Activity School*, N Y, Seiler, 1926

[4] Courtis, S. A, "The measurement of the effect of teaching," *School and Soc*, 1928, *28*, pp 53 ff.

situation by using extreme methods for developing motivation. Serious types of academic work, for example, have been presented to students in the form of games and competitive exercises These efforts simply bear witness to the fact that special attempts must be made to motivate rote learning. If teachers could escape from the assumption that rote learning is a major type of learning, it would still be possible to use it where its use is wise, but it seems to be clear that the effectiveness of such learning increases in direct proportion as motivation increases.

It has been easy to use drill procedures in a casual way, perhaps, because education has assumed the characteristics of mass production. When there is a more or less direct and intimate contact between teacher and student, special teaching procedures can easily be devised; but whenever a single teacher is required to handle scores or even hundreds of students, it has been easy to assign learning tasks which can be carried out by the whole group. One of the special dangers of this phase of drill procedures arises out of the fact that one may easily assign a given amount of time to any particular learning task. The reader already knows, however, that students differ widely from one another in their rate of learning Mass education, therefore, has always included some persons who are invited to spend much time in overlearning the assigned material, while other persons barely learn it or let it pass unstudied Overlearning, in and of itself, is an advantage, but the general question raised here is the question as to how fast the teaching process should be geared If it is geared to the learning rate of the better students, there will be high mortality, on the contrary, if it is geared to the slower students, there will be an enormous amount of waste time and an equal wastage of personal and social resources

It is to be noted further that where drill procedures are used they should follow some of the general principles laid down in Chapter Six. Experiments say clearly enough that rote learning proceeds most effectively when the learning periods are properly distributed. Moreover, learning is aided in direct proportion as the material to be learned is made meaningful. A schoolroom frequently provides situations in which the teachers will say that the students need not bother about the question of understanding the assignment, the inference being that comprehension can wait upon witless learning. This is the case, for example, in learning vocabularies where words are taken out of their normal sentence contexts. We may infer, then, that some teach-

ing methods will actually hinder rather than promote skill in the effective use of information.

A second teaching method which possesses some features in common with the drill method may be called the method of recitation.[11] In general, this method assumes that a lesson has been assigned. Let us say that the lesson consists of a chapter in a book of this kind or of a chapter in some one of the outside readings. At the next meeting of the class, the students are asked to recite, that is, repeat, describe, or comment upon the material that has been read. This method of teaching has been seriously criticized, not because it is based upon wrong psychological procedures but because it is easily misused. The psychological basis for it arises out of the fact that learning is essentially doing. The mere act of reading is, of course, a kind of doing, for the eyes have to move during the act of reading, but it has long been recognized that active periods of recitation may notably increase the value of the assignment method.

The more common criticisms that have been passed on the recitation method run somewhat as follows. Where special assignments are made, students are apt to study in isolation and, moreover, the recitation in the classroom is an individual effort. It is easy, therefore, to lose some of the advantages that come from group study and from a more informal type of class discussion. If the teacher limits himself simply to a recitation, it is clear that the student becomes responsible for not more than he has a chance to read. Correction for this difficulty can easily be made if the teacher is alive enough to ask leading questions or to throw the student into a more critical or argumentative frame of mind. It has been pointed out, also, that simplified recitation procedures fail to develop a proper degree of contact between the pupil and the teacher. The teacher is apt to play the rôle of an interrogator and the pupil the rôle of a more or less witless responder. This means, of course, that the pupil loses a great many opportunities for the development of initiative, originality, judgment, and other types of function not directly related to passive reading or to rote memory. It is a commonly recognized fact that, while one student is reciting, the remainder of the class may be inattentive.

One mode of escape from some of the bad features of the foregoing methods of teaching has been found in what are often called problem

[11] Thayer, V. T., *The Passing of the Recitation*, N. Y., Heath, 1928. See also Bagley, W. C., "The textbook in American education," *School and Soc.*, 1931, *33*, 356–360.

and project methods of teaching.[12] It can be argued that drill procedures and even recitations may be more or less completely divorced from actual situations. Moreover, where there is too much emphasis on rote learning, there is apt to be not only decreased emphasis upon problem-solving, but actual interference with the development of the problem-solving functions. This fact holds true because rote learning must lead to increased fixity of response rather than to versatility and flexibility in action. The problem method of teaching, therefore, means the setting up of a learning situation in the form of a special problem, perhaps in the form in which it appeared to the person who first solved the problem. In the teaching of geometry, for example, the famous Pythagorean theorum might be presented either as a demonstration to be learned or as a problem to be solved. It is essential, of course, that where problematic situations rather than rote learning are placed at the foundation of teaching procedure, the problem should be made as real as possible.

One of the objections to teaching by the problem method states that the interest of the student may be too highly compartmentalized or limited to specific problems. This difficulty, if it is one, together with the unreality of other teaching methods, has been corrected, in part, by the use of the project method. Let us suppose, for example, either that a single person or a group of persons is asked to buy, take care of, and study some animal—say a chimpanzee. The various operations that would have to be performed in carrying out this project might touch the formal curriculum in a great many places. For example, the learner would have to use arithmetic, handle money, study the relation between food and health, and know the biological place of such an animal as the chimpanzee, its modes of behavior, and a good many other things besides. It is said, too, that the project method enjoys all of the advantages of group study and action.

One of the most recent methods of teaching is commonly known as the laboratory method.[13] Here again emphasis is placed upon doing. Moreover, it is alleged that all laboratory methods lead to the de-

[12] Stevenson, J A., *The Project Method of Teaching*, N Y, Macmillan, 1921 See also Robbins, C L, *The Socialized Recitation*, N Y, Allyn and Bacon, 1920

[13] Ambel, F G, "The comparative effectiveness of the lecture-demonstration and the individual laboratory method," *J Educ Res*, 1924, *13*, 355–365 Downing, E R, "Summary of investigations of the demonstration method versus the laboratory method," *High School J*, 1930, *13*, 51–55 Gould, A. B., "Demonstration experiments and their place in the teaching of chemistry," *J. Chem Educ*, 1931, *8*, 297–302 Johnson, P O, "A comparison of the lecture-demonstration, group laboratory experimentation, and individual laboratory experimentation methods of teaching high school biology," *J. Educ Res.*, 1928, *18*, 103–111

velopment of observation This is accepted as an advantage for it has been supposed that development of the sensory apparatus was one of the first steps to be taken in the process of education As a rule, however, laboratory methods have been a failure save in so far as the development of special techniques for research men are concerned. This method of teaching is a very costly method and unless every experiment is carefully outlined, no single teacher can handle more than a few students. There has been a tendency, therefore, to write out laboratory manuals which guide the student even to the finest of details in all of his activity. Moreover, it is easily assumed by the laboratory method of teaching that dexterity in the handling of test tubes, magnets, and other pieces of apparatus is equivalent, first of all, to a knowledge about the various sciences and, secondly, to an intimate appreciation of what the scientific method means. In general, the studies that have been made on this method of teaching show that the results, save where special training in research methods is desired, have been small in comparison with the cost.

A fairly large number of experiments have been done on the lecture method versus the quiz method The lecture method has the advantage of handling large numbers of students at a fairly small cost, but it is sometimes argued against the lecture that it evades the more intimate types of instruction that can take place between a teacher and individual pupils When success in teaching is measured by familiarity with actual content, it looks as though the lecture method is just as efficient as the so-called quiz method Since some of the traits which cannot be easily measured must be left out of experiments of this kind, it cannot be said that the lecture method is absolutely superior or even equivalent to other methods If, as we have implied above, the secular school must take more responsibility than it has for the development of motives, incentives, interests, and sentiments, no teaching method can be finally evaluated until its outcome, so far as these traits are concerned, has been measured [14]

4. *Brightness and Dullness in Children* —Most of the things that have been said up to this point pertain most directly to the normal child. A considerable part of a modern school program, however, is taken up with the problems created by special children These may be of several types. On the one hand, the use of the I.Q. has made possi-

[14] Crawford, C C, "The correlation between college lecture notes and quiz papers," *J Educ Res*, 1925, *12*, 282-291 See also Greene, E B, "The relative effectiveness of lecture and individual reading as methods of college teaching," *Genet Psychol Monog*, 1928, *4* (No 6), 403-500

ble the discovery of a large number of persons who may be called exceptional simply because their I.Q 's stand higher than some arbitrary value, say 135. Then, too, there are some children who are superior in special traits, such as drawing, mechanical ingenuity, arithmetic, and the like. On the other side of normality, there are all those children who are generally deficient in what is called intelligence. Because of poor nutrition, sickness, and delayed growth, the school has to take care of what may be called retarded children. Below this level there are a great many persons whose I.Q.'s run as low as the 30's, 40's, and 50's As a matter of fact, it is now customary to apply the word "idiot" to children who are so retarded in their development that they cannot expect to exceed a normal child of about two years of age. Imbeciles rank somewhat higher than the idiot but do not exceed the normal child of about seven years. The moron stands still higher than the imbecile but does not exceed the normal child of about twelve years In addition to these general types of insufficiency there are a good many special deficiencies Some of these are created by the loss of a sense organ or by some injury to the nervous system itself.

A large number of studies have been made on all of these persons. The results have led to a distinct improvement in teaching methods so far as they are concerned. In one of the most elaborate surveys of children who rank 140 or above on the Stanford-Binet scale, the following inferences were drawn. Nearly one-third of the fathers of these superior children belonged to the professional classes and less than seven per cent to the semi-skilled or unskilled labor classes. Nearly a half of the fathers of superior children were listed as college graduates. Eminent relatives were observed as a common feature in the family history. The ratio of gifted boys to gifted girls changes from seven to six for pupils in the elementary grades to approximately two to one in the high school As we have seen in a previous chapter, there is some evidence to show that boys are apt to be more variable in their psychological traits than girls. Contrary to tradition, it does not appear that gifted children are inferior to normal children in size, strength, skill, health, and the like As a matter of fact, some skills such as walking and talking are slightly precocious among gifted children. This advantage holds true also of school progress, although gifted children, as a rule, are found in lower grades than their higher I Q ratings would suggest. This apparent retardation in school work is probably to be explained by the fact that no provision has been made until recently to place such persons in special classes. In other

words, the attainment of gifted children is somewhat below their capacity as measured by the intelligence test. Contrary also to popular opinion, very few gifted children are one-sided in their abilities. It is often said that superiority is a more or less local trait which must be compensated for by inferiority in other traits. Gifted children are usually above the norm for their age in every school subject. The quantity and quality of the reading done by gifted children is far above normal. At the age of nine, for example, three times as many books are read by gifted children as were read by normal children. Moreover, children of the former type have more hobbies and special interests than the average child They make larger collections of material and show greater maturity in other types of non-academic performance.[15]

The experimental study of exceptional children has not been under way long enough to show the changes that may take place with increasing age. There is a popular belief to the effect that a good many geniuses were, as children, backward and unpromising. Some of the studies that have been made on great men, however, now show clearly enough that most of them were precocious even in their earlier years.[16] The minimum I Q. of some of the great men whose early years have been studied turns out to be not less than 140. Goethe, Mill, Leibniz, Macaulay, Pascal, and Grotius are said to have had I Q.'s of 180 or better. Studies of this kind do not settle the question, however, as to whether there will be a greater likelihood for eminence among children who rank high in intelligence scores. From the evidence that is at hand, it seems fair to say that the I.Q.'s of boys show no tendency to decline as they grow older. The average intelligence quotients of girls, however, was observed to decrease by about ten points in the seven-year period covered by the study. In general, superior children rarely fail in their high school subjects and a great many of them go on to college. Of the older members of the group that were originally studied, some have already won professional recognition. Furthermore, the superior social training of the gifted children enabled them to stand higher than normal children in such traits as social intelligence, fair-mindedness, occupational interests, and the like.[17]

[15] Terman, L M , *et al* , *Genetic Studies of Genius*, Palo Alto, Stanford University Press, 1925 (3 vols) Much of the experimental literature on gifted children has been summarized by Terman, L M , and Burks, B S , "The gifted child," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass , Clark Univ Press, 1933.

[16] Cox, C M , *Genetic Studies of Genius*, Stanford Univ Press, 1926, Vol II, *passim*

[17] Burks, B S , Jensen, B W , and Terman, L. M , *Genetic Studies of Genius* Stanford Univ. Press, 1926, Vol III.

The facts that have been discovered regarding the gifted child lead naturally to some consideration of special methods of teaching. Among other things, it has seemed profitable to increase the load placed upon such persons. This procedure does not settle the entire question, however, for excellence in academic work may not be a matter of quantity so much as a matter of quality. It is one thing to ask a gifted child to learn twice as much as a normal child might learn and quite another to provide him with opportunities for developing some of his more complex psychological functions.[18] It has been pointed out that the division of children into inferior, normal, and superior groups may mean taking out of the environment of the inferior and of the normal groups the stimulus that might come from association with superior ability. The facts which we have been describing, however, cover scarcely more than a decade of research and it is clear that much must yet be done before educators can proceed wisely in this field.

The mental development of feebleminded children shows a slower tempo than it does for normal children [19] Moreover, growth ceases at an earlier time and decline takes place rapidly. These facts appear most clearly in the lowest order of feeblemindedness, viz., the idiot. They have a real significance, however, in the case of morons, that is, among those persons who stand just short of normality. The fact that feebleminded children are simply examples of retardation in development is shown by drawing comparisons between them and normal children. That is, a normal child and a feebleminded child of the same mental age give almost identical learning curves.[20] There are not enough studies on the higher forms of psychological function to show whether these functions would likewise be similar in children of the same mental age.

Up to the present time, no cure for feeblemindedness has been found. Sometimes glandular therapy may be used and indirect benefits may be gained from the treatment of tonsils, teeth, and adenoids. Furthermore, changes in diet may be helpful. The improvement shown is not an improvement in I.Q , however, but in the readiness

[18] Osburn, W J , and Rohan, B J , *op cit* , pp 58–61

[19] The experimental material on feeblemindedness has been summarized by Pintner, R , "The feebleminded child," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass , Clark Univ Press, 1933, Chap XX See also Woodrow, H , *Brightness and Dullness in Children*, Philadelphia, Lippincott, 1919 See also Hollingworth, L S , "The child of special gifts or special deficiencies," in *Handbook of Child Psychology* (ed. C Murchison), Chap XXI

[20] Woodrow, H , "Practice and transference in normal and feebleminded children," *J Educ Psychol* , 1917, *8*, 85–96, 151–165.

with which such persons may be trained to the limit of their abilities. One thing seems to be fairly certain. Now that feeblemindedness may be detected at a very early age, educators are inclined to say that training must begin as early as possible.

Some of the principles that have been described for the education of retarded children are as follows. It is always helpful to make the most of the natural activities of children. Since the sensory apparatus is the least affected by whatever conditions there are which produce feeblemindedness, training may be directed primarily upon the development of the perceptual functions. Every effort must be made, of course, to direct the correlation of subject matter, for the retardation of the child makes this sort of performance exceedingly difficult. As a rule, the training of feebleminded children must be much more individualized than is the case with normal children. Furthermore, it must be directed toward practical skills such as can be used by the child in his later life.[21]

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Valentine, P F, *The Art of Teaching*, N. Y, Heath, 1932

[21] Whipple, H D, *Making Citizens of the Mentally Limited*, Bloomington, Ill, Pub. School Pub Co, 1927 See also Anderson, M L, *Education of Defectives in the Public Schools*, N. Y., World Book Co., 1921.

CHAPTER TWENTY-SEVEN

THE TRANSFER OF TRAINING

1. *Introduction*—When a man buys a new car, he is warned that it must not be driven too fast for the first five hundred miles. He is told that his top speed should not be more than thirty miles an hour and that this top speed may gradually be raised until, at the end of one thousand or fifteen hundred miles, the engine will be thoroughly broken in. We might say, then, that every new automobile engine has to go through a certain "training period" during which the cylinder walls become glazed, the bearings adjust themselves to one another, and other moving parts are tested for their stamina. After the car has been thoroughly "shaken down" it may then be used for a variety of purposes The chauffeur may move slowly through heavy traffic or swiftly along a highway, he may use the engine as a brake on downhill roads and as a powerful locomotive on uphill roads. In other words, a short period of training has brought a mechanical device to the place where it can serve a large number of different functions even though it has not actually been used in these several ways before

There is, however, another picture we may get of such an engine. If the driver is compelled to go slowly through heavy traffic, he may have to retard the spark or even readjust the carburetor. If he wishes to go swiftly during hot weather, still other adjustments must be made If he climbs to a high altitude, the carburetor must be changed and some means taken to prevent vapor lock In other words, the car is the same car in all of these various places, and yet certain specific adjustments have to be made on it in order to meet situations which are just as specific.

We have, then, a double picture of the operation of a car and of the way in which it can be adjusted to road conditions On the one hand, we may emphasize the fact that a single engine, having been properly broken in, can be used for a variety of different purposes. On the other hand, we get the idea of a single engine which must be especially adjusted in certain of its parts in order to meet special situations If now we apply these two points of view to a human being, we may say that every person has to pass through a period of growth which is

somewhat like a prolonged training period. We might argue,—indeed, it has been argued,—that this period of growth leads to the training of psychological traits and talents which may then be used with equal facility in a great variety of situations. On the other hand, we may argue that the process of growing means the development of certain special traits and skills which are immediately tied up with equally specific situations. Just as a rich mixture in the carburetor may be necessary for a cold morning and not helpful at all during high speed driving in warm weather, so certain psychological functions may be especially trained to handle certain situations and not others.

Which of these two views of human nature or of methods of training human nature is correct? Clearly, the right kind of an answer must have considerable importance for education. If education is a way of training a person so that he can become increasingly effective in all kinds of situations, then it is clear that one might educate a human being much as one breaks in an automobile engine or shakes down a new steamship. It would make no particular difference what kind of situations had been used for training purposes because the result would be an increase in general fitness. That is, it makes little difference in an automobile engine as to how the "shaking down" process has been accomplished. On the contrary, if a student has to learn special skills or special adjustments for each of the kinds of situations he may be called upon to meet, an entirely different picture of the nature of education must be drawn. This latter sort of education would mean the location and identification of groups of similar or of dissimilar situations and a simultaneous effort to train just those skills and traits which would be most applicable to the different situations. In more general terms, does education lead to the general training or the general discipline of a person or should it lead to specific training? Is it possible that the development of specific skills with respect to any particular situation will make a person more adept not only in that situation but in other situations as well? [1]

2 *The Doctrine of Formal Training*.—For a long time both psychology and education have given the first answer named above. It has been held that it did not make much difference how the student trained himself, whether on Latin, on Greek, on mathematics, or in the sciences, he would still improve himself in a general way. Were he to gain some considerable skill in the psychological operations in-

[1] Discussions of this problem can be found in any of the textbooks on Educational Psychology

volved in the study of the ancient languages, this competence would naturally be available for the study of anything else. This means, of course, that training can be general in the sense that knowledge and skill is readily transferable from one situation to another.

This doctrine of the transfer of training from one situation to another was, in part, a product of an older view of the nature of the mind. According to this view, it was said that the new-born child had a mind which was just as complete in all of its parts and in all of its modes of operation as an automobile engine which has just come from the assembly line. Likewise, just as such an engine is not yet ready to pick up quickly in traffic, climb mountains, or run at high speed along a level road, so the mind of a new-born infant is not yet ready to solve problems, to remember well, to perceive accurately, or to arrive at sound judgments. Both the engine and the mind must be broken in. Education, then, marks a way of helping the child to "break in" its mind. It does not have to learn how to think. On the contrary, it simply has to learn how to think more maturely. Just as an athlete puts himself into good condition by training his muscles, so the child can put itself into good psychological condition by training its mind.

As an illustration of this way of thinking about education we may take a short note from a recent student of education who writes: "If in after life your job is to think, render thanks to Providence which ordained that, for five years of your youth you did Latin prose once a week and daily construed some Latin author." [2] The inference is clear. The study of Latin is not only a way of learning a vocabulary and of learning how to read another language, but it is also a way of training a general faculty of the mind.

Near the beginning of the present century certain experiments were made which seemed to throw doubt upon this view of education. In what seems to be the first experiment upon the matter, William James learned, during the course of an eight-day period, some 158 lines of Victor Hugo's satire. Then, for the next thirty-eight days, James exercised his memory ability for twenty minutes a day by learning the first book of *Paradise Lost*. At the end of the training period, James came back to another 158 lines of the satire. He supposed, of course, that he would be able to learn this second section more quickly than he did the first because of the special training period through which he had passed To his surprise, he found that it took

[2] Whitehead, A N, *The Aims of Education* N Y, Macmillan, 1929, p 78

him slightly longer to learn the second selection than it did to learn the first [3] This result stood in such sharp contrast against current beliefs about the effect of training that James supposed that his performance must have been caused by undue fatigue Soon, however, other experiments were to show that James had not been very far wrong Two other experimenters went at the matter in this way. They asked a group of subjects to estimate the area of rectangles varying from ten to one hundred square centimeters in size. This skill was practiced day after day until marked improvement was apparent Then the subjects were tested for their ability to judge areas of the same relative size but of different shape If the faculty of judging areas had been sufficiently disciplined in the original practice series, it ought to follow that the subjects would judge the new areas with a high degree of success. It turned out, however, that they were only forty-four per cent as skillful as they had learned how to be during the previous training period In other words, it looked as though the previous skill was more or less specific to the particular situation in which the skill had been gained and that it was not, therefore, wholly transferable to a new situation even though the new situation greatly resembled the practice situation.[4]

No one who believed in the transfer of training had ever gone so far as to say just how complete the transfer effect of training ought to be It seemed, however, that if specific training is not only specific but general as well, the amount of transfer ought to be greater than the amount that actually appeared in the experiments. In any case, the whole subject was opened up to serious study with the result that there are now several hundred articles and monographs on this problem alone [5]

Closely related to the experiments on transfer from one function to another there is that kind of training which has sometimes been called cross-education [6] Let us suppose, for example, that a subject is asked to practice the skill of hitting a dot with a pencil During the practice period only one hand,—say, the left,—is used. After the left

[3] James, W , *Principles of Psychology*, N Y , Henry Holt, 1890, Vol I, footnote on pp 666–668

[4] Thorndike, E L , and Woodworth, R S , "The influence of improvement in one mental function upon the efficiency of other functions," *Psychol Rev* , 1901, *8*, 247–261, 384–395, 553–564

[5] Much of the experimental material has been summarized and commented upon by Orata, P , *The Theory of Identical Elements*, Columbus, Ohio State Univ Press, 1928

[6] See, for example, Ewert, P H , "Bilateral transfer in mirror drawing," *Ped Sem* , 1920, *33*, 225–240

hand has acquired a high degree of skill, one may argue in either of two ways. In the one case, it may be said that such a skill is specific to the left hand or to one side of the body, and that the right hand will not have profited greatly therefrom. In the other case, one may say that a general psychological trait has been exercised, viz., skill in muscular coordination and that this trait should be useful to the learner no matter which hand is used. It has been found, however, that the amount of transfer to the right hand will not usually amount to more than fifty per cent.[7] Experiments of a little different type have led to contrary results. Let us suppose, for example, that the left eye of a white rat is blindfolded and that, with the use of the other eye, the subject is trained to avoid the brighter of two lights in a problem box. When this skill is acquired, let us transfer the blindfold to the other eye. Even though this eye has not been subjected to practice, the animal will continue to discriminate between the two lights as correctly as it has done before.[8] In other words, the amount of transfer from the one eye to the other has been complete This is, theoretically, the amount of transfer that should take place in other kinds of psychological operation if the older theory of the nature of the mind were proven correct.

3. *Methods of Explaining Transfer.*—If we could take the time to review any considerable number of the experiments that have been done in this field, we should find that there are no experiments which show a complete absence of transfer In other words, the case against the transfer of training is not a complete case. In some experiments, to be sure, the amount of transfer is so small as to throw serious doubt upon the advisability of trying to gain any general training through the use of specific kinds of training. On the other hand, a great many of the experiments show, as we have just seen, an amount of transfer that may stand anywhere between fifty and one hundred per cent.

We may take these facts in either of two ways. First, we may say that they actually prove the point of view of the older psychologies. In short, we may say that they argue for the existence of a mind or of certain kinds of mental faculties which can be disciplined or trained much as an athlete would train his muscles. On the other hand, however, we may argue that the older view of the nature of the mind is no longer tenable and that we must, therefore, explain such

[7] Davis, W W, "Researches in cross-education," *Studies from Yale Psychol Lab*, 1898, *6*, 6–50, 1900, *8*, 64–109

[8] Lashley, K S, *Brain Mechanisms and Intelligence*, Chicago, Univ of Chicago Press, 1929, *passim*

transfer as has been discovered in some other terms. From what has been said elsewhere and especially because of the principles that are to be considered in Chapter Thirty-Six, modern psychology and education are inclined to take the second view. What, then, are the various ways in which transfer may be explained?

The first method of explanation runs as follows. Suppose that a subject has learned how to add 8 and 7. He has practiced this skill until the stimulus-situation presented by 8 and 7 runs almost thoughtlessly into the response 15. After having acquired this skill, we may then begin to teach the subject how to multiply. During the process of multiplying the number 37 by the number 42 the subject will again be called upon to add the number 7 to the number 8. In other words, any speed which an individual may acquire in multiplication will depend, in part, upon the fact that multiplication has at least one identical element with addition, viz., the adding of 7 and 8 together. The theory of identical elements then says that the amount of transfer from one situation to another would depend upon the extent to which the two situations have elements in common with each other.[9]

To put this theory on more general grounds, we may argue as follows. Let us suppose that situation *A* involves ten specific pathways of conduction between the total stimulus-situation and the total response. During practice, each of these pathways might become more fixed in their character. In another situation *B* we may suppose that the same facts hold true save that *B* contains none of the stimulus-response connections found in *A*. Some skill, however, with reference to *B* is gained. At some later time the learner is confronted with stimulus-situation *C*. Now it may happen that stimulus-situation *C* is made up of three of the elements that were formerly practiced in *A*, two of the elements that were formerly practiced in *B*, and of five new elements. The theory we are discussing would argue that the amount of transfer from *A* and *B* to *C* would depend upon the number of these identical elements.

In order to place a proper value upon this theory of transfer, it is necessary, first, to see whether or not the phrase "identical element" can have any meaning, second, to see whether there are any other ways in which the results of the experiments in this field can be explained, and, third, to ask whether there are any kinds of psychological operations in which the theory could not possibly be true. With

[9] Thorndike, E. L., *Psychology of Arithmetic*, N. Y., Macmillan, 1922, pp. 143 ff.

respect to the first proposition, the case is fairly clear. It has not been possible to define the phrase "identical elements" in a way that would give it any particular value for either psychology or education This is true, in part, because the word "identity" cannot be used as it might be used in physics or in mathematics. When we say that two values are identical we mean to say that they can actually be substituted for one another. It is true, of course, that an 8 and a 7 in one problem might be substituted for an 8 and a 7 in another problem, but identity in psychology must mean functional identity rather than objective identity. That is, objects and events are identical when they operate in the same way in regulating the behavior of the individual. It is very difficult to know, however, when and how objects may work in this manner. Suppose, for example, that we are looking at a given table. This table may be identical from one time to another so far as physics is concerned, but the chances are that no human being has ever seen any table in exactly the same way on two different occasions. In short, it would be very difficult to throw an image of any object on the eye which would excite exactly the same end organs in the eye. In our dealings with tables, however, different patterns of stimuli come to have a similar functional value. This functional value does not depend upon a long series of practice periods in which a table has been viewed from every possible angle in every possible degree of illumination, and with every possible kind of previous experience.

4. *Generalized Experience.*—There is, of course, a great deal more that may be said about the theory of identical elements, but the essential facts may be stated, perhaps, by taking account of other modes of explanation. In order to get at these other modes of explanation, we may take one or two typical experiments. Let us say that we have divided into three groups a number of subjects who are approximately equal to one another in ability. The one group, which we shall call the control group, will be given no special training. A second group to be known as a practice group will be asked to memorize certain kinds of material, but it will be given no special instruction as to the most helpful ways of going about this memory task. This group will be asked to memorize poetry and nonsense syllables for certain periods of time. A third group which may be called the educated group will also learn this same material. In this case, however, a part of the time will be spent in actual learning and a part will be devoted to a description of the rules and principles of

learning. Throughout the entire training period, frequent reference will be made to these general rules, to reviews of preceding memory periods, to the value of making proper associations during the learning period, and so on.

If we have carried out this experiment faithfully, we shall find at the end of our study that the educated group will have done very much better than either of the other two groups. That is, we shall find that because of the nature of the practice periods between the initial and the final tests given to each of these groups, some of them enjoy large amounts of transfer and others small amounts of transfer. On the average, the amount of transfer for the educated group will be very much greater than that for the non-educated group.[10]

In another study of the same general kind, the subjects were asked to practice the art of defining various terms. The experimenter wished to know how much transfer there might be from learning how to define scientific terms to the definition of more ordinary terms. As in the experiments cited above, three equivalent groups were used. The first group was given no special training, the second group was given regular routine training in the art of definition, while the third group had in addition to its training three periods of discussion on the nature of definition and on methods of analyzing the general procedure As in the case cited above, the results showed clearly enough a distinct advantage for the third group.[11]

Experiments of this kind have supported what may be called the theory of generalized experience. This theory of the transfer of training has taken two or three different forms. Let us say that we have been asked to solve a given problem in mathematics. Since certain mathematical rules or principles have already been learned, these principles can be applied to the new problem in so far as the new problem contains parts or processes that are identical with previous processes It usually happens, however, that in addition to special rules of procedure, every student will be more or less expert in general patterns of accuracy, neatness, persistence, self-reliance, and the like. If, then, in a solution of a prior problem a student had learned how to increase his self-reliance, he might expect to use this general pattern of conduct in some future problem In other words, he could

[10] Woodrow, H, "The effect of type of training upon transference," *J Educ Psychol*, 1927, *18*, 159–172

[11] For a summary of a great many experiments in this field and for critical comments on the conclusions, see Orata, P T, "The theory of identical elements," *Ohio State Univ. Contrib to Educ*, 1928, No 3

take the same attitude toward one problem that he has learned how to take toward others [12]

Other persons have emphasized still another phase of these general problems of conduct by emphasizing the word "generalization" A student may, for example, in connection with learning processes in the field of mathematics generalize his procedures and then carry over these generalizations to the study of some other types of subject matter [13] Somewhat the same kind of capacity to adapt general patterns of conduct to a variety of situations is suggested by the phrase "the development of attitudes" [14] Both of these phrases lead on naturally to the argument that transfer of training will be increased in direct proportion as the learner makes a "conscious effort" to apply attitudes and dispositions acquired in one situation to new situations.[15]

5. *The Meaning of Growth* —The significance of these various ways of explaining such transfer effects as have been discovered cannot be seen until we consider again just what it means to grow older in psychological traits. As a preface to a statement of the meaning of growth, we may make one or two comments about the relation between transfer of training and the use of experimental methods If it had been possible for us to review very many of the experiments in this field, we would have discovered that a large share of them have been carried out on very simple and easily measurable psychological operations. In one of the experiments reported above, an effort was made to see how the visual estimation of lengths and areas might be transferred from lengths and areas of one class to lengths and areas of another The perceptual skill involved in this kind of estimation is so precise that an experimenter could easily hope to draw reasonable conclusions from his data The very phrases "general patterns of conduct," "general attitudes," and "conscious effort," on the contrary, imply lack of precision. It is almost fair to say, then, that where the greatest precision in measurement can be reached the amount of transfer from one stimulus-response pattern to another is a minimum. On the contrary, where precision cannot be so easily reached and where the psychological functions involved are more complex, alleged amounts of transfer are greater.

This fact holds more than a passing interest for educational psy-

[12] Thorndike, E L, *The Principles of Teaching*, N Y, Seiler, 1906, pp 243 ff
[13] Judd, C H, *Psychology of High School Subjects*, Boston, Ginn, 1915, Chap XVII
[14] Freeman, F N, *How Children Learn*, Boston, Houghton Mifflin, 1917, pp 274 ff.
[15] Bagley, W C, *Educational Values*, N Y, Macmillan, 1911 pp 193 ff

chology. We have already found out that the repetition of a learning situation is one way of promoting the growth of an individual so that the reactions he will make to it become more and more adequate. The word "adequate" means that the behavior patterns of the subject will become more and more specific, more and more automatic, more and more habitual, or more and more skillful. That is, learning is a process which leads to specificity and fixity of response rather than to a response which could be in any sense of the word general in character.

It would seem to follow from these considerations that those experiments on the transfer of training which make use of simple psychological functions or of functions which readily become highly specific in character are, in their very nature, incommensurate with the problem. By definition, transfer of training implies flexibility or plasticity among psychological operations. It is difficult to see how experimental facts derived from materials that are purposely deprived of flexibility could have anything pertinent to say about the problem of the transfer of training.

This proposition takes us naturally on to a consideration of the nature of growth. Just what do we mean when we say that a man of mature years is actually older in his psychological functions than a new-born infant? Of certain aspects of increasing maturity we can have no doubt. The motor and sensory apparatus of the growing individual become functionally more mature in the sense that finer or more graduated types of response can be made to finer differences in stimulus-situations. Moreover, other processes of learning lead to increasing periods of voluntary attention, to the development of a great many interests and derived incentives, to the attachment of emotional forms of action to a great many variable situations, and to an increasing enrichment of all of those attitudes, traits, and dispositions which are summarized by the word "personality." What can we mean, however, by maturity in the problem-solving functions? As we have seen, the solution of a problem is often made possible by the extraction of various kinds of data out of particular spatial and temporal settings and their subsequent reorganization into a new configuration. If a learner could hope to respond to a new situation only by using modes of action which had already been automatized, he would never be able to achieve those sudden insights which imply a quick and significant alteration both in the stimulus-situation and in the response.

The ability to achieve insights is, by definition, an ability which cannot be experimented upon in the sense that one can predict what the character of the insight will be. The best that the experimenter can do is to place his subjects in situations which will create an opportunity for insight to happen, but the significance of the insight itself is unpredictable. This conclusion seems to say that the problem of the transfer of training cannot be exhausted simply by supposing that stimulus-response patterns which have been more or less stabilized through a learning process can be transferred from one situation to another. On the contrary, the thing that actually is transferred is a growing person. Under the influence of learning situations every person becomes more mature. It is idle to suppose that an adult is not a more effective psychological instrument than an infant. A part of his increased effectiveness may come from the fact that the adult has developed a large number of habit systems, but a part of it must also be due to the fact that the adult is a more effective agent. This proposition must certainly hold true in particular of the problem-solving functions. So long as education is inclined to emphasize sheer learning, that is, the gradual development of specific habit systems, transfer through the use of the principle of identical elements might stand high in importance. Any system of training, however, which emphasizes the problem-solving functions, that is, which emphasizes flexibility and plasticity in the use of the fruits of learning, must recognize that a more mature person is the object which is actually transferred from one situation to another.

GENERAL READINGS

See the General Readings at the end of Chapter Twenty-Three.

PART SIX

PSYCHOLOGY IN INDUSTRY AND COMMERCE

CHAPTER TWENTY-EIGHT

THE GENERAL PROBLEMS OF INDUSTRIAL PSYCHOLOGY

1. *Introduction.*—It has been almost twenty years since a psychologist at Harvard put such information about the relations between psychology and industry as were then known into a unit by themselves. There was, as a matter of fact, little to say. In industry, as in education and medicine, certain practices were followed which were thought to be suggested by the nature of the worker and by the nature of his task, but in addition to this, Hugo Munsterberg had only a few experiments of his own making.[1]

One of these experiments had to do with the fact that street railway companies were already becoming alarmed at the number of accidents among their motormen. Upon going over the matter, it seemed that accidents might be more nearly related to the variable factors of attention than to any other mode of psychological operation and he decided, therefore, to devise a test that would yield some measure of this trait.[2] His test consisted of a miniature street scene upon which substitutes for pedestrians, horses, automobiles, and other objects might be placed. A method was used to show in which direction these objects were moving and how fast they were moving. An experimental situation was thus presented to a group of subjects in such a way that they could be asked to judge it in terms of its potential danger to life and limb. A group of motormen who had good records seemed to do well with this apparatus, whereas a group which had a long history of accidents did not do so well.[3]

Neither the apparatus devised by Munsterberg nor the results of his experiment marked anything more than the simplest possible beginnings of an industrial psychology; but a beginning is often one of the hardest parts of a whole movement. In any case, a method of applying the experimental laboratory to practical industrial problems had been pointed out and now this domain of applied psychology con-

[1] Munsterberg, H., *Psychology and Industrial Efficiency*, Boston, Houghton Mifflin, 1913.
[2] *Ibid.*, Chap VIII
[3] Munsterberg's experiment, together with other studies of a similar nature, are described in Viteles, M. S., *Industrial Psychology*, N. Y., Norton, 1932, Chap XIV.

tains one of the most respectable bodies of knowledge to be found anywhere. A major share of the facts that have been discovered have been brought together in a monumental volume bearing the title *Industrial Psychology*. From cover to cover, this book is filled with tables, descriptions of method, and many paragraphs of inferences and conclusions.[4]

We must now try to go over some of the ground that has been so much more adequately covered by special books and monographs. It will not be possible for us to do more than cite typical examples of what can be done in this field. In general, the whole field admits of a variety of sub-topics. Those which will concern us most are some of the general concepts which lie behind the applications of psychology to industry, the problem of proneness to accident, the various aspects of accident prevention, the nature of industrial motivation, the various problems of personnel selection, some of the psychological factors which have to do with buying and selling, the psychology of advertising, and the nature of efficiency, together with the factors which influence it. The first of these topics is the task of the present chapter.

2 *The Concept of Technology.*—The application of psychological facts to industry has often been said to make up a field which can be called psychotechnology. This word has come out of an attempt to avoid the several, and highly variable, meanings that may be given to the terms "science," "art," and "technology." For a time, the word "science" was said to include only the pure sciences, viz., mathematics and logic Mathematics, however, has been described as applied logic, but in view of the studies that have been made upon problem solving, one may wonder whether even logic itself can be called a science. To be sure, there are certain rules or principles which ought to guide a man in his effort to demonstrate the truth of a proposition, but, as we have seen, a logic of demonstration may differ widely from the actual course of problem solving.[5]

There is a very old distinction between science and art. Whereas science has been used to refer to mathematics and logic or, more recently, to the experimental method of arriving at facts, the word "art" has meant skill in the use of knowledge. The art of medicine, for example, implied the practical use of certain kinds of information drawn from the natural sciences. Even the word "science" however

[4] Viteles, M S, *op cit*, *passim*

[5] Carmichael, R D, *The Logic of Discovery*, Chicago, Open Court Pub Co., 1930.

has had this same meaning, for the scientific spirit had its origin in very practical attempts to control natural objects and events. More recently the term "science" has been used as an aspect of experimental research, whereas the phrase "applied science" and the word "technology" mark the effort to apply the fruits of research to practical undertakings. In this case, mathematics and logic would stand as tools or instruments which are more or less useful to the experimenter.[6]

There are, however, still other distinctions that may be drawn. Sometimes the phrase "practical science" is used in connection with such disciplines as agriculture and engineering. The practical sciences, then, could be distinguished from the applied sciences and both types from the theoretical or pure sciences. When distinctions of this type are drawn, theoretical or pure science refers to laboratory researches which are carried out simply for the sake of knowing, whereas the practical and the applied sciences would represent one or more types of art. The general inference to be drawn from these various terms is that the getting of knowledge and its use are, perhaps, different ways of looking at a single composite picture. In any single instance, it might be possible to distinguish a piece of pure research from a piece of applied research, but in the long run, the practical sciences, the applied sciences, and the pure sciences fuse rather closely into a single composite picture. All science has as its purpose the understanding and control of natural objects and events. Sometimes the factor of understanding must be emphasized and at other times direct contact between pure knowing and daily practice must be established. In either case, it is the attitude of the man of science which counts most. When we say, therefore, that there is an industrial psychology or a psychotechnology, we may imply that the problems to be studied have their origin in a very practical situation, but we must imply, also, that the methods used to handle the situation shall be the same as those which might be used in the so-called pure research laboratory

3. *Science and Technology*—We have spoken of the difference between a pure science, on the one hand, and an applied science, on the other. A great many of the problems which we have considered in previous chapters, together with those yet to be considered, will appear in a better light if we now think a little more about this distinction.

[6] Cf the discussion by Weld, H P, *Psychology as Science*, N Y, Henry Holt, 1928, Chap. I

Let us devote ourselves, first, to a few notes about the historical relations between science and technology. In order to do this, it is necessary to turn back the pages of history to a time when men had not yet begun to leave any written records of their doings. As a matter of fact, we may even go to the behavior of some of the animals which are supposed to represent forms of life that antedated man. If we look at the behavior of the lower animals or of the most primitive men, we cannot help but see that they conducted themselves as though they had drawn a serviceable distinction between the actions of living things as opposed to non-living things. This fact is revealed in the way they themselves acted toward these two classes of objects for, toward things, they used a series of techniques which we may call thing-techniques, and toward living creatures, they used actions and postures which we may describe as person-techniques.

In general, most of the animals which stand just below man prey upon other animals, take care of their own young, and otherwise carry out a series of movements which are peculiarly adapted for just such purposes. It is not very often that one animal tries to outwit a tree or to suckle a stone. On the contrary, most of the lower animals use toward such objects just the type of action we have described as a thing-technique. The same facts hold true of primitive men. Every person who wooed another, or invited another to engage in combat or in a hunt, or subjected himself to the wishes of another, was using a variety of actions which he would not have used toward inanimate objects. That is, he would not have used such actions until after he had come to that place in his development where he supposed that all objects must be handled as one would handle persons. This stage in the development of human beings is sometimes called the animistic stage for it represents a time when human beings made the mistake of using person-techniques with respect to things as well as with respect to persons.[7]

If we had the time, we might be able to show how this mistake of primitive man has put a definite bias on the whole history of psychology; but there is another matter that is of more importance to us now. The development of a working distinction between thing-techniques and person-techniques meant that even the most primitive men had some sort of "knowledge" about the nature of human nature. That is, they had learned, through their dealings with inanimate ob-

[7] Tylor, E B, *Primitive Culture* (7th ed), 1924. Lange, A, *The Making of Religion* (3rd ed), 1909 McDougall, W., *Body and Mind*, N Y, Macmillan, 1920

jects, on the one hand, and with animate objects, on the other, how to make the proper allowances for both kinds of objects. When one man can make the right allowance for another man or animal and order his own conduct accordingly, he has arrived at his first information of a psychological sort.

It is clear, of course, that this first information of primitive man about his fellows was for the practical purpose of controlling others or for controlling himself in their presence. In other words, the first psychology was an applied psychology. There was no thought of having knowledge about human nature simply for the sake of the knowledge itself. In this respect, then, the history of psychology has been like the histories of all of the other sciences, for each of them began in the same way. The Egyptians had to measure their fields and this practical task meant the establishment of a computing system and of a simple geometry. The other sciences are known to have been tied up in this same way with the daily life of men when they were first developed.[8]

In the course of time, however, men came to the belief that the observation of nature excited by daily contact with it was not a sufficient outlet for their curiosity. The discovery that certain kinds of events could be put under experimental control and that the laboratory might reveal things which Nature herself did not reveal, led to the gradual emergence of pure science, that is, of knowing simply for the sake of knowing, but this was not the whole of the matter, for the use of experimentation quickly showed that common-sense information could easily go wrong. The casual observer would make mistakes in his recitals of happenings. Furthermore, he usually displayed a tendency to see and know only those things he wished to see and know. The laboratory, on the other hand, furnished a way of remaining wholly objective, disinterested and impersonal in the description of nature. It happened that the more impersonal the experimenter was, the more certain he could become in his statements about the "laws of nature."[9]

In any case, the two branches of sciences, viz., the pure branch and the applied branch, began to draw farther and farther apart. This

[8] Dampier-Whetham, W C. D , *A History of Science*, N Y , Macmillan, 1929, *passim*

[9] Weld, H P , *op. cit* , Chap I See also Titchener, E B , "Psychology science or technology?" *Pop. Sci. Mo* , 1914, *84*, 42–46 Saidla, L E , and Gibbs, W E , *Science and the Scientific Mind*, N Y , McGraw-Hill, 1930 Barry, F , *The Scientific Habit of Thought*, N. Y , Columbia Univ. Press, 1927 Wallace, W. K , *The Scientific World View*, N. Y., Macmillan, 1928 Burtt, E. A , *Principles and Problems of Right Thinking*, N. Y., Harper, 1932.

divorce took on particular significance to psychology, as we shall try to show in the next section. In the meantime, we pass on to the fact that the pure and the applied sciences have now come together again. This new union, however, is not like the first In the beginning, the togetherness was of the unintentional sort that might hold brothers together who had never been apart. The new union is more like a reunion of persons who have long been separated from one another and who now seek reacquaintance for their mutual advantage

We may illustrate this fact in the following way. It is well known that most of the large industries have set up, as a permanent part of their organization, research laboratories and experimental stations, the sole function of which is to do the same sort of work that has long been done in the so-called laboratories for pure research. To be sure, it is expected that the men in these laboratories will confine themselves to problems related to the main interests of the industry which employs them, but it is now recognized that such experimental stations are an immediate and practical part of any large concern. Most of the men who carry on the work of these laboratories come to their posts directly from the research laboratories of the universities.[10]

There is, then, a new kind of affiliation between the pure and the applied sciences, but it still remains true that pure science is becoming more and more abstract. When one is curious enough about the ultimate nature of things, one is very apt to move away from the immediate nature of things. There is, however, another reason why the pure sciences must continue to become more abstract. In their immediate nature, the objects and events around us are very complex. The experimenter has thought it wise, therefore, to try to keep as many things constant as he could, and allow only the object or event under immediate observation to vary In other words, the method of science is to take one thing at a time while trying to let other things remain equal Since, in actual practice, other things are never equal, there must always be a difference between the pure and applied sciences.

As a specific illustration of this fact we may make use of some of

[10] The most important general research bureau for applied psychology is known as the Psychological Corporation, with headquarters in New York City The function of this corporation is described as follows "The objects and powers of this corporation shall be the advancement of psychology and the promotion of the useful applications of psychology It shall have power to enter into contracts for the execution of psychological work, to render expert services involving the application of psychology to educational business administrative and other problems, and to do all other things, not inconsistent with the law under which this corporation is organized, to advance psychology and to promote its useful application"

the experiments that have been done on advertising Let us say that we wish to find out what effect the size of an advertisement will have on its usefulness. The laboratory method for studying this problem would run somewhat as follows. The experimenter would take a number of common advertisements that actually differed from one another in size and, with the aid of proper apparatus, present each of them to a suitable number of subjects. He would fix the amount of time for each exposure and otherwise try to keep all conditions constant save the size of the advertisements themselves. After proper exposure he might ask his subjects to recall those plates which they could remember, or to arrange them in order of preference. Immediate recall could be compared with delayed recall after one week, two weeks, or after any other suitable interval. It usually turns out that, within limits, the larger the advertisement, the more effective it is as measured by recall. An advertiser might decide, therefore, that all of his display material should be of full-page rather than half-page or quarter-page size.[11]

There are two things to say about such experiments, the one thing running toward a purer kind of science and the other toward a more practical science. It is clear that no group of advertisements could ever be so similar to one another as to vary only in size unless one used exactly the same format. The psychologist might, therefore, get wholly away from advertisements simply by using squares of plain light which differ from one another only in area. His problem, then, would concern the stimulus value of a large area versus the stimulus value of a small area. He might be ever so exact in his determination of this fact, but his conclusions would probably have no significance for the firm which is just ready to initiate an intense advertising campaign. On the other hand, it is easy to see that even the conditions of experimentation first cited above will run beside the mark so far as actual practice is concerned, for all advertising is set down in the midst of a great many variable factors. The reader who picks up his magazine may not be looking at the advertisements at all, he may be reading the text and, at a particular point in reading, a small advertisement tucked away in one corner of the page might easily have considerable value for him. Moreover, the experiences through which he has passed just before picking up the journal may tune him to see certain kinds of objects and to overlook other kinds of objects. There

[11] Link, H C, *The New Psychology of Selling and Advertising*, N Y, Macmillan, 1932, Chap V.

are times when even the semi-clad figure of a female may lose much of its stimulus value for a given subject.

There must, then, always be a marked difference between pure science and applied science; but this difference no longer keeps the two from interacting freely with each other. The man who is interested in pure research will always come upon new discoveries that can be industrialized. On the other hand, the industrialist will always lay problems before the research man. In this way, these two types of human activity will go on to enrich one another just as two different nations, with the signing of trade agreements, will come to each other's aid.[12]

4. *Science and Value.*—There is one phase of the relations between the pure and the applied sciences which touches psychology much more closely than the phases already discussed. When we say that a man of science must be impersonal or objective in his attitude, we mean that he must approach his experiments without any prejudice as to the way the facts may turn out. That is, he must not wish too strongly to secure one group of facts rather than another. Furthermore, save for the way in which they promote his scientific theories, one fact is never of any more importance than another. Outside of good or bad experimental method, then, the man of science knows nothing about goodness or badness, loveliness or ugliness, better or worse. The man on the street, however, lives in an entirely different world. Most things are good or bad so far as he is concerned. They please him or they do not please him. Now it happens that psychology is the science which has to describe and explain the actions of a man when he is being pleased or displeased. That is, an impersonal science has to take account of very personal facts. The psychologist has to be objective with reference to a group of events that have a subjective quality about them.

It goes almost without saying, then, that the proper relations between science, on the one hand, and values, on the other, constitute a puzzling problem for the student of human nature. This is particularly true when the psychologist tries to be impersonal and objective with reference to personality traits. All human beings have personalities. Moreover, these personalities cannot help but be judged as good or bad, useful or useless. How, then, shall we write out a scientific account of them? How shall the scientist achieve an impersonal description of persons?

[12] Seidla, L. E., and Gibbs, W. E., *op. cit., passim.*

The only answer that one can make to this question runs as follows. It is the business of psychology to describe the main types of psychological function irrespective of the purposes for which these functions may be used. All normal human beings, for example, are possessed of what we may call the perceptual functions. That is, to take only a single case, the lighted objects around him may enter into such a relation with a human being as to excite and direct the course of some adequate kind of movement. For social or for engineering purposes, this whole situation from stimulus to response may be judged as good, bad, or indifferent; but the psychologist may still study such a perceptual operation as this without regard to any social or other purpose. That is, he may still be able to give an impersonal account of an operation which is set down in the midst of a very personal context.[13]

This way of treating the relation between science and values has behind it one of the most stirring arguments through which psychology has ever lived. We have just said that it is the business of the psychologist to describe the psychological functions of a human being. This means that there are certain kinds of operations which men and animals carry out that cannot be carried out by non-living substances. An operation or a function, however, can scarcely be divorced from the results achieved by the function. And results, as we have seen, are easily judged as good or bad, useful or useless. Because of these facts, certain psychologists have argued that a pure science cannot treat of functions or of modes of operation. On the contrary, it must limit itself to existences. Its business is to describe what is rather than what works.[14]

Now it happens that the existences which psychology might describe are either minds or bodies. If we say, to start with, that minds exist, we ought to be able to describe a mind, both in its parts and in the way it is put together. If we say that there is no mind, we are left with a body, but it is the task of physiology, anatomy, and morphology to describe the body. It looks as though we must say that there can be no science of psychology so long as we say that there is no mind. There are, as we shall see, a certain number of psychologists who argue that minds do not exist; but this has not been our point of view. Instead of going to this extreme, we have meant to say

[13] Carr, H. A., "Functionalism," in *Psychologies of 1930* (ed C Murchison), Worcester, Mass., Clark Univ Press, 1930, pp 59 ff

[14] Titchener, E B., *op cit*, pp 42–46 See also "Experimental psychology a retrospect," *Amer J Psychol*, 1925, *30*, 313–323.

that human behavior, when taken in conjunction with the stimulus-situations which excite it, has certain properties or characteristics which stamp it as psychological rather than mechanical. In other words, there are psychological functions, and we shall try to show, in the following chapters, how these functions can be described as a scientist would describe them.[15] We have begun, here, to touch upon rather difficult problems, but they will become much simpler when, in a later chapter, we give a more complete account of the nature of psychology as a science.

5. *Differential Psychology.*—The phrase "differential psychology" or individual psychology comes into the psychotechnological picture simply because the man in the factory, like the child in the school-room, is not a typical or average person but a distinctive individuality. The application of the facts of psychology to industry would not be possible at all if such facts were simply fictitious cross-sections of what might be expected on the average. It has always been assumed, therefore, that one of the first problems of an industrial psychology is to find out in detail how people differ from one another rather than how they resemble one another. It must be determined, also, what the origin of these differences is, and how they may be changed by practice.[16]

Even when we say that people differ from one another in every trait or function of which they are a sum, it is implied that a norm of some kind has been established. As an example, we may take the concept of intelligence. This concept is, of course, a group concept in the sense that a very large number of persons, when tested for their intelligence, will fall around a central tendency or norm. When we say that one person differs from another in intelligence, it is already implied that this difference has some meaning with respect to a distribution curve. The fact that a person with an I.Q. of 100 is called a normal person is a pure piece of fiction based upon the fact that 100 seems to stand as a convenient point of reference. There is nothing about the number "100" itself which directly means normality or abnormality. When, however, normality has been arbitrarily established at 100, the differential psychologist can use any number above

[15] Bentley, M., "A psychology for psychologists," in *Psychologies of 1930* (ed C Murchison), Worcester, Mass., Clark Univ Press, 1930, Chap V Hunter, W S., "The psychological study of behavior," *Psychol Rev*, 1932, *39*, 1–24 Tolman, E C, *Purposive Behavior in Animals and Men*, N Y, Century, 1932, *passim*

[16] The first studies of individual differences were made by Stern, W, *Die differentielle Psychologie*, Leipzig, J. C Barth, 1911.

or below this average value to designate the specific intelligence of some other person. These same considerations would hold true of every other measurable trait of a person. It is clear that, if only one man had been found who displayed that particular trait called reaction time, it would not be possible to say that persons differ from one another in reaction time. Neither would it be possible to describe the amount of difference Since, however, all human beings have a personal equation and since measures of these personal equations tend to fall into a normal probability curve, the median of such a curve can be taken as the norm and divergence from this norm accepted as descriptions of the way in which one individual may differ from another.

It is easy to see, then, that the study of individual differences marks one of those places where both the interests of a science and of a technology may be served at one and the same time. The man who drives an automobile, the customer who sees a poster, or the worker who becomes fatigued at a given time during the day is not a statistical average On the contrary, he is a single person who varies in some specific and describable way from the norm. This means that he is an entity and that he must be handled as an entity when it comes to a question of fitting him into industrial or commercial operations. The reader must not suppose, however, that the problem of individual differences is a problem which concerns industry alone. On the contrary, almost every one of the preceding chapters has implied this same set of facts Differences created by the age factor are of great importance to education. Differences created by racial origins and by sex touch not only upon education but upon some of the major problems of social psychology as well. Differences created by maladjustments of various types inevitably make the contacts between a physician and his patient a very personal rather than a general matter. One of the fundamental problems of an applied psychology, then, is the problem of differential psychology.

The significance of this problem can be seen in the extent to which individuals actually differ from one another, that is, in the total range of human talent. In industry, it is obvious enough that the best workers may earn at least twice as much as the poorest workers.[17] On the experimental side, the ratio between excellence and inefficiency has been found to be much greater than this. The ratio of 1 to 10 has been found to obtain between the lowest and the highest scores on an in-

[17] Elton, P M , "An analysis of the individual differences in the output of silk weavers," *Ind Fat Res Board*, Rep No 17, 1922

formation test. In tests of speed of decision, freedom from load, motor inhibition, and volitional perseverance (the Downey-will-temperament test) the ratios vary from 1 to 5 to 1 to 10 The average ratio of low scores to high scores in a group of twenty tests was as 1 to 5.2.[18] As a result of these studies the author concluded that among persons who are ordinarily regarded as normal, the most gifted will be from three to four times as capable as the least gifted. It is clear, however, that the range of differences in a large group of persons cannot be accurately stated because a quantitative difference in a score is not equivalent to a qualitative difference in the way in which various traits may be used. An attempt has been made to reduce scores on various tests to comparable units When this is done, it may be argued that a ratio of 2 to 1 more nearly represents the true range of individual differences [19] Even if we were to accept this ratio of 2 to 1 or any smaller ratio, we would still be talking in terms of quantitative differences The significant fact in industry, however, is not to be found in numbers. On the contrary, small differences between individuals may make an enormous amount of difference in the part which these persons may play in the social group In the case of intelligence quotients, for example, one person may differ from another by only ten points, but sound educational practice has suggested that a difference of this kind may enable one person to become a self-supporting and self-respecting citizen, whereas another may well be placed in an institution. The slightly greater facility of one man in a factory over another can easily give the one steady work, whereas the other will be laid off whenever the factory load is decreased.

6. *The Origin of Individual Differences.*—We may summarize some of the arguments to be presented in Chapter Thirty-Seven by saying that the following facts are used to prove that individual differences have their origin in hereditary dispositions. There are, first, all of those facts which have to do with family resemblance. Ever since the first studies of Galton on this problem it has been argued that the correlations between intellectual and physical features among the members of a single family are apt to be higher than correlations between the members of one family and the members of another.[20] It has been shown, for example, that a member of a family in which there are a great many eminent persons has a much greater chance

[18] Hull, C L , *Aptitude Testing*, N Y , World Book Co , 1928, pp 33 ff
[19] Wechsler, D , "The range of human capacities," *Scient Mo* , 1930, *31*, pp 35–39
[20] Galton, F , *Hereditary Genius*, London, Macmillan, 1869, pp 383 ff.

of becoming eminent than the member of a family which does not include eminent relatives. The inference is that eminence is a hereditary trait. A corollary runs to the effect that feeblemindedness and other types of intellectual impoverishment are likewise hereditary.

These facts are often said to be supported by the comparisons that can be drawn between identical twins. As a typical example, we may take a study of 158 pairs of twins who were compared with 199 ordinary siblings. The average difference in the intelligence quotient between the siblings was 13.1 points, whereas the average difference between identical twins was only 5.0 points. Non-identical twins differed from one another by 7.3 points.[21]

As we shall see later on, there are other facts such as the alleged constancy of the I Q. and the resistance of individual differences to modification through practice that lend further support to the hereditary point of view. There are, however, a certain number of facts which suggest the great importance of environmental factors. It is known that the intelligence quotients of children are more or less intimately related to the social and economic status of their parents. If it is assumed that the status of the parents is determined by their innate superiority, resemblances of this kind must be taken as a further argument for the hereditary point of view. It can be shown, however, that the social and economic status of parents may depend in part upon environmental factors.[22]

Other studies on the effect of new environments on children placed in foster homes and on the specific influence of such factors as literary interests, recreational interests, tools, books, and other objects throw still further light on this group of problems.

Since we are to study the topic of original nature in another chapter, we may postpone further reference to the experimental material. It is clear, however, that all of the fields of applied psychology must have a profound interest in this question. If individual differences are largely native, any attempt to discover them before an accident and before the employment of the worker might mean a tremendous sav-

[21] Tallman, G. G., "A comparative study of identical and non-identical twins with respect to intelligence resemblances," *27th Yearbook Nat Soc for Study of Educ*, Bloomington, Ill., 1928, Part I, pp. 83–88. See also Gesell, A., and Thompson, H., "Learning and growth in identical infant twins an experimental study by the method of co-twin control," *Genet. Psychol Monog*, 1929, *6*, 1–124.

[22] Goodenough, F. L., "The relation of the intelligence of school children to the occupations of their fathers," *Amer J Psychol*, 1928, *40*, 284–294. Jones, D. C., and Carr-Saunders, A. M., "The relation between intelligence and social status among orphan children," *Brit. J. Psychol*, 1927, *17*, 343–364.

ing to industry. On the contrary, if individual differences are largely a matter of training, industry could well afford to go back to the older methods of apprenticeship by means of which an untrained and an inexperienced worker could be gradually inducted into a given occupation. The experiments that have been made on the effect of practice on individual differences show that practice is not ordinarily effective in leveling out the performances of a group of subjects. Even these data are subject to variable interpretations. As a practical matter, the failure of practice to eliminate individual differences when practice is given to adult or semi-adult subjects means that it can make no difference to industry whether individual variations from the norm are native or acquired This is only to admit that after growth has been under way for a number of years, each person will become more or less stabilized in his traits and talents. Industrial organizations would have to use him then just as he is found. It is easy to see, however, that the relative fixity of an adult might be the result of a highly stabilized environment during the tender years of infancy. Practical control over individual differences, then, ought to become the primary object of research in child psychology.

The inference is that psychotechnology must have a twofold interest in the problems of original nature versus training. The one is a very practical interest for both heredity and environment work toward the early stabilization of each person. This means that industry and all of the other branches of applied psychology as well must take human nature as it finds it. It is reasonable to expect that a serious attempt should be made to fit each person as neatly as possible into an appropriate working situation On the other hand, psychotechnology must have a theoretical interest in the problem of original nature versus training, for it is one thing to admit and take account of individual differences at the mature level, and quite another to let one's philosophy be suggested by the inevitable factor in human nature. The point is that the attitude of the environmentalist toward human traits is an attitude that favors research upon the origin and development of these traits.

7. *The Aims of Applied Psychology.*—The general aim of applied psychology is to bring to the understanding of personal and social activities the same sort of guidance, thoughtful planning, or intelligence as is brought to bear upon other problems of living by the physical and biological sciences The science of biology, for example, is the parent science to the art of medicine. In the study of the human body,

a vast number of facts have been gained which enable the physician and the surgeon to relieve man of some of his fear of accident and disease. The sciences of physics and of chemistry are the parent sciences which lie behind a very large part of modern industry. Through the discovery of facts about materials and about the various forms of energy, it has been possible to make nature the servant of man instead of leaving man a victim of nature. The science of psychology stands in this same sort of relation to a great many personal and social problems.

We shall write out a list of these problems shortly. In the meantime, we may state the general aims of applied psychology in another way. One of the functions of all of the sciences is to make men wise about an event before it has happened rather than afterwards Human wisdom is very great when the sun, the moon, and the earth, the onset of certain kinds of diseases, the ways in which the chemical elements will react with one another, and the extent to which energies of different types will act upon one another, are under examination, but wisdom is often greatly limited when men try to exercise intelligent control over their own thoughts and actions. When oxygen and hydrogen are brought together under well-known and well-defined conditions, the chemist can predict with almost absolute assurance what will happen. When a seller and a buyer come together, however, there is no way of knowing at the present time what will happen. Yet it is the business of applied psychology to find and make use of such facts as it can in order to allow both the buyer and the seller to be as intelligent and as effective as possible in their relations with each other.

If, now, we pass from this example to all of the relations that may obtain between men, we begin to get some idea of the general area within which applied psychology proposes to work. But there are still other areas. Men have to be wise before the event, not only in their relations to their fellows as individuals, but in their relations to whole groups of persons. Similarly, societies and nations can well afford to meet each other at this same level. Moreover, modern man finds it more of a task to adjust himself to his environment than primitive man did. The former has surrounded himself with machines many of which can be called deadly weapons,—if he is remiss for a moment in handling them. When a million people a year are injured in automobile accidents, it would seem that there had been much lack of wisdom in connection with this one machine. Other products

of inventive genius take their toll, not because they are inherently deadly, but because so many persons do not know how to be wise about the use of such products in advance of the accident rather than after it.

These same considerations hold true of each person taken as an individual. The human body is made up of a great many members. The brain alone contains more than eleven billion nerve cells. Within this community all kinds of minor communities of function can be established. These communities war with one another in a way that it has taken the whole of Part Four to describe. In other words, there is a vast amount of psychological wastage due to no other cause than lack of organization and cooperation among the several psychological functions of each person. Most men now come to the end of their days realizing that life has consisted of an almost endless amount of remorse or of regret occasioned by the fact that they have been able to be wise only after the events that have taken place in them or have been caused by them. Applied psychology would have the temerity to suggest that, some time in the future, enough will be known about human nature so that each person can be a little wiser in his self-development in advance of conflict, repression, doubt, hesitation, incompetence, and unpreparedness. In other words, just as there is preventive medicine, and life insurance, and foresight against time of famine, storm, or earthquake, so there may be prevention of the psychological sort against maladjustment

This possibility has become sufficiently clear, perhaps, as we have passed on from chapter to chapter. There is, however, one other phase of the general aim of applied psychology which has not received enough attention. It is a phase suggested by what has been said about foresight or planning at the psychological level. The man on the street commonly supposes that applied psychology should measure its value by the extent to which it can reduce accidents, bring in more returns from advertising, soften social, economic, and political conflicts, increase the skills behind high-pressure salesmanship, or make distinguished men out of untrained infants. A good argument can be made out, however, in favor of the proposition that sound living should mean mental comfort, freedom from worry and uneasiness, satisfaction with information and culture, together with some degree of artistry in the development of personal character. In short, psychology might easily contribute to what the Greeks would call a good life.

It is often assumed that a psychologist cannot talk about such matters as these without becoming unduly sentimental and certainly without departing far from his status as a man of science. So long as he adapts his facts to education, to industry, to commerce, or to some other "external" problem, he is allowed to think that he is on safe ground, but when he holds that one of the aims of applied psychology should express itself in the development of happier or more comfortable living for each person, his more scientific brethren will remark that he is becoming foggy in his thinking or parental in his interests.

There are only two grounds upon which this criticism can be based. On the one hand, a long tradition supports the view that it is one of the peculiar functions of religion to comfort the distressed and bring joy to the downcast. It is now known, however, that religion is only one of the many ways in which healing of the psychological sort can be effected. Moreover, loss of religious hope is not the only source of human unhappiness. On the other hand, it can be said against the parental and solicitous activities of the applied psychologist, that no one knows enough about the more intimate phases of human nature to enable him to be of any service in these respects. There is some justification for this point of view and when, in some of the later chapters of the book, we try to speak in more detail of these things, we shall have to exercise the caution that lack of knowledge should always bring to scientific men.

8. *The Control of Human Nature.*—We have said in the last section that one of the general aims of applied psychology is to enable men to be just as wise before psychological happenings as they have learned how to be in advance of physical and physiological happenings. When we said this, it was implied, of course, that human nature is like other parts of nature in the sense that it is more or less completely subject to laws that can be discovered and used. In other words, it was implied that the events studied by the psychologist are made up of as many causal sequences as is the rest of nature.

This implication runs exactly contrary to one of the most frequent and cherished opinions that men have held about themselves. From time immemorial men have thought of themselves as somehow free to do as they pleased. We ourselves can be interpreted to have argued in this direction when, just above, we drew a distinction between thing-techniques and person-techniques. Things, it will be said, can be handled easily because they are subject to the laws of nature, but persons have a free will and a certain amount of spontaneity and they

cannot be handled, therefore, with the aid of the laws of nature. It would follow that, if human nature is unpredictable and hence beyond guidance or control, the study of applied psychology must be a vain study. What are the facts?

It is necessary, first, to draw a distinction between the experiences a man enjoys when he says that he has acted in response to his own free will, on the one hand, and the general doctrine of freedom in nature, on the other. About the first, there can be no doubt. Men have always remarked the unusual but wholly private feelings that arise when they are free to choose and to act as they may desire. That is, there is a certain kind of psychological operation which carries with it the immediate and direct experience of personal freedom But, as a famous philosopher has put it, this can mean only what it says, viz., that a man is free to do as he pleases. He may not be free to *please* as he pleases. To do as he pleases merely means that some kinds of acts have that unique quality about them which we call the sense of freedom. To please as one pleases means to proceed as though one were in no real way dependent upon one's past experiences. Let us examine these matters a little more closely, for it is clear that they strike right at the heart of the problems of applied psychology.

There is one respect in which it is absolutely certain that human beings are not free. This is true in the group sense or in a statistical sense. For example, it is absolutely certain that approximately 650 people will be killed by automobiles within the next week in the United States alone That is, a certain number of pedestrians and drivers will make those choices and perform those acts which will lead to their death. On the average, there is no escape from this fact. It is just as certain of human nature, taken group-wise, as is the rising of the sun. Similarly, it is absolutely certain that other groups of individuals will die from cancer, from heart failure, from sleeping sickness, and the like. All of these facts can be predicted and great business enterprises such as insurance companies depend for their solvency upon the inflexible character of such information.

If we look at each person, however, the situation is quite different. Even though we may say that certain kinds of human facts are sure to take place, on the average, it is not possible to pick out the very next person who will die in an automobile accident. Are we then to say that there are laws of human nature which apply to groups of people but that there are no laws which apply to the individual? That is, when human beings are taken in large numbers, do we find

that they are not free to do as they choose, whereas they gain such freedom when they are taken singly? Clearly, there must be something wrong with this picture.

The thing that is wrong lies, apparently, in the belief that human beings are actually free in the second sense described above Everything that we know about them, however, seems to suggest that they are not free In support of this proposition, we may take the following instances In the field of learning, it is now known that skills are acquired in accordance with very definite principles. For any given subject, an increase in skill is directly dependent upon the amount of practice and upon the way in which the learning situation is presented to him. Research has gone so far in this particular group of problems that it is now possible to cite a considerable number of laws or principles which, if properly used, will promote the learning process with the same regularity as the growth of corn may be promoted by rain, sunshine, and good soil. This fact will become clear in the next chapter.

When any considerable number of learning processes have been completed, that is, when a large number of stable connections between stimulus-situations and responses have been laid down in the nervous system, it is possible, given any particular stimulus-situation, to predict what the response will be and, given any particular response, to state what the stimulus-situation must have been. Human nature is, of course, tremendously variable in the sense that an immense number of factors have to be controlled if behavior is to be controlled, and for this reason it is much easier to say that the lower animals are not free in their actions, but in spite of the variability of human conduct in the face of variable situations, there are an immense number of regularities which give form and substance to the argument we are making.

At a more general level, we may argue as follows. Let us suppose that human beings are actually free to do as they please and free, at the same time, to please as they please. This means, of course, that the reader of this book is made up in such a way that he could, on occasion, liberate himself wholly from his past experience and carry out some action which will, in no way whatsoever, reflect the total trend of his character. For purposes of argument let us suppose that he has stepped up to a man on the street and shot him He is forthwith hailed into court. In reply to the question, "Are you guilty?" he may say, "I am not guilty. This act does not represent either my

training or my character. It was a perfectly free and uncaused act for which you cannot hold me responsible. On the spur of the moment it occurred to me that it would be a good idea to shoot the victim and the thing was done. Because of past training and because of my general respect for human life, I do not believe that one should commit murder, but this is another matter. Being perfectly free, that is, not being bound by my past or in any way determined in my action, I plead not guilty."

To be sure, no court would listen to an argument of this kind, and it would not listen because it has already accepted the proposition that human beings are not lawless in their behavior. The court would decide that the whole training and disposition of a murderer were of such a character that he should be removed from the common walks of life.

We may now look at this person through the eyes of his parents and of his teachers Let us suppose that, when they were actively engaged in training him in good manners and good morals, they had known all along that the training would not put a permanent bias in the character of the child. We may suppose that they will have known and feared the time when an act of free choice would destroy, in a moment, their many hours of labor. If parents and teachers really believed this about themselves or about young people around them, parental authority and teaching skill would quickly lose their zest.

Now that we have begun to look at this question of free will in this manner, it is easy to see that, even though men have tried to argue themselves into personal freedom, they have actually acted toward one another as though they were not free. Experimental psychology has accepted this common-sense mode of thinking and has assumed, just as all science must assume, the strict determinism of human thought and action. If this assumption could not be made, it would be fruitless to write a book of this kind which proposes to say something about the ways in which psychology may be applied to the daily affairs of men. If, because of human freedom, the data secured from one experiment could have only a chance relation to some other experiment, the whole scientific enterprise would break down. We might say, for example, that *A* will not make a good taxi driver because reaction time is too slow and yet discover that *A* has suddenly decided to change his reaction time.

Experimental psychology must, then, adopt the principle of determinism as a faithful guide in all of its researches. In this respect,

it stands on the same foundation with all of the other sciences. It is only because of this assumption that men of science can be wise before events have happened. Were events wholly unpredictable, it would never be possible to have such prevision save as chance would allow a prediction to come true.

We are now able to conclude that human nature can be controlled. But certain other things must be said at the same moment. Control is possible only when all of the conditions surrounding an event can be identified. Save for very simple kinds of action in response to very simple kinds of situations, control of this sort is not possible in psychology. One must, therefore, do the best that one can. In other words, the psychologist must search for reasonable expectations where he cannot have absolute certainty. If he takes a large number of cases he can be *certain* that a given amount of practice will result in a given amount of skill. If he takes a single case, he may *expect* that a certain amount of practice will yield a certain amount of skill. If he takes a large number of cases, he may be *certain* that a given percentage of republicans will become democrats if the republicans have been in power and there has been a widespread and prolonged drought. About any given subject, however, he cannot entertain anything more than an expectation.

There is, then, wide variability in the conditions surrounding human behavior. It is this variability, perhaps, which has given rise to a belief in the first kind of freedom mentioned above. Consider, for instance, the batter at the plate just as the pitcher is ready to deliver the ball. There is no way of proving that he is free to please as he pleases so far as hitting at the ball is concerned. He is, however, free to hit as he pleases. The point is that he will be pleased to hit or not to hit depending upon variable factors in that one situation. If it is obvious, as the ball comes toward him, that it will not pass over the plate, he will please not to hit at it. If he has just happened to remember that the last pitch was squarely over the plate and if he infers from this fact that the pitcher will now try to tempt him with a ball just off the corner of the plate, he probably will please not to hit. If two strikes and three balls have been called, he may reasonably infer that the next pitch will be good, in which case, he will please to hit.

An attempt has been made to find out how many circumstances there are that may play a part in determining a batter's action under these conditions. At least fifty such items have been noted and described, and this certainly cannot include them all. If a psychologist

could arrange an experiment in which all but one of these fifty items were under strict control and if he could vary the one as he wished, he would be inclined to say that the choice of the batter must certainly be determined. In the nature of the case, no such control can be effected Hence the batter may fail to hit when he should have hit and try to hit when he should not have tried. He will appear to be doing as he pleases.

Not the least of the difficulties to be faced by both applied and pure psychology is the following It is often said that human nature is perverse. We do that which we would not and fail to do that which we would. If, for example, we happen to know what is expected of us, we are very likely to do the opposite. As a case in point, we may take the device known as the lie detector. This device is based upon the fact that a great many people will respond easily and quickly to words that have no bearing upon a given act but will often hesitate about words that do have a bearing The amount of hesitation may be so small as to escape ordinary observation, but fortunately such intervals can be detected by a reaction time apparatus and by slight changes in the resistance of the body and of the skin to small electric currents. Let us suppose, then, that a naive subject is being tested. Indifferent words will have no differential effect, either on his reaction time in reply or upon the electrical resistance of his body. Relevant words, however, will have an effect that can often be interpreted. Soon, however, the naive observer finds out how the thing is working, whereupon the value of the lie detector is lost. The subject may now reply to stimulus words by giving, in succession, the words in the Declaration of Independence or by making up a series of words of his own.

The inference we wish to draw from this experiment runs as follows. Any additional information that the subject of a psychological experiment gets about the study that is being made of him enters into the experimental situation as a new and sometimes, uncontrollable factor. A small child, for example, may respond admirably to a mental test so long as the test is a game between himself and the teacher; but when some children learn that they are being tested, a new element enters into the situation which completely changes the whole affair. Instead of remaining a test of intelligence, the situation will have turned into a test of social attitude as, indeed, it often has.

In short, then, human nature can be controlled whenever the conditions of experimentation are sufficiently known and accounted for. The more naive the subject, the more constant will be the results. It

ditions and who might be, therefore, equally subject to misadventure, we should find that not all of them suffer the same number of accidents over a given period of time. Let us suppose, for example, that we can keep track of such persons for a period of five years. During a period of this length we might expect, on the laws of chance, that one particular person would suffer as many accidents as any other person, since all are at work in the same general environment. Just the contrary, however, is the case. If a large number of such workmen are classified into groups according to the number of accidents they have suffered, it will be found that that group which can be called the no-accident group suffers, on the average, about half an accident during a five-year period. Another group which may be called the one-accident group will have an average of nearly one accident during the period. The multiple-accident group, on the contrary, may have an average of $1\frac{1}{3}$ accidents during the period.[2]

In a still more comprehensive study of accidents involving twenty-two different plants and 8,962 workers, it was found that the having of accidents was subject to the following circumstances. It was clear that the distribution of accidents among the workers was not at all a chance matter. On the contrary, a very few workers accounted for the high average number of accidents of the whole group. There was, for example, a fairly high degree of relationship between the number of accidents suffered by some persons during two different periods of time and a fairly close relationship between accidents of one kind and accidents of another. Furthermore, those persons who are subject to accidents in a factory are found to suffer from accidents at home as well. There was no evidence in this study that the having of an accident is in any way dependent upon the having of a previous accident,—that is, there is no evidence to support the belief that accidents operate like diseases in making a workman more susceptible to them. On the contrary, those persons who fall into the multiple-accident group do so because of some factors which are responsible for all of the accidents suffered by them.[3]

These conclusions, drawn from a study of accidents in industry, are borne out in even a more striking way by studies on the number of accidents in transportation. We may take, for example, a survey of 1,871 accidents participated in by 1,294 drivers employed by taxicab

[2] Marbe, K., "Ueber Unfallversicherung und Psychotechnik," *Prakt Psychol.*, 1923, 4, 257–264

[3] Newbold, E M, "A contribution to the study of the human factor in the causation of accidents," *Ind Fat Res. Board*, Rep. No. 34, 1926.

companies When these employees were distributed according to the number of accidents they had suffered, it turned out that ten per cent of them were responsible for nearly thirty-two per cent of all of the accidents sustained by the 1,294 drivers. Forty-three per cent of all of the drivers were shown to be responsible for nearly seventy per cent of all of the accidents. Fifty per cent of the drivers were responsible for nearly eighty-three per cent of the accidents. On the other hand, it turned out that about twenty-five per cent of all of the drivers had been entirely free from accidents during the period in which they were under observation.[4]

This single study has been supported by a great many other studies of a similar nature Some of them have to do with accidents among the employees of street railway companies, and even among average drivers on the highway It has been shown, for example, in an analysis of 64,000 automobile accidents in New York state that the number of drivers who had been in three accidents was approximately three times the number that would have been expected if the having of an accident were dependent solely upon chance factors [5]

It goes almost without saying that facts of this sort place a tremendous burden upon students of applied psychology. If accidents are not a matter of chance, if, on the contrary, they are the result of certain special features in the human factor, it is the task of the psychologist to find out what these specific features are Furthermore, it is his business to see whether or not persons may be tested for their liability to accident before the accident has been suffered. Then, too, it may be possible, given an accident-prone workman, to train him or to place him in a new position so that he will cease to be a menace to himself and to the other persons around him.

3. *Factors in Accident Proneness.*—There are a great many factors which might contribute to any given accident. These factors are so many and so variable that it is almost possible to say that no two accidents happen for exactly the same reason or under exactly the same situations. Nevertheless, it has been possible to identify, in a general way, the outstanding factors in a number of cases. The Cleveland Railway Company, for example, has made a thorough study of the accidents occurring among some of its employees. It was found that, among fifty motormen, fourteen per cent of the accidents were

[4] *Preventing Taxicab Accidents*, The Metropolitan Life Insurance Co, New York, 1931.

[5] Weiss, A P, and Lauer, A R, *op cit*, p 3 See also Bingham, W V, "Prone-to-accident driver," *Proc 17th Ann Conf on Highway Eng*, 1931, p 4 Slocombe, C S, and Braheman, E E, "Psychological tests and accident proneness," *Brit J Psychol*, 1930, *21*, pp 37 ff.

due to faulty attitude, twelve per cent to the failure of the man to recognize potential hazards, another twelve per cent to faulty judgments of speed of distance, ten per cent to impulsiveness, eight per cent to irresponsibility, another eight per cent to failure to keep attention constant, and smaller per cents (from two to six) to nervousness and fear, defective vision, organic diseases, slow reaction time, high blood pressure, old age, worry and depression, fatigue, and the like.[6]

The relation between accidents and such factors as age and experience, the physical condition of the worker, his race, the degree of fatigue, the rate of work, atmosphere and illumination have been made. In the case of age and experience, it is clear that the relative number of accidents suffered by workers in the field of industry decreases steadily as experience increases. It is clear, of course, that a high degree of relationship might exist between age and experience. In general, the younger the workman, the less his experience. In any case, it is known that accidents are more apt to occur among young men than among older men.[7] The experience side of the picture is filled in by a decreasing number of accidents as experience increases. In one study, for example, it was shown that workers who had had less than one month of experience suffered an accident rate of one hundred eighty-one per cent or an average of nearly two accidents during their working time. The accident rate for persons having less than one year of experience was ninety-two per cent. This figure is to be compared with the average accident rate of persons who had been employed from one to five years. Their average was fifty-seven per cent. Workmen with twenty to thirty years of experience had an accident rate of only thirty-five per cent.[8] The same data come from accidents in transportation. In the Cleveland study mentioned above, those motormen who had less than five years of experience had thirty-six per cent more accidents than those who had from five to ten years of experience. It is clear, then, that age and experience factors do play an important part in the production of misfortunes.

It would seem that the physical condition of a worker might have a great deal to do with the average number of accidents which he may suffer. The evidence on this point, however, is not clear. In the Cleveland study of which we have spoken, only twelve per cent of the total number of accidents could be attributed to such physical difficulties

[6] *The Accident Prone Employee*, The Metropolitan Life Insurance Co., New York, 1930.

[7] Gates, D. S., "A statistical study of accidents in the cotton mills, print works, and worsted mills of a textile company," *J. Indust. Hygiene*, 1920, *2*, pp. 8 ff.

[8] Quoted by Viteles from Fisher, B., *Mental Causes of Accidents*, N. Y., 1922, pp. 34 ff.

as defective vision, organic diseases, high blood pressure, and senility. On the contrary, twenty-two per cent of the accidents were related to poor mental attitude and similar factors. Sixty-six per cent of the accidents were due to improper use of the psychological functions during the operation of a motor vehicle. In other words, the failure to recognize potential hazards, faulty judgments of speed and distance, improper distribution of attention, and the like, were much more significant than physical condition. There are times, however, when men suffer from minor ailments. In these cases, it does appear that a certain number of accidents may be directly attributed to the effects of the ailment.[9]

In some cases it has been helpful to distribute the number of accidents according to the race of the person injured. A certain taxicab company, for example, analyzed 497 accidents among its drivers. Of this number, nearly half (213) were suffered by members of the Hebrew race, whereas only a little more than a tenth of them were suffered by individuals who were born in Italy or whose parents had been born in Italy. All other nationalities, including 174 native-born Americans, accounted for 227 of the total number of accidents.[10] Results of this kind, however, could easily be subject to an error of sampling.

It might be expected that the majority of accidents would be due to fatigue. As we shall see, the word "fatigue" refers, in part, to a decrease in performance that occurs after the prolonged exercise of any function, in part, to toxic products and other alleged "causes" of decreased performance and, in part, to that psychological state called monotony The facts about the relation between accident and fatigue, however, are not altogether clear When a number of studies on this problem are brought together, it appears that the number of accidents tends to increase with each hour during the morning until a maximum is reached at or near eleven o'clock. From eleven o'clock on until noon, the number of accidents falls off almost to zero. Immediately after lunch the rate of accidents rises sharply again reaching its high point a little after the middle of the afternoon. From then on, until closing time, there is a slight decrease in the number of accidents.[11] If the reader can think of these facts in the form of a curve he will see that the hourly distribution of accidents certainly

[9] Newbold, E M, *op cit*, p 45

[10] Cf Viteles, M S, *op cit*, pp 354 ff

[11] Osborne, E E, and Vernon, H M, "The influence of temperature and other conditions in the frequency of industrial accidents," *Ind Fat Res Board*, Rep No 19, 1922.

does not fit his general presumption concerning the distribution of fatigue during the day. As we shall see below, fatigue increases steadily after the second or third hour in the morning and also during the late hours of the day. Some light is thrown on this problem by the relation between the accident rate during day shifts as compared with the accident rate during night shifts. In the latter case, the accident rate stands at its highest near the beginning of the working period and falls off rather quickly during the night period, the lowest accident rate coming at the very end of the night shift. It looks, then, as though the number of accidents must depend upon other factors as well as upon fatigue. This is not to say that fatigue plays no part but only to say that in addition to fatigue there must be other causes [12]

It is almost certain that one of these other causes is the actual rate of production. This fact may be studied either experimentally in the laboratory or directly in an industrial plant itself. Let us suppose, for example, that a group of subjects is asked to aim and to strike at a target. The rate of aiming and striking is varied from one group of trials to another. It can be shown under these circumstances that accuracy in movement is highly subject to rate of movement. Other things being equal, the more rapid the movement the greater the degree of inaccuracy.[13] This same conclusion can be drawn from other laboratory experiments and from classroom experiments as well, although it is known that the effect of speed on accuracy will vary somewhat with modifications of the laboratory situation [14]

It is well known, of course, that rates of production vary greatly during the day. As a matter of fact, there is some reason to believe that the production curve is very much like the accident curves described just above. The inference, then, is that the number of accidents must be significantly related to the rate at which laborers are asked to work. Rate of work, on the other hand, must be closely connected with the development of fatigue. It has been a very nice problem, therefore, to separate the fatigue factor and the rate of work factor in the general picture of accidents. One of the studies that has been made of this situation involved an analysis of 46,000 accidents in two metal manufacturing plants. The study sought to find a way

[12] See the comments by Viteles, M S, *op cit*, pp 360 ff.

[13] Muscio, B, "On the relations of fatigue and accuracy to speed and duration of work," *Ind Fat Res Board*, Rep No 19, 1922, pp 18–36

[14] Hahn, H H, and Thorndike, E L, "Some results of practice in addition under school conditions," *J Educ Psychol*, 1914, 5, 65–84 Myers, G C, "Some variabilities and correlations in learning," *Amer J Psychol*, 1918, *29*, 316–326 Sturt, M, "Comparison of speed with accuracy in the learning process," *Brit. J. Psychol.*, 1921, *12*, 289–300.

of measuring units of output and to compute the hourly accident rate per unit of output If accidents are dependent only upon rate of work or upon number of units of output, it ought to follow that the relation between accidents per unit of output will show a marked increase toward the end of the work period. It would seem, then, that fatigue was an essential factor in causing accidents [15] In still another study, however, the number of accidents was shown to stand in close relation to the total power load in the factory, the inference being that variations in power load ought to be equivalent to variations in output. Altogether, then, the facts seem to say that the number of accidents may be occasioned both by rate of work and by the incidence of fatigue.[16]

In the case of atmospheric conditions, it is quite clear that a favorable temperature and humidity decrease accidents. In one study, for example, it was shown that the smallest average number of accidents in munition plants occurred at a temperature of 67 5 degrees The number of accidents increased markedly with a lowering of temperature to 52.5 degrees. The number also increased with an increase in temperature, but a marked difference was found between men and women, for accident rate among men increased very rapidly when the temperature rose above 72 5 degrees.[17]

The relation between accidents and atmospheric conditions, together with the relation between accidents and degree of illumination will receive more attention in one of the later chapters of this section. In passing, however, we shall mention one study in which it was shown that the number of accidents seemed to depend in an intimate way upon the nature of the artificial light that was used. Since, however, this conclusion was based upon the fact that accidents occurred more frequently during the two winter quarters of a year than they did during the two summer quarters, both illumination and temperature changes must have been included.[18]

4. *Prediction and Prevention.*—In view of these facts about the causes of accidents, it is hardly necessary to argue that, given the history of any worker, one ought to be able to predict the number of accidents which that worker will suffer during a given period of time. In other words, a definite meaning and a measurable value can be

[15] "A comparison of an eight-hour plant and a ten-hour plant," *Public Health Service Bull*, 1920 (No 106) Cited by Viteles, M S, *op cit*, pp 359 ff

[16] Viteles, M S, *op cit*, pp 361 ff

[17] See Viteles, M S, *op cit*, pp 364 ff

[18] Stephenson, A, "Accidents in industry," *J Nat Inst Ind Psychol*, 1926, 3, pp. 196 ff.

given to the phrase "accident proneness." Because of a large list of factors, some of which are external to the average worker but many of which are internal to him, certain persons may be expected to have more than their share of accidents. These persons can be discovered and either warned of their proneness to accident or treated in such a way as to make them less of a menace to themselves and to the others around them [19]

Since a simple warning can do nothing toward helping a person, and since a social group does not profit by simply discharging him, all industries have made serious efforts to search out the causes of the accidents and at the same time find proper remedies. In some cases this is not at all difficult. In the age and experience factor, for example, it appears that a worker can be introduced to more complex and high speed modes of work by a period of apprenticeship in some of the simpler modes This method is being used more and more frequently. In the case of physical condition, most industrial plants now have hospital and surgical services for their workmen. These services are partly for the sake of giving immediate attention to those who have been injured and partly to ward off illness by giving advice on health matters to employees.

It is not so easy to handle some of the other factors which lead to accident. Fatigue, for example, must always be counted upon as an inevitable consequence of industrial labor and yet even here, as we shall see in a later chapter, the introduction of short rest intervals during a working period may go a long way toward diminishing the amount of fatigue. The use of rest intervals in this way has brought about not only lessened fatigue but an increase in total output for any given period of time. Rate of production is also a problem that cannot easily be handled In a long assembly line, for example, various operations must be geared to one another so that the whole pattern of production can be made as efficient as possible. The slower the rate of movement along the assembly line, the greater the cost of the product. When a factory is selling its goods on a low margin of profit, it is almost essential that it shall get as much output per man hour as it can. This phase of accident proneness, therefore, goes beyond the mere question of efficiency. It touches upon more general social problems as well.[20]

[19] Orth, G. A., "Does accident prevention pay?" *Ann Amer Acad Pol and Soc Science*, 1926, *123*, pp 22 ff

[20] Cf Watkins, G S, *Labor Problems*, N Y, Macmillan, 1929, pp 320 ff, and *passim*.

It is now possible, in a small way, to control temperature and illumination. Clearly, much more can be done with respect to illumination than with respect to temperature and, as we shall see shortly, the illuminating engineer has been able to take long strides toward proper lighting not only in the factory but in the home, in the schoolroom, and on the street. Since changes in the seasons cannot be prevented, any control over atmosphere must depend upon the use of air-conditioning apparatus. This is a costly process and not easily applicable to very large areas, and it looks, therefore, as though accidents that would normally come as a result of temperature conditions must be attacked from some other source.

In addition to these more general modes of approach to the problem of accident prevention, there are three specific modes. In the first place, a serious effort is being made to find out whether there are any tests which can be made of a person that will reveal weaknesses in his psychological functions before he ever gets into a dangerous situation. The nature of some of these tests has already been suggested in our brief study of driving an automobile. Differences in reaction time, for example, can be measured easily enough, as can also various types of motor coordination. Furthermore, it is possible to find out a great many things about fluctuations of attention, rate of learning, accuracy in the use of the perceptual functions, general alertness, and so on. Since it will be more convenient to discuss a great many of these special tests in another chapter (Chapter Thirty-Three) we shall say nothing more about them here.[21]

In the second place, the prevention of accidents can be greatly aided by making what has come to be called a clinical study of the accident-prone person. It is clear, of course, that no two accidents may depend upon exactly the same factors. Moreover, these factors may operate in different intensities or in different patterns with respect to one another in any given case. A set of statistics may show some of the general trends in accident rate and some of the more general relationships between accidents and special personal or environmental factors, but it is only the clinical study that can show just how these various factors and relationships will have operated in any single case.[22]

In making a clinical study of any given accident, some represen-

[21] See Viteles, M S, *op cit*, Chaps XIV and XX

[22] Viteles, M S, "The clinical viewpoint in accident prevention," *Proc 5th Internat. Congress Psycho-tech*, Utrecht, 1928, Shellow, S M, "The accident clinic, how it functions and what it accomplishes," *Person J*, 1930, 3, pp 214 ff.

tative of the employer will, perhaps, conduct an experimental examination of the different traits of the employee. This information will be clothed with a rich background of material drawn from the home life of the employee, from the general run of his financial and other affairs, from his relations with his neighbors at home, and from other employees in his own department. It is these and other factors which give rise to discontent, worry, uneasiness, and carelessness. It is clear, of course, that data of this kind can be secured only after a personal interview with the employee.

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CHAPTER THIRTY

EFFICIENCY

1. *Introduction.*—There is no word which describes more accurately the frame of mind and the guiding star of our modern technical society than the word "efficiency." The word had its origin, apparently, in some of the writings of the early economists. It referred to the general plan of getting more work done with a smaller amount of energy and with a greater degree of safety. Now the word has been extended to cover almost every kind of human activity. We think not only of machines that must be more efficient but principally of the efficiency of human nature along the highway, in the operating room, in the factory, in the sales office, in the law court, and in the schoolroom.

So far as psychology is concerned, the exact meaning of the word can be gained from some of the contrasts that have been drawn between habit and skill A habit is any well-learned type of action to which a minimal amount of conscious attention need be given. Skills differ from habits in the sense that they depend either upon greater speed, —or upon an optimal speed,—and upon greater accuracy, or upon both.[1] We might, however, extend the word even to cover some of the facts that are described by the word "adjustment." It will be clear, of course, that any person who is adjusted in his psychological operations according to some of the principles outlined in Chapter Nineteen will also be a more efficient person. He will be more or less at peace with himself and quite capable of conducting himself in an effective way with respect to the objects and events around him and with respect to the social group in which he holds membership.

As a rule, no one thinks of the word "efficiency" as having anything to do with values. That is, efficiency is usually measured by the rate at which work can be done, by the amount of energy that is expended, or by the degrees of accuracy and of safety which are achieved during the day. One might, however, go so far as to say that some efficiency

[1] Some of the literature on the distinction between habit and skill is as follows Pear, T H, "The nature of skill," *J Nat Inst Indust Psychol*, 1928, *4*, 193–202, "Some subtler skills," *Brit J Psychol*, 1929, *20*, 145–160, Gemelli, A, "Recherches sur la nature l'habilité manuelle," *J de Psychol*, 1929, *25*, 163–200, Bruce, W F, "Shall habits be discarded in educational psychology?" *J Educ Psychol*, 1930, *21*, 479–488, Tuttle, H. S, "Habit and attitude," *J Educ. Psychol*, 1930, *21*, 418–428.

could be exercised in a choice of values and it is certainly true, as we shall see in some of the chapters of Part Seven, that the creation of a painting, of a piece of music, or of a bit of good literature can be made more efficient through the use of psychological facts. Even the art of playing a piano and the appreciation of the artistic efforts of others can be improved in the same way.

Most frequently, however, the word efficiency is used in connection with the efforts of men in industry and commerce. It is in these fields more than in any others that differences in efficiency may make very great differences in the cost of production. A man who is slow or awkward may make it necessary for an entire assembly line to be geared to his particular rate of work. Not only is this true, but lack of speed and lack of accuracy may, as we have seen, stand high among the causes of accident.

It has become customary to discuss the whole problem of efficiency in terms of the relationship between it and certain other well-defined conditions. Among the conditions about which there is some experimental information we may mention the following, viz., degree of skill, degree of fatigue, the use of such drugs as alcohol, nicotine, and caffeine, the nature of ventilation and of illumination in the workroom, the presence or absence of noises and other modes of distraction, general climatic changes, the nature of one's diet, the presence or absence of monotony, and so on. It is the purpose of this chapter to recite briefly some of the main facts that have come to light about the relation between efficiency and these various circumstances.

2. *The Work Period.*—As a preliminary step, we may write out a few general facts about the work period as it is commonly met with in a factory. Almost any unit of time may be chosen for this purpose. The unit most frequently used is the day; but one might use just as well, the hour that one devotes to the study of this chapter, the two hours that one may devote to a game of tennis or of football, the half-day that one devotes to the writing of a theme, the week that one devotes to an examination period, the several months that one devotes to the writing of a book, and so on.

Let us say that we have already taken some typical period as, for example, the period of one hour devoted to the study of this chapter. It then appears that the curve of work during this hour may be characterized in certain ways. In the first place, it will be found that the period will often begin with a level of efficiency which may be called the "warming-up effect." In the type of effort that one would use in

reading this chapter, the warming-up period would consist mostly of the following processes. The chances are that the reader has not had any of the facts about industrial psychology before him in advance of opening the book to this place. When these pages are presented, they form, of course, a continuous stimulus-situation. It may be that this stimulus-situation will differ mightily from the one that has just previously dominated the behavior patterns of the reader. He will not be in a receptive attitude, therefore, toward this new material. As he reads, however, his attitude may change. That is to say, a new set of associations will be stirred up such that his comprehension of what he is reading will be favored. Thus the whole study hour will be brought to a more efficient level.[2]

If the work period which we are describing is given over to hard manual labor, a similar warming-up effect may be noted.[3] Here, however, more of a demand will be made upon the whole physiological organism Normal rates of breathing, of pulse, of blood pressure, and of metabolism must be changed to meet the new demands. Moreover, the skills which one would like to use may be a little rusty. Altogether, then, the warming-up effect would serve to put the worker into a more effective attitude and disposition in which case his output, a few minutes after work began, might be greater than it was at the start. We shall meet some of these facts in a very real way when we come, in a moment, to describe variations of efficiency throughout twenty-four hours of a day.

After the warming-up period has been passed, the reader or the worker will move along at a fairly regular pace for a considerable period of time. This phase of the work period may be called the plateau of effort. The plateau of any given person will be just as high as his average tempo of work or his skill will allow it to be. One of the readers of this chapter, for example, may read along at two or three times the rate of another. He will thus differ from the slower reader in the height of his plateau, but his performance will usually stay upon a fairly even level. The changes that occur will be related more often to special sources of motivation or to special sources of

[2] Skaggs, E B, "A study of 'warming-up' in the case of a task of more complicated perceptual motor coordination," *J Appl Psychol*, 1931, *15*, 499–511. Other studies are as follows Robinson, E S, and Heron, W T, "The warming-up effect in learning nonsense syllables," *J Genet Psychol*, 1928, *35*, 219–228 Mitchell, M B, "The alleged warming-up effect in memorization," *J Exper Psychol*, 1933, *16*, 138–143 Chapman, J C, and Nolan, W J, "Initial spurt in a simple mental function," *Amer J Psychol*, 1916, *27*, 256–260.

[3] Skaggs, E B, "A study of 'warming-up' in the case of a task of more complicated perceptual motor coordination," *J. Appl. Psychol.*, 1931, *15*, 499–511.

distraction than to any other factor. This phase of the work period will also come out more clearly as we describe an average day's labors.

At some indeterminate period after the plateau has been reached, there will come a falling off in output or in the quality of performance. This end-effect is the result of the repeated use of the organism throughout the work period. As a rule it is occasioned by the development of fatigue, although monotony and loss of interest may also betray themselves in lessened performance. In certain kinds of performance and under special motivation there may appear, at the end of a work period, a short interval known as the final spurt. In running a half-mile race, for example, the rate of movement of the athlete does not become progressively slower. On the contrary, the whole race will be run at a given pace save for the last hundred yards. Somewhere in this hundred yards the runner will increase his tempo and perhaps also the length of the stride. Obviously, a final spurt of this kind does not contradict the final fatigue effect. If a man runs faster at the end of his course, he does so with an increased expenditure of energy.[4] If there are no reserves of energy, the final spurt cannot appear.

We may now look at these features of a typical work period from the point of view of actual labor in the factory and in the mine. In general, the first hours of the morning are warming-up periods. These periods may not last for more than a few minutes, but in some cases production may not reach its maximal level until the second or third hour after work has begun. Toward the noon hour, the rate of production will fall off greatly, but immediately after lunch the rate rises almost to the initial rate in the morning. Early in the afternoon, there will be some increase in output but the curve of work will not reach the maximum reached in the morning. Moreover, the rate of production falls off very rapidly during the late afternoon. It used to be thought that these variations in the work period must be due to some native rhythm on the part of the laborer himself; but it is now clear that it depends primarily upon the length of the work period. If the working day begins at 10:30 instead of 7:30, the same kind of a curve is gained.[5]

The marked retardation of production toward the end of the day has suggested a number of experiments upon the best length of a

[4] Hill, A V, *Muscular Movement in Man*, N Y, McGraw-Hill, 1927, *passim*

[5] Hollingworth, H L, "Variations in efficiency during the working day," *Psychol Rev*, 1914, *21*, 473 ff Laird, D A, "Relative performance of college students as conditioned by time of day and day of week," *J. Exper. Psychol*, 1925, *8*, 50–03.

working day and upon the best length for a working week. For a long time it has been supposed that ten hours a day, and six days a week, should make a normal schedule. It is now known, however, that the average output per hour tends to vary more or less closely with the length of the day. That is, the longer the day, the less the hourly output and the shorter the day—within limits—the greater the hourly output.

This relationship has been studied both in the laboratory and in the practical field. It is known, for example, that if a subject is asked to squeeze a hand dynamometer a great many times, the strength of any given squeeze will depend upon the number of efforts the subject expects to make The average performance of seven subjects who knew that they were to make only one attempt was about thirty-one per cent greater than the average performance of the same men when they knew that they were to make fifteen attempts In industry, there is a case on record where two factories making the same article differed from one another in average hourly output by a little over three per cent, the difference being in favor of the factory which used an eight-hour day and against the factory using the ten-hour day.[6]

Facts of this same order appear when the week rather than the day is the total unit A study of the output of a machine shop, for example, showed that the smallest output came on Monday, and the largest on Wednesdays and Saturdays Tuesday's output was slightly in excess of Monday's but not so great as Wednesday's Output, then, decreases toward the end of the week save for Saturday where it appears that the factors favoring an end spurt were great enough to overcome the fatigue factor Other studies on weekly variations in output have not shown this end spurt.

The amount of work done during any single day also depends upon the total number of hours in the working week. In a munitions plant, for example, a reduction of the total number of hours from 58 2 to 50 0 led to a marked increase in the hourly rate of production and to a total increase of production of twenty-one per cent. This result cannot be expected from every reduction in total number of hours, however, for there comes a time when too short a working period must mean diminished rather than increased output. The problem is to find an optimal number of hours for the average laborer. In one case, it appeared that the optimum stood at about forty hours. In a group of

[6] Vitels, M S, *op cit*, Chap XXII.

box manufacturing plants it was found that a thirty-six hour week was less effective than a forty-hour week, whereas the forty-hour week was more effective than either a forty-four or forty-eight hour week.[7]

Altogether, then, it seems fair to say that there is some optimal length of time during which the total output and the hourly output will reach their maximal value. If this time is determined for any given industry, it does not follow that the workers will adjust themselves to it immediately. On the contrary, in industry, as in athletics, men acquire time or pace habits. It may take two or three months to change these habits in any given industry.[8] Once the change has been effected, production will attain a maximal value as compared with energy output, with liability to accident, and with low levels of monotony.

As we have said, these general facts come out of objective measures of efficiency, but they are supported by studies on the subjective feelings of laborers at various parts of the day. Each member of a group of subjects was asked, for example, to describe his feelings at different times during the day, on different days of the week, and during different months of the year. Measures of the intensity of feeling were gained through the use of a rating method where +5 represented the very best kind of feeling, while −5 represented the very worst. Between these two extremes other degrees of feeling were noted by the subjects. Among the conclusions that were drawn from this rough way of describing the intensity of feelings were the following. It appeared that most of the subjects had a tendency to overestimate their pleasant feelings and to underestimate unpleasantness. It looked as though the levels of feeling were lowest during the first and last half-hours of the day. Moreover, the average level of feeling seemed to be lower on Monday than on any other days of the week. January, February, and March gave a lower level of feeling than April and May, the general attitude of the subjects reaching a high point in June. The level was lower in July and August and reached another high point in September. In general, it seemed that the average level of feelings might be lower after forty years of age than before.[9]

3. *Degree of Skill.*—No argument could be raised against the proposition that the efficiency of a person must depend upon the skill that

[7] Miles, G. H., and Angles, A., "The influence of short time on speed of production," *J. Nat. Inst. Ind. Psychol.*, 1925, *2*, 300–302. See also Vernon, H. M., "The speed of adaptation of output to altered hours of work," *Ind. Fat. Res. Board*, Rep. No. 6, 1920.

[8] Pennock, G. A., "Industrial research at Hawthorne," *Person. J.*, 1930, *8*, 296–313.

[9] Cason, H., "General curves and conditions of feeling," *J. Appl. Psychol.*, 1931, *15*, 126–128.

he has acquired. The normal processes of education give to most men a fairly high degree of control over their muscles, but it is not possible in any normal process of maturation to gain all of the special skills that may be needed in any particular task. When a person takes up some new task with the skills which he has already acquired, he is almost certain to work less slowly and to be less accurate than he will be after variable amounts of special practice. It frequently happens that this kind of practice can be gained after a brief period of apprenticeship during which the worker may receive a lower salary and at the same time submit himself to further instruction [10]

In other cases, the skills to be learned are of such a character as to call for special preliminary training. A surgeon, for example, must develop as fine a use of his fingers as will be acquired by an expert piano player. Men who operate high-speed machines are often known to make a large number of unnecessary movements when they first begin. By special training and even after a photographic analysis of the movements that are actually necessary, their efficiency may be increased not only by increasing the speed of operation, but by decreasing the use of energy through the making of fewer movements.[11]

In general, one may say that the lower the degree of skill, the less efficient the worker. This does not mean, of course, that every task requires that a man shall move as fast as possible. On the contrary, as we have seen on page 24, it is sometimes highly useful to be able to move at an optimal speed, that is, at a pace which is the right pace for a long period of effort rather than to move with maximal speed. In any case, almost every large industry has now made it possible for new workers to go through a training period so that the special skills which may be required in any trade can be brought to the right pace and form.

4. *Fatigue*.—If one could be sure, after a period of training, that one's skill would remain at the level that had been reached by practice, many of the problems of efficiency would be avoided. There are, however, two factors which interfere with a skill that has already been brought to a satisfactory level. The first of these is forgetting. To be sure, the processes of forgetting are not very important so far as a worker is concerned who goes back to the same task day after day. It has been shown, however, that an unexpectedly large number of

[10] Viteles, M. S., *op. cit.*, Chaps. XIX and XX.

[11] Gilbreth, F. B., *Motion Study*, N. Y., D. Van Nostrand, 1911. Also Gilbreth, L. M., and Gilbreth, F. B., *Applied Motion Study*, N. Y., Sturgis and Walton, 1917.

accidents during the first hour of the morning or on a Monday morning must owe their origin, in part, to forgetting processes that have taken place during the night or over the week-end. As every worker knows, he must, when he takes up a task after a short rest interval, warm himself up to his labor again As we have seen above, this warming-up process is partly a matter of getting the physical machinery into operation and partly a matter of remembering again what has to be done.

The other factor which interferes with an acquired skill is known as fatigue. This word covers a very great variety of facts and inferences. There is, first, the problem of the difference between physical fatigue and mental fatigue.[12] When one uses the phrase "mental fatigue" one might be supposed to argue that the mind is a kind of stuff or substance which can become tired in the same way that a body becomes tired From the studies that have been made on this problem we may draw the inference that the phrase "mental fatigue" refers to that kind of work which depends primarily upon the use of the nervous system and, perhaps, of the vocal apparatus. The term "physical fatigue," on the contrary, refers, in part, to the lessened work that can be done by the nervous system, but mostly to events that happen in muscle tissue or in the regions where motor nerves touch muscle fiber [13]

It is known that, as a result of the continued exercise of any motor or psychological function, there will be left over in the bodily system, certain amounts of toxins. The most important of these are carbon

[12] Arai, T, "Mental fatigue," *Columbia Univ Contrib to Educ*, 1912 (No 54). Batty, A M, "Some observations upon practice and fatigue as they affect the rate of tapping," *Amer J Psychol*, 1909, *20*, 440–455 Heron, W T, "The warming-up effect in learning nonsense syllables," *J Genet Psychol*, 1928 *35*, 210–228 Robinson, E S, and Heron, W T, "The warming-up effect," *J Exper Psychol*, 1924, *7*, 81–97 Thorndike, E L, *Educational Psychology*, N Y, Columbia Univ Press, 1912, Vol III, pp 1–140, especially 111–125 Dodge, R, "The laws of relative fatigue," *Psychol Rev* 1917, *24*, 89–113 Myers, C S, "Conceptions of fatigue and adaptation," *Psychol Rev*, 1925, *32*, 1–16 Robinson, E S, "Principles of the work decrement," *Psychol Rev*, 1925, *33*, 123–134 Robinson, E S, and Bills, A G "Two factors in the work decrement," *J Exper Psychol*, 1926, *9*, 415–443. Thorndike, E L, "Fatigue in a complex function," *Psychol Rev*, 1914, *21*, 402–407 Thorndike, E L, "The curve of work and the curve of satisfyingness," *J Appl Psychol*, 1917, *1*, 265–267 Garth, T R, "Mental fatigue during continuous exercise of a single function," *Arch Psychol*, 1918 (No 6). Garth, T R, "Racial differences in mental fatigue," *J Appl Psychol*, 1920, *4*, 235–244 Freeman, G L, and Lindley, S B, "Two neuro-muscular indices of mental fatigue," *J Exper Psychol*, 1931, *14*, 567–605. Johnson, H M, "The real meaning of fatigue," *Harper's Mag*, 1929, *141*, 1–18 Poffenberger, A T, "The effects of continuous mental work," *Amer J Psychol*, 1927, *39*, 283–296

[13] Gould, A G, and Dye, J A, *Exercise and Its Physiology*, N Y, Barnes, 1932, Chaps VII to X Gerard, R W, "The oxygen consumption of nerve during activity," *Science*, 1930, *72*, 195–196

dioxide and lactic acid. The human body, including the nervous system, is a kind of a chemical laboratory wherein nerve impulses can be conducted from one place to another, and where muscle fibers can be shortened through the use of oxygen and of a bodily sugar known as glycogen. The refuse from these chemical processes is the source of what we call fatigue.[14]

Fatigue may manifest itself to a worker either in a lessened amount of work done or in those general attitudes which we describe as the feeling of being tired, the feeling of lassitude, and the feeling of monotony. In the case of psychological fatigue, it can be shown that a continuous task such as the mental multiplication of numbers leads eventually to a lessened output.[15] The rate of decrease in such psychological operations, however, is much less than in the case of physical work. If physical work is limited to so simple a task as lifting a weight over and over again with a single finger, the subject soon comes to the place where no further work can be done. The same kind of result, of course, follows the strenuous use of all of the other muscles in the body.[16]

The rate at which fatigue develops and the influence which it will have on the output of a laborer depends very largely upon two factors, viz., the number of rest intervals that are introduced into the total work period and upon the degree of motivation which has been brought to bear upon effort. As we have seen on page 47, the more frequently a worker rests for a few moments, the slower the onset of fatigue and the higher the general level of efficiency. Similarly, if the incentives to work are very great the effects of fatigue may be obscured over a long period of time.[17] Sooner or later, however, the exhausted person must seek rest if he is to replenish his reserve energies.

The same facts come out of studies on motor functions and especially upon the rate at which fatigue may develop among workers of different racial origins. A number of studies in this field have compared the performances of whites, Indians, Negroes, Mexicans, and Japanese. To be sure, minor variations in susceptibility to fatigue have been discovered, but there is no reason to suppose that these differences are in any way due to different racial origin. On the con-

[14] Gould, A G, and Dye, J V, *op cit*, Chap VII

[15] Cf Arai, T, *op cit*, *passim*

[16] The first experiments in this field were done by Mosso, A, *Fatigue*, N Y, 1904 See also Bogardus, E S, "The relation of fatigue to industrial accidents," *Amer J Sociol*, 1911, *17*, 512–539

[17] Refer again to the discussion of the work that can be done during periods of long sleeplessness in Chapter Three.

trary, it appears that the inevitable selection of subjects, together with differential modes of training, are quite adequate explanatory factors.[18]

5. *Alcohol.*—The effect of the use of various drugs such as alcohol, nicotine, and caffeine upon efficiency has raised a number of very knotty problems. In the case of alcohol, for instance, there is a wide difference between the actual performance of a man and his own feelings and attitudes about his performance. It has long been recognized that even small amounts of alcohol may dull aches and pains and lead to a general feeling of well-being. During this condition a worker may feel ever so confident of the amount and nature of his labor and under some circumstances this result is more or less to be desired It is necessary, therefore, to balance these feelings against the actual output of the drinker as measured by some other standards than his own attitudes. Then, too, there are very great difficulties in the way of proper experimentation in this field, for it is difficult to know just how much alcohol, caffeine, or nicotine the subject of an experiment is getting and it is still more difficult to know just what his degree of tolerance for such substances may be [19]

The effect of alcohol on efficiency has been described from two points of view. There is, on the one hand, a more or less empirical and casual method of describing the behavior of a person after he has taken alcohol. It is often remarked, for example, that conversation and other types of action become less restrained and that emotional types of action, in particular, become freer and more intense. On the contrary, it is said that some of the higher intellectual functions may be blunted and that self-criticism and good judgment are decreased.

With larger amounts of alcohol, the effects appear in still more stable types of action, and especially in habits and skills of long standing There is a certain amount of clumsiness or awkwardness in the movements of a heavy drinker, and an exaggerated effort to control the general posture of the body. With still greater inebria-

[18] Garth, T R, "White, Indian, and negro work curves," *J Appl Psychol*, 1920, *4*, 14–25, "Mental fatigue of mixed- and full-blood Indians," *J Appl Psychol*, 1922, *6*, 331–341, "Mental fatigue of Indians of nomadic and sedentary tribes," *J Appl Psychol*, 1926, *10*, 437–452 Garth, T R, Holcomb, W, and Gesche, Irma, "Mental fatigue in Mexican children," *J Appl Psychol*, 1932, *16*, 675–680 Garth, T R, Ikeda, K, and Gardner, D A, "Japanese work curves," *J Appl Psychol*, 1933, *17*, 331–336

[19] Dodge, R, and Benedict, F G, *Psychological Effects of Alcohol*, Washington, D C, Carnegie Institute, 1915 See also Emerson, H (ed), *Alcohol and Man The Effects of Alcohol on Man in Health and Disease*, N Y, Macmillan, 1932

tion it has been observed that the perceptual functions are blurred and that emotional behavior becomes still more violent.[20]

On the more strictly experimental side it has been shown that alcohol acts, as a rule, as a depressant. In only one bodily function, viz., pulse rate, does it act as a stimulant. Among other things, it has been shown that several of the more common types of reflex movements such as the knee jerk, the eyelid reflex, the speed of eye movements, and the speed of finger movements, are decreased One student of this problem has sought to measure the effect of alcohol upon pulse rate, steadiness, coordination of hand and eye, speed of tapping, speed in naming colors, speed of adding, speed in the opposites test, and speed of learning and memory. The experiment was so arranged that the effects of alcohol could be balanced against the performances of the same person on the day before the alcohol was taken, on days when a control dose (beer without alcohol) was taken, and on days when neither the control dose nor alcohol were taken As a rule, the alcohol was consumed in the afternoon and all of the performances of the subjects in the tests just named were poorer during the morning before the taking of alcohol. It turned out that the effect of alcohol was to reduce the score in all of the mental and motor tests used. The hand was less steady, motor coordinations were inaccurate, although more rapid, and the psychological functions were generally impaired. It was shown also that the amount of impairment varied directly with the size of the dose. Moreover, some of the functions tested, and especially the motor functions, recovered more slowly than did other functions.[21]

It is natural, of course, that the effects of alcohol on a great many other things besides efficiency should have been studied. For this purpose, the lower animals have frequently been used as subjects. In general, it appears that the long-continued use of alcohol decreases physical endurance and increases susceptibility to fatigue. It looks as though alcohol may interfere with the rate of learning and with the degree of attention among such animals as the white rat.[22] Finally, there is some evidence to show that a considerable amount of alcoholism in the parents may have a bad influence on the offspring. This

[20] Hollingworth, H L, "When is a man intoxicated?" *J Appl Psychol*, 1925, *9*, 122–130. Also McDougall, W, *Outlines of Abnormal Psychology*, N Y, Scribner's, 1926, pp 68 ff

[21] Hollingworth, H L, "The influence of alcohol," *J Abnorm and Soc Psychol*, 1923, *18*, pp 204 ff, 311 ff

[22] Arlitt, A H, "The effects of alcohol on the intelligent behavior of the white rat and its progeny," *Psychol Monog*, 1919, *26* (No 115)

fact has long been suspected in the case of human subjects where statistics show that the percentage of feebleminded persons in families accustomed to the use of alcohol is much greater than one would ordinarily expect. It is difficult, however, to know just how these facts may be interpreted, for it is clear that alcoholism may be a result of feeblemindedness as often as it is a cause.[23]

6. *Nicotine.*—Nicotine and some of the other alkaloids which are generated in a cigarette or in a pipe during smoking are extremely poisonous. It is very difficult, however, to get exact information about the effects of nicotine on performance since it has not been possible to control the amount of nicotine generated during a smoking period. This amount depends in part upon the nature of the tobacco, in part upon the rate of combustion, and in part upon the smoking habits of the individual himself.[24] There is even some doubt about the presence of nicotine in tobacco smoke save where a cigarette is burned very rapidly. Even then the amount of nicotine carried in tobacco smoke may vary from seven to seventy per cent of that which was in the tobacco to start with.[25] Moreover, there is some reason to believe that suggestion may play a part in producing both physiological and psychological effects, for there is no obstacle in the way of preventing the responses of a smoker to nicotine to become conditioned to other objects and events. Even though hypnotized subjects who believe they are smoking show little change in physiological and psychological functions (the same subjects showing marked changes when actually smoking), the readiness with which conditioning may take place must enter into the experimental situation.[26]

In view of these facts it is not strange that it has been rather hard to arrive at any accurate information in this field. Then, too, there is great danger from non-critical use of statistical comparisons. Let us suppose, for example, that a high school principal wishes to find out what the effect of smoking is on the scholastic records of the students in the high school. He divides the students into two groups, viz., the smokers and the non-smokers. He then compares the average grades

[23] Goddard, H H, *Feeblemindedness Its Causes and Consequences*, N Y, Macmillan, 1914

[24] A description of the errors that stand in the way of research on the effect of drugs will be found in Hollingworth, H L, "The influence of caffeine on efficiency," *Arch Psychol*, 1912 (No 22) See also Hollingworth, H L, *Abnormal Psychology*, N Y, Ronald Press, 1930, pp 545–559

[25] Bush, A D, "Tobacco smoking and mental efficiency," *New York Med J*, 1914, *99*, 519 ff

[26] Dorcus, R M, "Effect of suggestion and tobacco on pulse rate and blood pressure," *J Exper Psychol*, 1925, *8*, 297–309.

of these two groups, and it almost always turns out that the smokers have lower grades than do the non-smokers. It is easy, then, to draw the inference that smoking has a bad effect upon intellectual effort. It must be clear, however, that such a conclusion can scarcely be drawn until a great many other factors have been studied, such as the socio-economic status of the persons concerned. It is barely possible, for example, that smoking may be a result of some other group of circumstances and that these circumstances would likewise lead to a low scholastic standing In other words, smoking may accompany a certain kind of social or personal attitude which, in its turn, is not conducive to high intellectual effort [27]

Other direct experimental studies of the effects of tobacco have shown no great amount of agreement In one study there was some evidence to suggest that muscular strength might be decreased after the subject had smoked a single cigarette. On the other hand, it has been shown that the slightly decreased efficiency which appears after smoking may be no greater than that which would occur at different periods of the day under normal conditions [28]

The best study of this problem was directed toward such motor and psychological processes as pulse rate, tremor of the hand, rate of tapping, muscular fatigue, speed and accuracy in crossing out the letter *a* in printed material, reaction time in reading, reaction time in learning, the speed and accuracy of addition, the memory span, and rote learning In general, only three of the twelve functions tested showed any clear evidence of having been adversely affected by smoking. Of these three, two, viz., pulse rate and tremor of the hand, are physiological rather than psychological The clearest evidence of the effect of nicotine on psychological performance appeared in the case of addition where there was a distinct decrease in skill [29]

7 *Caffeine* —Caffeine is an active toxin which is found in such substances as coffee and tea. It is found also in a good many different kinds of soda fountain drinks In the case of caffeine, as in the cases of alcohol and nicotine, controlled experiments are very difficult to carry out because of wide variations in tolerance, because of the unknown effects of long use of the drug, and because of uncontrollable

[27] Meyland, G L, "The effects of smoking on college students," *Pop Sci Mo*, 1910, 170 ff O'Shea, M V, *Tobacco and Mental Efficiency*, N Y, Macmillan, 1925, *passim*

[28] Bates, R L, "The effects of cigar and cigarette smoking on certain psychological and physiological functions," *J Comp Psychol*, 1922, *2*, 371–424

[29] Hull, C L, "The influence of tobacco smoking on mental and motor efficiency," *Psychol Monog*, 1924, *33*, No 150 See also Carver, D J, "The immediate effect of tobacco smoking," *J Comp Psychol*, 1922, *2*, pp 279 ff

variations in strength when it is obtained at a breakfast table or at a tea table In general, caffeine is thought to be a stimulant, but great differences in its stimulus value have been noted.

In one study of this problem it was shown that sixteen persons who were observed over a period of forty days enjoyed an increase in speed of movement after drinking coffee. The amount of increase depended directly upon the amount of caffeine administered and its effect was observed to be present from one to four hours after taking. In the case of coordination, small doses seemed to be of advantage whereas larger doses were a disadvantage. The fact that speed of movement is increased while coordination may be somewhat decreased would naturally bring about a decrease in steadiness. In tests of psychological performance such as the association test and choice tests, it has been found that caffeine may lead to a slight amount of improvement.[30] This fact holds true, in particular, of the power to form associative bonds as measured by the use of nonsense syllables.[31]

There is a popular impression to the effect that the taking of caffeine is one of the predisposing causes toward sleeplessness It is known, of course, that the effects of caffeine may be greatly increased when it is taken on an empty stomach, and the late-evening cup of coffee therefore might have an excessive stimulus effect This seems to hold true, in particular, of persons who are underweight or who are inclined toward headaches, dizziness, and general irritability. In any case, coffee must be one of the contributing factors to insomnia; but further experimental work is urgently needed at this point.

8. *Diet*—It will not be possible for us to do anything more than draw some of the main outlines of the many and variable problems suggested by the words hunger, malnutrition, proper vitamin content, scurvy, and other aspects of the relation between food and the proper development of psychological functions. We have already seen that hunger may be used in a great many different ways in experiments on the psychological functions It is known, for example, that animals will learn much more rapidly if they have been deprived of food and if success in running a maze or solving a problem means hunger satisfaction.[32] Experiments in this same field, however, have

[30] Rivers, W H R, *The Influence of Alcohol and Other Drugs on Fatigue*, London, Arnold, 1908, *passim* Also Hollingworth, H L, "The influence of caffeine on efficiency," *Arch. Psychol*, 1912 (No 22)

[31] Ruman, G, "The influence of coffee on the association constant," *J Exper. Psychol.*, 1934, *17*, 93–104

[32] Ligon, E M, "A comparative study of certain incentives in the learning of the white rat," *Comp Psychol Monog*, 1929, *6* (No. 2).

shown that prolonged hunger will have a weakening influence upon rate of learning. The optimal period for female white rats appears to be about two days and for males about four days [33] In general, it is known that bodily activities are greatly increased during hunger. These changes may be noted by attaching a tambour to the beds in which infants are resting or by correlating variations in rate of tapping, steadiness, and coordination with hunger contractions in the stomach.[34]

Not a great deal has been done as yet concerning the relation between variations in type of diet as compared with psychological performance. One might, for example, try to search out the relations between some of the more common tests, on the one hand, and controlled variations in the vitamin content of food. A preliminary experiment of this sort using children as subjects seems to suggest that an increase in the vitamin-B content of food may react favorably upon a good many different types of psychological performance. The subjects used in the experiment were drawn from highly impoverished sections of a large city and the dietary control was effected through the luncheons served at the school.[35] One of the most elaborate studies that has been done in this field examined the effect of a prolonged restricted diet on a group of college men. An attempt was made to keep the weight of these men ten per cent below normal during a single school year The results were compared with similar tests made on control subjects who maintained their normal weight during the test period. Some decline in physical energy was noted and such functions as pulse rate were more affected by exercise than was the case with normal subjects. In general, the psychological functions were little impaired Most of the subjects reported a decreased tendency to be drowsy in classes immediately after lunch periods All of the subjects more than regained their weight at the conclusion of the experiment [36]

9. *Ventilation* —One of the most significant and probably the best known experiment on the influence of ventilation on efficiency, to

[33] Warner, L H, "A study of hunger behavior in the white rat by means of the obstruction method," *J Comp Psychol*, 1928, *8*, 273–299

[34] Wada, T, "An experimental study of hunger in its relation to activity," *Arch Psychol.*, 1922, *8* (No 57)

[35] Balken, E R, and Maurer, S, "Variations of psychological measurements associated with increased vitamin-B complex feeding in young children," *J Exper Psychol*, 1934, *17*, 85–92

[36] Benedict, F G, Miles, W R, Roth, P, and Smith, H. W, "Human vitality and efficiency under prolonged restricted diet," *Carnegie Inst Pub*, 1919, *passim.*

say nothing at all of endurance, was carried out in the Black Hole of Calcutta. One hundred and seventy-six British soldiers were crowded into a very small room where the temperature was very high, the humidity very great, and the movement of air imperceptible. When morning came, only a few of the prisoners were still alive. The inference is that physiological and psychological activity may be very susceptible to such factors as ventilation.[37]

Contrary to popular opinion, it is now known that proper ventilation increases efficiency not because of the need for additional oxygen or because of an increase in the carbon dioxide content of the air but because the air in an enclosed room may not be circulating fast enough to carry away from the body the toxic products that are thrown off by normal perspiration and respiration. This means that normal bodily temperatures cannot be maintained. It has been shown, for example, that a person may breathe fresh air from some other source than the room in which he is placed and yet suffer all of the discomforts of a "stuffy room" if the room is enclosed and its temperature and humidity raised. Moreover, if the air in a closed room is kept in circulation, normal work may continue for long periods of time. Symptoms of discomfort such as drowsiness, lassitude, and headache will not appear until the oxygen content of the air has become very low or the carbon dioxide content very high.[38]

It has been shown that both physical and psychological work can be done to best advantage in a temperature of 68 degrees Fahrenheit, a relative humidity of fifty per cent, and with forty-five cubic feet of fresh air per minute. An increase in temperature is known to decrease the efficiency of physical effort, although this deficiency may be removed if proper motivation is developed. The same fact holds true of changes in humidity. In general, the effects of changes in temperature and humidity on psychological work are not so great. This result may be due, in part, to greater incentives for maintaining a given standard of output.[39]

As a practical illustration of the way in which ventilation may be controlled in industry, we may take the following experiment. A weaving shed was equipped with fans which were operated on alternate days during the summer. At the end of this period, the fans ran continuously for a week and then they were stopped for a week. A

[37] Lee, F S, "Fresh air," *Pop Sci Mo*, 1914, *84*, pp 313 ff

[38] *Report of the New York State Commission on Ventilation*, N Y, Dutton, 1923

[39] Thorndike, E, McCall, W, and Chapman, J, *Ventilation in Relation to Mental Work*, N Y, Columbia Univ Press, 1916

suitable piece of apparatus measured the rate of air movement created by the fans and the cooling effect as well. In general, it appeared that the workers at the looms in the shed reached a higher output on those days when the fans were running than they did on the other days. The increase was greater when temperature and the humidity were unusually high.[40]

It is clear that results of this kind might have an important bearing upon the efficiency of work where the possibility of ventilation is subject to difficult problems of engineering. In mines, for example, it has been shown that manual labor may cause a rise in the temperature of the body to as much as 103 degrees. If, however, the air movement in such places is increased, there are no changes in body temperature and work becomes much more effective. The effect of poor ventilation in mines can be studied not only with respect to the efficiency of the laborer but with respect to his susceptibility to disease as well. There is some evidence to show that miners who are working at high temperatures without proper air movement may be as much as sixty-five per cent more liable to illness than those working at lower temperatures.[41]

10. *General Climatic Conditions.*—The effect of temperature and humidity on efficiency are closely related, of course, to the more general problem of the effect of climatic changes. There have been two methods of approach to this problem. On the one hand, certain students have taken advantage of prevailing types of climate over the surface of the earth in order to draw comparisons between these prevailing climates and cultural output of the peoples located in them.[42] Then again, it is possible to work out correlations between specific climatic factors such as velocity of the wind or prolonged hot spells. It has been shown, for example, that in certain communities increases in misdemeanors and crimes, including suicides, stand in direct relation to periods of high wind.[43]

When a survey is made of the major cultural achievements of social groups in relation to climatic conditions, it appears that most of

[40] Wyatt, S, Fraser, F A, and Stock, F G L, "Fan ventilation in a humid weaving shed," *Ind Fat Res Board*, Rep No 37, 1926

[41] Sayers, R R, and Harrington, D, *Physiological Effects of High Temperature and Humidity with and without Air Motion*, U S Bureau of Mines Report of Investigation (Ser. No 2464) Also Vernon, H M, Bedford, T, and Warner, C G, "The relation of atmospheric conditions to the work capacity and accident rate of miners," *Ind Fat Res. Board*, Rep No 39, 1927

[42] Huntington, E, *Civilization and Climate*, New Haven, Yale Univ Press, 1915.

[43] Dexter, E G, *Weather Influence*, N Y, Macmillan, 1914, pp 112 ff

the great cultures have been associated with areas of moderate temperature. It goes almost without saying, of course, that no great cultures have appeared near either of the poles and neither have they been developed out of arid or high temperature regions. There is some reason to believe that high cultures are associated with those regions of the temperate zones where reasonable fluctuations in temperature from winter to summer may be expected.

When attempts are made to relate more specific climatic changes to specific degrees of efficiency, it appears that the months of October, November, and December are less efficient than the months of April, May, and September. In one study, for example, it was shown that the number of errors made by bank clerks was greatest in the last months of the year and fewest in April, May, and September. The summer months were also accompanied by numerous errors.[44] These facts, however, do not take account of seasonal variations in the amount of work to be done and other similar factors. In general, it appears that the summer months are apt to be more closely associated with certain types of crime than are the winter months. In an analysis of 40,000 cases of assault, for example, it was shown that four to five times as many crimes might take place in July and August as took place in December and January.[45]

One of the factors in the study of temperature and climatic conditions which is very difficult to control is known as rhythms in the work period. That is, apart from special changes in the environmental situation, it appears that the body itself may set various tempos of efficiency. In order to explain these rhythms, students have gone to variations in physiological processes during the twenty-four hour period, to the fact that most deaths occur between two and six in the afternoon, to special periodic changes such as the menstrual period of women, and the like.[46] Except in the last case, it has been very difficult to get any sort of accurate evidence on this problem. There is some reason to believe, however, that rhythms of work imposed upon an individual from without may become very effective in promoting efficiency. It looks as though both the tempo of work and the number of errors may be favorably changed when persons are asked to work at a certain rhythm. Here too, however, the facts are difficult to interpret because variations in rhythm mean variations in energy

[44] Vernon, H M., *et al*, "The relation of atmospheric conditions to the working capacity and accident rate of miners," *Ind Fat Res Board Reports*, 1927 (No. 39).

[45] Dexter, E G, *op cit*, pp 238 ff.

[46] Viteles, M. S, *op cit*, pp 504 ff.

expended. It has been shown, for example, that one may spend four times as much energy in walking at a rate of five miles per hour than in walking an equal distance at the rate of two miles per hour.[47]

11. *Illumination.*—In view of the fact that all types of physical labor and most types of psychological labor depend upon the intimate cooperation of the perceptual apparatus,—principally of the visual functions,—with the motor apparatus, it follows that efficiency in working may be closely dependent upon the nature of the illumination.[48] It may be, for example, that low levels of illumination will be particularly fatiguing on the eyes and it may be true also that inadequate types of vision under low illumination may result in inadequate types of bodily adjustment. It is known, for example, that colors may change the apparent weight and size of objects.[49] Moreover, an agreeable type of illumination may have the effect of promoting the general attitude and disposition of a person apart from any specific change in his movements.

Some of the experimental evidence on the general problem of illumination runs as follows. It has been shown that dim lighting induces the general feeling of relaxation whereas a bright light acts as a stimulus to increased activity, although not necessarily to increased output of energy In an actual factory situation, a group of thirty-eight subjects worked for a period of eight weeks under specified changes in illumination. It was shown that the amount of work done stood in direct relation to the nature of the illumination. In one set of conditions the subjects worked under half-daylight illumination, whereas under another set they worked under a properly constructed system of artificial lighting [50]

In general, it appears that the light in a room in which any kind of work is being done should be more or less uniform and not too bright.

[47] Hill, A V, *Living Machinery*, N Y, Harcourt Brace, 1927, 158 ff

[48] Some of the more strictly experimental studies on illumination run as follows Adams, E Q, and Cobb, P W, "Effect on foveal vision of bright and dark surroundings," *J Exper. Psychol*, 1922, *5*, 39–48 Sheard, C, "Some factors affecting visual acuity," *Amer J Physiol Opt*, 1921, *2*, 168–185 Luckeish, M, and Moss, F K, *Seeing—A Partnership of Lighting and Vision*, Baltimore, Williams and Wilkins, 1931 Troland, L T, "An analysis of the literature concerning the dependency of the visual functions upon illuminating intensity," *Trans I E S*, 1931, *26*, 107 Luckeish, M, *Light and Work*, N Y, Van Nostrand, 1924. Luckeish, M, and Moss, F K, "A correlation between illumination intensity and nervous muscular tension resulting from visual effort," *J Exper Psychol*, 1933, *16*, 540–555

[49] Warden, C J, and Flynn, E L, "Effect of color on apparent size and weight," *Amer. J Psychol*, 1926, *37*, 399–401 Monroe, M, "Apparent weight of color and correlated phenomena," *Amer J Psychol*, 1925, *36*, 102–206 Pressey, S L, "The influence of color on mental and motor efficiency," *Amer J Psychol*, 1921, *32*, 326–356

[50] See Viteles, M S, *op cit*, pp 483 ff

If the light is not uniform there will be special areas of glare which will act as a distraction to the person in the room The best conditions are obtained, of course, when full daylight is thrown upon a work area, by modern systems of indirect lighting, and by the proper use of filters which have served in a good many cases almost to duplicate natural daylight.

A certain amount of work has been done on the relation between efficiency and color illumination. In one study, yellow, green, red, and blue, and ordinary daylight were thrown around subjects who were being tested for visual acuity, speed of vision, and certain types of eye-hand coordination. The intensities of the various kinds of light were varied between wide extremes. The light was also controlled in such a way that it could be diffused generally over the working area, or be focused at the actual place of work, or presented in a combination effect. In general, it appeared that there was no relationship between the color of the general illumination and rate of work. When, however, colors were confined to the actual place of work, yellow was found to be most effective, the other colors running in the order: green, red, daylight, and blue. In another still more elaborate experiment it was shown that efficiency decreased with the following order, viz., unsaturated yellow, reddish yellow, unsaturated yellow with a trace of red, orange yellow, unsaturated yellow with a trace of green, unsaturated yellow with more green, unsaturated yellowish green, greenish and bluish green. The loss of efficiency for the unsaturated yellow in a simple acuity test was five per cent, whereas the loss of efficiency for the bluish green was almost fifty-five per cent.[51]

There is some evidence to show that the type of illumination in hospital and surgical rooms may have a variable effect upon the comfort of patients. It looks as though the so-called bright or cheerful colors are more appropriate to such rooms than the dull colors, save where the patient is very ill, in which case dull colors are more acceptable.

12. *Distraction and Noise.*—It is often remarked nowadays that the increase in nerve disorders can be explained, in part, by the excessive number and variety of stimuli and, in particular, by such stimuli as street and factory noises. Students of industrial psychology have turned their attention to this phase of the problem of efficiency with the hope that some measures can be taken in order to decrease unnecessary distractions.

[51] Ferree, C E, and Rand, G, "Visibility of objects as affected by color and composition of light," *Person J*, 1931, 9, 108–124, 475–492.

One of the first studies in this field was made on a group of subjects who were asked to translate letters to numbers and numbers to letters while they were surrounded by various kinds of distractions.[52] The noises used were buzzers, electric bells, and a series of phonograph records Quiet periods of work were alternated with noise periods. Records were taken of the rate at which the task set could be done and of accuracy. The expenditure of energy was measured by changes in rate of breathing and by the amount of pressure exerted upon the keys of a typewriter in recording the translations. The initial effect of noisy surroundings was to decrease the rate of work of every one of the subjects Later on, however, there was a rapid increase in the rate of work. Some of the subjects did better work during the noisy period than during the quiet period This result was explained by saying that the noise might have a general stimulating effect upon the subjects It turned out, however, that more energy was expended in order to get the better records during the noisy periods than was expended during the quiet periods

This fact has been supported by other experiments[53] In one case, for example, an analysis of the air which was exhaled during the noisy phase of a working period disclosed an expenditure of energy that was seventy-one per cent higher than during a rest period, while the increase was only fifty-one per cent during the quiet phase of the work period. It looks, then, as though special motivation and the general stimulus value of a noisy situation may actually increase the amount of work that is done during periods of distraction, but that this increase is paid for in terms of a greater amount of expended energy.

Here again, we come upon a difference between actual rate of performance and the general attitude of the performer. Almost without exception the subjects in experiments of the kind just described report that noise is disagreeable and that it leads to an uncomfortable attitude It is barely possible, of course, that such changes in attitude could have an influence upon rate of work which is not directly measurable. That this fact may hold true is supported by experiments in which it has been shown that noisy work periods may actually be less efficient than quiet work periods and that there is some difference

[52] Morgan, J J B , "The overcoming of distraction and other resistances," *Arch Psychol*, 1916 (No 35) Laird, D A , "Experiments on the physiological cost of noise," *J Nat Inst. Ind Psychol*, 1920, *1*, 251–258

[53] Laird, D A , "The influence of noise on production and fatigue as related to pitch, sensation level, and steadiness of the noise," *J Appl Psychol*, 1933, *17*, 320–330

between a continuous noise and a discontinuous noise In any case, we may be sure that further work must be done on this problem for, after all, the noises which are studied in a laboratory persist for only short periods of time, whereas the factory worker is subject to such influences throughout the day.

A partial attempt to meet this situation has been made by setting up in the laboratory a miniature factory which required of the subjects that they punch 10,500 holes during a half-day's period of effort. The work period was interrupted by noises of various types ranging from steady, complex noises to high frequency pitches The data show that, among the conditions studied, a varying complex noise has the most serious effect upon production. The complex but steady noise was found to lessen efficiency much more than a relatively pure tone did. Pitches above 512 cycles diminished production more than low pitches of the same loudness did and an increase in frequency above 512 cycles also caused loss in production. Any reduction in a complex noise, no matter how loud it was to start with, brought about an increased rate of work [54]

13 *Monotony*—Perhaps the most important problem in connection with the relation between psychology and industry is named by the word monotony This problem touches the everyday life of the student as well, for nothing will interfere with efficiency quite so quickly as those feelings of boredom that usually arise in connection with repetitive work. It has even been possible for some writers in this field to wax dramatic in their attempts to show that the machine age through demand for meaningless and monotonous repetition stands as a major menace to modern culture.

There is plenty of evidence to show that monotony or boredom may have two effects upon curves of production. In the first place, it is clear that boredom will be associated with a reduced rate of working In the second place, boredom causes greater variability in rate of work [55] In other words, as the worker passes on to the plateau of performance, he will respond to the monotony of repetition either by an increase in his efforts to maintain a level of efficiency or by alternating between periods of spurt and of relaxation. It looks as

[54] Laird, D A, "The effects of noise," *J Acoust Soc Amer*, 1930, *1*, 259–262 Laird, D A, and Coye, K, "Annoyance as related to loudness and pitch," *J Acoust Soc Amer*, 1929, *1*, 158–161 Cassell, E E, and Dallenbach, K M, "Effect of auditory distraction on sensory reaction," *Amer J Psychol*, 1918, *29*, 129–136

[55] Wyatt, S, "Boredom in industry," *Person J*, 1929, *8*, 161–171 Hall, O M, "The disagreeable job, selecting workers who will not be annoyed," *Person J*, 1930, *9*, 297–304.

though variations of this kind appear only among those workers who actually report the presence of boredom, restlessness, or dissatisfaction. Among the troublesome features of monotonous repetition is the tendency of a worker to overestimate the time interval which has been spent on monotonous labor.[56]

There are great individual differences in susceptibility to monotony. In other words, it looks as though the feeling of monotony depends much less upon the work that is being done than upon the disposition of the worker himself.[57] Among these dispositions, degree of intelligence stands foremost. In general, the more intelligent the worker, the more susceptible he will be to restlessness during monotonous effort.[58] The presence of the intelligence factor, together with other temperamental differences in the development of feelings of boredom, has suggested the possibility of measures of susceptibility to monotony. One student, for example, has worked out a questionnaire which is thought to establish some of the criteria by which susceptibility could be measured.[59] This questionnaire was supplemented by correlating one period of work against another in such laboratory tasks as punching a punch board, turning a simple crank, solving a simple maze, and canceling numbers.

Escape from feelings of monotony can be secured in several ways. It is known, for example, that change in the type of work may have this effect.[60] This conclusion, however, is to be modified by the nature of the changes that are introduced, together with their frequency. It has been clearly established that rest pauses introduced at the proper time during a working period will also favor escape from boredom.[61] It looks too as though the development of monotony may depend upon the payment system in vogue. For example, monotony appears more easily under a time-rate system than under a piece-rate system.

[56] Wyatt, S., Fraser, J. A., and Stock, F. G. L., "The effects of monotony in work," *Ind. Fat. Res. Board*, 1929, No. 56, pp. 20 ff.

[57] Munsterberg, H., *Psychology and Industrial Efficiency*, Cambridge Univ. Press, 1913, p. 108.

[58] Viteles, M. S., "Selecting cashiers and predicting length of service," *J. Person. Res.*, 1924, *2*, 467–473. See also Kornhauser, A. W., "Some business applications of a mental alertness test," *J. Person. Res.*, 1922, *1*, 103–121.

[59] Thompson, L. A., "Measuring susceptibility to monotony," *Person. J.*, 1929, *8*, 172–193. Davies, A. H., "Physical and mental effects of monotony in modern industry," *Brit. Med. J.*, 1926, *2*, pp. 472 ff.

[60] Wyatt, S., "The effect of changes in activity," *Ind. Fat. Res. Board*, 1924, No. 26, pp. 13–37. Spencer, L. T., "Curve of continuous work and related phenomena," *Psychol. Bull.*, 1927, *24*, 467–480.

[61] Vernon, H. M., and Bedford, T., "Rest pauses in heavy and moderately heavy industrial work," *Ind. Fat. Res. Board*, 1927, No. 41. See also, Mayo, E., "Daydreaming and output in a spinning mill," *J. Nat. Inst. Ind. Psychol.*, 1925, *2*, 203–209.

In view of the many different facts which have been considered in this chapter, we may conclude that human efficiency is subject to a great many variable conditions. Many of the studies which we have reported, whether they be from the laboratory or from the factory, have limited themselves to the study of a single variable under the supposition that other possible variables have been held constant. In view of the complexity of the work situation, this method of research is subject to high degrees of error. Nevertheless, it seems fair to draw the conclusion that some of the major factors which have to do with variations in efficiency can be and have been properly estimated. In any case, no person can suppose that he has made an effective psychological instrument out of himself until he has taken such facts as have been described above into consideration. It is true, of course, that the person who studies this book is not a worker in a factory, but he may be well assured that his own variations in efficiency are created by the same conditions.

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——, *Industrial Psychology*, N. Y, Norton, 1932.

CHAPTER THIRTY-ONE

THE PSYCHOLOGY OF ADVERTISING

1. *Introduction.*—There is no place, perhaps, where people are so ready to believe that a business man can, through the use of psychology, persuade a buyer against his will, convince him of facts that are not true, and get him to act where he does not wish to act, as in the use of advertising. The man on the street knows that there is hardly a piece of clothing that he wears, a form of food that he eats, or any other phase of his life as an individual which is not announced to him by a signboard, an elaborate pattern of twinkling lights, the newspapers and journals which he reads, or the programs that he hears over the air. He is led to believe that one food is better than another, that his very health and happiness depend upon a single toothbrush, that no car will serve his purpose save the one that literally shouts out at him from a signboard, and so on. Moreover, there are times when he is almost inclined to think that there must be some occult psychical power which is brought to bear upon him through advertising mediums. It is the purpose of this chapter to take a brief look at the events in the whole field of advertising which are going on, so to speak, behind the scenes. What is the psychology of advertising? What do we mean when we say that one sign has a greater "pulling power" than another? Why should manufacturers spend hundreds of millions of dollars through newspapers, posters, letters, electric signs, and window displays in order to persuade people to buy things which they might buy in any case?

It is not true, of course, that the field of advertising makes use of a type of psychology which is different from the kind used in other branches of industry and commerce Both the men who manufacture goods and the men and women who buy them are still human beings and the facts that are used by the salesman or in the makeup of an advertisement are facts of the same order as those that have been studied in almost every one of the preceding chapters. Advertising begins with the proposition that every person has needs or wants which must be satisfied There is, in the second place, the plain fact that producers and manufacturers are in possession of goods which

will satisfy these various wants. Since it is not possible, in a very large community, for each manufacturer or each producer to make a direct announcement of his goods to each possible consumer, he must find a more general way of announcing his goods to the consumer. The advertisement serves this purpose well. An advertisement tells what goods are available, where they may be purchased, how much they will cost, and what particular needs of the consumer they will satisfy. Since an announcement of this type must be addressed to the perceptual functions of a consumer, a part of the psychology of advertising is made up of the psychology of perception

The problem is not quite so simple as this, however, for producers and manufacturers are in constant conflict with one another Goods of the same general type are made by many different persons It follows, therefore, that an advertisement must not only announce the goods that are available but that it shall announce them so that the consumer will act upon the announcement as soon as possible. Moreover, each manufacturer is anxious that the consumer shall act with respect to his particular brand. This means that the psychology of advertising includes such problems as the value of repetition in deciding preferences and the problem of how to convert knowledge about a product into action with respect to it. In other words, the psychology of advertising simply cuts across all of the psychological functions of a person. There is no particular formula which the advertiser can use as a short cut through all of these several functions. If the consumer is assailed at every moment with some invitation to buy, the invitation is based only on the fact that a number of different manufacturers are seeking to outdo one another in their use of the ordinary facts of psychology in order to keep one step ahead of their competitors.

It is the purpose of this chapter, then, to take a very brief look at these several aspects of an advertising campaign. There is, first, the general problem of finding out what the needs of the consumer are. We already know what the primary needs are, but, as we have seen on page 62, these needs or desires are tremendously modified through processes of training. We shall try, therefore, to give some picture of the transformations that have taken place in the primary tissue needs of each human being. Given a list of needs and a set of products which will satisfy these needs, the next task is to announce the products as effectively as possible. As we have said, this task is made up largely

of the psychology of perception. We shall wish to ask, for example, what colors, what sizes, and what positions in a journal an advertisement should occupy in order that it may stand out as an effective announcement. As a further step in our study, we shall refer briefly to the various measures which can be taken in order to make certain that a given announcement will be remembered and that it will be acted upon either immediately or at some later time. As we shall see, an advertisement may perform two different functions for the merchant. It may create what is commonly called good will or consumer acceptance or it may lead to an immediate and direct sale. Both of these functions are held to be of high importance by the manufacturer; but the means that are used to bring them about are slightly different. The final part of our task will let us see how the manufacturer can go about it in order to measure the effectiveness of his advertising campaign. In view of the fact that such enormous amounts of money are spent in the announcement of goods, the manufacturer has a right to know whether his announcements are really serving the purposes for which they are devised.

2. *The Needs of the Consumer.*—For a long time it has been supposed that manufacturing and selling could be more or less divorced from the buying habits of the public. Everyone knew, of course, that each human being would have to have food, clothing, a home to live in, and perhaps some of the so-called luxuries of life. With this assumption behind him, the manufacturer thought he could simply hurl commodities at the consumer and make him buy them by using what have long been known as high-pressure methods of selling. It was supposed that the salesman, supported by an intense advertising campaign, could sell anything to the public just as soon as he sold himself. Now, however, this set of prejudices about salesmanship is rapidly changing. Manufacturers are beginning to see that the consumer not only has a set of primary needs or desires but that he has, also, certain ideas as to the way in which he would like to have these needs or desires satisfied. It is not an uncommon thing, then, to find modern advertising campaigns prefaced by what are called market surveys, that is, attempts to find out what things people want and just how or in what form they would like to have them [1]

It is not necessary, perhaps, to name in any particular detail the primary tissue needs of the average consumer. As we have seen in previous chapters, hunger, thirst, sex, the desire for activity, and the

[1] This phase of the problems of advertising will be described in the next chapter.

desire for rest stand high among such needs.[2] The important thing for the manufacturer to realize, however, is that these needs practically never appear in their primary form among the adult members of society. On the contrary, they have been greatly changed and modified through training and through the existence of such socialized forms of conduct as imitation, custom, fad, fashion, the ambition of one man to excel another, a widespread desire for luxuries, and the like. In other words, our complex civilization has seen a tremendous expansion of so-called wants. This expansion has been brought about, in part, by the manufacturer himself who has intentionally sought to create new ways in which consumer wants, both primary and secondary, may be satisfied and, in part, by significant increases in that vague thing known as the standard of living. It is sometimes argued, for example, that if a really clever inventor could discover several new ways of satisfying wants during a time of depression, these inventions alone would be one major way of escaping from depression.[3]

From the point of view of science, one of the first steps to be taken in the field of desire or want is to measure their relative strengths. Practically nothing has been done on this problem at the human level, although a great many studies have been made of the relation between the several tissue needs of the lower animals.[4] It may be doubted, however, whether studies of this type are of real significance to the advertiser since the various factors mentioned above, viz., custom, fashion, fad, and imitation have so covered up the more native urges that the advertiser can easily connect his products with almost any secondary or derived need that he desires. Any one of the common soda fountain drinks, for example, may be suggested to a consumer, not because it satisfies his thirst, but because the taking of one of them rather than another is alleged to facilitate informal social contacts between casual acquaintances. A mouth wash or disinfectant may be remotely related to health, but it may also be bound up with one's desire for success, either in the commercial world or in a social group.

As an illustration of the way in which primary tissue needs may be

[2] The student should review the discussion in Chapter Four. Consider also Dorcus, R M, and Shaffer, G W, *Textbook of Abnormal Psychology*, Baltimore, Md, Williams and Wilkins, 1934, Chap V.

[3] Snow, A J, *Psychology in Business Relations*, Chicago, 1925, Chaps I–III

[4] Diserens, C. M, and Vaughn, J., "The experimental psychology of motivation," *Psychol Bull*, 1931, *28*, 15–65.

covered over with a large number of secondary considerations, we may take some of the factors that have to do with the choice of clothing for boys. Among the factors that have to do with boys' clothing we may mention material, durability, style, fad, price, comfort, tailoring, merchant's guarantee, reputation of firm, satisfaction or money-back guarantee, maker's guarantee, and such trade-marks as "wears like iron," or as "union made." When an attempt was made to find out how these various appeals affected the buying habits of consumers in urban and rural communities, it appeared that tailoring, merchant's guarantee, reputation of the firm, maker's guarantee, and the trade-marks exercised a much greater influence on consumers than such items as material, durability, style, and the like. It is hardly necessary to say, of course, that the appeal which these factors possessed differed from community to community [5]

One of the perplexing phases of the psychology of advertising is the relative effect of positive and negative appeals. As a typical study, we may take the measure of these two factors by the number of coupons returned from advertisements. A positive appeal, of course, is supposed to invite the reader to the attainment of some desirable object or goal. In contrast to this a negative appeal would lead him away from annoyance, help him to avoid fatigue, or show him how to escape disease Out of a large number of advertisements of the positive and negative type, thirty were chosen which seemed to be suitable for experimental purposes. These displays were studied by taking account of the number of inquiries sent in from the readers of a number of different magazines. The conclusions made possible by the data showed that there was not much difference between positive and negative appeals, so far as the products used in this study were concerned. It seemed to be true, however, that the direction of appeal might change with the nature of the product being advertised. The most important results of the study have to do with the variations which show up with either type of appeal [6] There has been, however, a general increase in the number of advertisements making a negative appeal during recent years.[7] Studies on the effect of these two types of appeal among younger subjects seem to suggest that children of high school age re-

[5] Starch, D , *op cit* , pp 209 ff. See also Shuler, L A , "Consumers want quality first—price second," *Printer's Ink*, 1932, *160*, 56–57

[6] Lucas, D B , and Benson, C E , "The relative values of positive and negative advertising appeals as measured by coupons returned," *J Appl Psychol* , 1929, *13*, 274–300

[7] Lucas, D B , and Benson, C E , "The historical trend of negative appeals in advertising," *J Appl Psychol* , 1929, *13*, 340–356.

act more effectively to positive appeals than to negative appeals. This difference disappears as the child grows older.[8]

3. *Announcing the Product.*—The problem of announcing the product is certainly something more than a matter of publication It is often said in the psychology of advertising that an announcement must take a form which will make it appeal to the consumer. This appeal may be measured, in part, by its color, its size, its position, the number of times it is repeated, and by the general attitude which it induces on the part of the consumer. Then too, as we have just seen, there are secondary considerations such as cheapness, durability, healthfulness, the reliability of the firm, the practical use of the material, its price, its quality, and so on. Some of these forms of appeal may have much greater influence upon the consumer than others would have

As an initial example of the way in which some of the facts of perception may be used in advertising, we may take a brief glimpse at a long list of studies on the relation between rate of reading and size of type, length of line, amount of reading, and other features of the format of printed material In general, it has been found that ten-point type as compared with six-, eight-, twelve-, and fourteen-point type is the best size of type for a line which is eighty millimeters or nineteen picas in length On the other hand, a line eighty millimeters long (a nineteen-pica line) is the best length of line for ten-point type as opposed to 59, 97, 114, 130, 152, 168, and 180 millimeter lines[9] Further studies on varying both the size of type and the length of line seem to suggest that these two factors must always be properly balanced with each other if the best reading rate is to be gained[10] In general, the practice of using black type on a white background appears to have sufficient experimental justification[11] This fact is a part of a more general inference from studies on legibility which states that a printed page, irrespective of the colors used, should present a maximum brightness contrast between the print and the background. Moreover, it appears that dark printed material on a light back-

[8] Lucas, D B, and Benson, C E, "The recall values of positive and negative advertising appeals," *J Appl Psychol*, 1930, *14*, 218–238

[9] Paterson, D G, and Tinker, M A, "Studies of typographical factors influencing speed of reading," *J Appl Psychol*, 1920, *13*, 121–130, 205–219

[10] Tinker, M A, and Paterson, D G, "Simultaneous variation in type size and line length," *J Appl Psychol*, 1931, *15*, 72–78 See also Gilliland, A R, "The effect on reading of changes in the size of type," *Elementary School J*, 1923, *24*, 138–140

[11] Paterson, D G, and Tinker, M A, "Black type versus white type," *J Appl Psychol* 1931, *15*, 241–247 See also Holmes, G, "The relative legibility of black print and white print," *J Appl Psychol*, 1931, *15*, 248–251.

ground is to be preferred to light printed material on a dark background.[12]

One of the most important features of legibility is the space between the lines. This space is called leading. Experiments on this problem are usually carried out by having a large amount of material of approximately the same type printed in such a way that the amount of leading is one of the main variabilities. In other words, the kind of type and the length of a line may be held constant while the leading is changed. In one of the best experiments on this problem it was found that every kind of leading except nine-point (a very wide spacing of lines) favors speed in reading aloud.[13] The most favorable separation of the lines was at seven-point leading. Similar results were obtained for six-point and nine-point type. Further studies have borne out these results. When a nineteen-pica line with ten-point type is used, two-point leading may be read 7 5 per cent faster than solidly set material. Four-point leading may be read 5 per cent faster [14]

Further studies have been made of legibility as it would be affected by slight spacings between the letters and by the characteristics of individual letters It looks as though a half-point spacing between letters in a common form of ten-point type does not greatly improve legibility save in drawing distinction between such letters as *p*, *d*, *b*, and *q*. Small differences in legibility occur between one kind of letter and another. Serifed letters, for example, are more legible than unserifed letters In general, the ability to distinguish letters increases greatly with practice.[15] One of the practical consequences of studies on legibility touches the printing of titles on the backbones of books. A task of the librarian or of the student as he goes down a shelf of books is to see quickly and accurately the titles printed on the backbones. One may, for example, read from below upwards with the letters ninety degrees from the normal position or from above downwards with the letters ninety degrees from normal, or one may read downward with the letters in normal position. It looks as though the first method of

[12] Tinker, M A, and Paterson, D G, "Variations in color of print and background," *J Appl Psychol*, 1931, *15*, 471–479

[13] Bentley, M, "Leading and legibility," *Psychol Monog*, 1921, *30* (No 136), pp 48–61.

[14] Paterson, D G, and Tinker, M A, "Space between lines or leading," *J Appl Psychol*, 1932, *16*, 388–397 See also Hovde, H T, "The relative effects of size of type leading, and context," *J Appl Psychol*, 1929, *13*, 600–620, 1930, *14*, 63–73. Baird, J W, "The legibility of a telephone directory," *J Appl Psychol*, 1917, *1*, 30–37

[15] Crosland, H R, and Johnson, G, "The range of appearance as affected by inter-line hair-spacing and by the characteristics of individual letters," *J Appl Psychol*, 1928, *12*, 82–124

printing titles is inferior to the other two. Under certain circumstances, the second method is to be preferred to the third.[16]

Most of these facts have a bearing, of course, on printing and publishing rather than upon advertising, but since many advertisements are printed in books and journals, they are pertinent to the topic of this chapter. Let us, however, turn to other features of the art of announcing products.

One of the first problems we may consider calls for a comparison between the relative drawing power of an advertisement which appeals to the wants or desires of the consumer as opposed to advertisements which describe the way in which these wants or desires may be satisfied Clearly, advertisements might emphasize either the needs of the consumer or the way in which the manufacturer can satisfy a need. A third type of advertisement might emphasize almost, if not quite, equally these two functions. In the experiments that have been made on this problem, it has been shown that the order in which trade names are remembered is substantially the same order in which people are desirous of buying the commodity announced. In other words, the interests of the consumer himself direct him toward certain advertisements rather than toward others. These very interests have a greater value in helping him to remember the solution to these wants than such factors as repetition and intensity. Even though advertisements emphasizing wants or desires contain fewer repetitions of trade names and devote less space to describing the commodity than do advertisements emphasizing new ways in which a want may be satisfied, nevertheless the former often have a greater memory value than the latter.[17]

Because of the aesthetic attitudes which are frequently associated with colors, advertisers have turned more and more frequently to the use of color in magazine advertisements, and even on billboards. During recent years, for example, the number of colored advertisements in four commonly read magazines has increased by more than twenty per cent In an actual experiment on the matter, a mail order house sent out their catalog with one page in color in one half of the edition and the same page in black and white in the other half The returns from the colored advertisement were fifteen times as frequent

[16] Burtt, H E, Beck, H C, and Campbell, E, "Legibility of backbone titles," *J Appl. Psychol*, 1928, *12*, 217–227 See also Gould, N. P, Raines, L C, and Ruckmick, C A., "The printing of backbone titles on thin books and magazines," *Psychol Monog*, 1921, *30* (No 36), pp 62–76

[17] Strong, E K, and Loveless, J E, "'Want' and 'solution' advertisements," *J. Appl. Psychol*, 1926, *10*, 340–365 Also *J Appl Psychol*, 1927, *11*, 8–24

in number as those from the black and white page.[18] It is known, of course, that different colors vary greatly from one another in what is called their appeal, that is, in the aesthetic attitude they develop and in the attention which they attract to themselves. Red is used most frequently, with browns, greens, oranges, and yellows appearing in the order named.[19] There is some reason to believe that certain colors are more appropriate to some products than to others.

Other things being equal, the larger an advertisement the more direct will be its appeal. It must be remembered, however, that other things can never be equal. The factor of size must be changed in comparison with the location of the advertisement in the journal, with the number of times it is repeated, with the colors that are used, and with the character of the illustrations. In any case, however, the number of full-page advertisements has been increasing rapidly during the last few years.[20] In one study of this factor, the experimenter measured directly the eye movements of his subjects while they were looking at selected advertisements. The apparatus was so arranged that two displays could be presented simultaneously to the subject. Fifty-one subjects were asked to look at such pairs where one member of the pair was a full page and the other a half-page in size. An attempt was made to find out which member of the pair was looked at first and how many seconds were devoted to each of the displays. An attempt was also made to keep certain other factors constant such as the presence or absence of pictures of women, children, and food, the size of the type, the presence or absence of color and the use or non-use of relevant advertisements. In general, the subjects turned their attention to the full-page advertisements about ten per cent oftener than they did to the half-pages. In terms of total time spent in looking at the displays, the ratio in favor of the full page over the half-page was as 1.00 to 0.74. After the first series of tests was completed, the subjects were asked to write down those advertisements which they could remember as having seen. The ratio in favor of the full page to the half turned out to be 1.00 to 0.47. This means, of course, that so far as the initial attraction is concerned, the advantage of the full page is

[18] See Gilbert, H. N., "An experiment with colored and uncolored advertisements," *J. Appl. Psychol.*, 1933, *17*, 195–204. Sumner, F. C., "Influence of color on legibility of copy," *J. Appl. Psychol.*, 1932, *16*, 201–204. Anon., "Comparative pulling power of color and black and white," *Printer's Ink*, 1932, *160*, pp. 65 ff.

[19] Luckiesh, M., *Light and Color in Advertising and Merchandising*. N. Y., Van Nostrand, 1923, *passim*.

[20] Warden, C. J., *et al.*, "A study of certain aspects of advertising in the *Saturday Evening Post*," *J. Appl. Psychol.*, 1926, *10*, 63–66.

fairly small, but in terms of memory value, the advantage is fairly large.[21]

It is easy to see that the size of an advertisement may be measured either in absolute or in relative terms. For example, a full-page advertisement in one of the common monthly magazines would be as large as such a magazine could contain but not so large as an advertisement in one of the weekly magazines. One might ask, therefore, whether the attention value of a display is a function of its absolute or of its relative size This question must be answered in the latter way. In one experiment on the matter the area of the displays varied approximately as 1.2·3 These materials were presented to a group of subjects by means of the method of paired associations. The exposures were two, five, and fifteen seconds. As we have said, the conclusion was that the full-page advertisements in periodicals of all sizes seemed to have the same effectiveness.[22]

4. *The Attention Factor* —The primary aim of color and of size is, of course, to attract attention. We already know, however, that there are a good many other ways in which some objects and events may become prepotent over others in directing behavior. One of the laws of attention, for example, says that those objects and events which are recent or strange or which stand in sharp contrast against one another are apt to determine the direction of attention This fact has been much made use of in advertising, for the illustrations that decorate the displays of motor companies frequently give views of automobiles and of other objects in new or strange positions. The same factors hold true of intensely illuminated signs and especially of those which give the appearance of movement. It often happens, too, that a shop window will earn some attention by the use of rhythms or periodic claps against the plate glass [23]

The factor of position on the page is perhaps one of the most important in determining the attention value of an advertisement. The back cover page of a widely circulated weekly journal, for example, commands a much higher price than any other page This is

[21] Adams, H F, and Dandison, B, "Further experiments on the attention value of size and repetition in advertisements," *J Appl Psychol*, 1927, *11*, 483–489 Karwoski, T, "The memory value of size," *J Exper Psychol*, 1931, *14*, 530–554

[22] Newhall, S M, and Heim, M H, "Memory value of absolute size in magazine advertising," *J Appl Psychol*, 1929, *13*, 62–75 Strong, E K, "The effect of size of advertisements and frequency of their presentation," *Psychol Rev*, 1914, *21*, 144–150

[23] Nixon, H K, "Attention and interest in advertising," *Arch Psychol*, 1924, *11* (No 72) Strong, E K, "The effect of size of advertisements and frequency of their presentation," *Psychol Rev*, 1914, *21*, 136–152.

due to the fact that such a page is more apt to be seen by a large number of persons, but even among the inside pages there are not only preferences which make the front pages more valuable than the back pages, but preferences in the location of an advertisement on any single page. In general, it is known that the upper half of a page is probably more valuable than the lower half. Likewise, the upper left-hand corner is apt to attract attention more often than other corners of the page. The least valuable part of a page seems to be the lower right-hand corner.[24]

There are other factors which give high attention value to an advertisement. When, for example, a relatively small advertisement is surrounded by a fairly large amount of white space, the attention value is greatly increased. This fact appears to hold true so long as the white area does not exceed sixty per cent of the area of the advertisement itself. If this limit is exceeded, the increasing cost of the space will not be compensated for by an increased amount in attention value. Furthermore, advertisers like to think that a large amount of white space around an advertisement gives dignity and prestige to the advertisement.[25]

Another one of the variable conditions affecting the attention value of an advertisement is its location with respect to other advertisements. In recent years there has been a marked tendency for manufacturers to concentrate their commodity announcements in a few widely read journals. The result has been a marked increase in the size of the advertising sections. In general, it appears that the larger the advertising section the less effective the advertisements in it. If a twenty-page section is doubled, the effect is greater than when a forty-page section is doubled. In smaller sections the first four pages are to be preferred over the remainder. In larger sections, however, the results are variable.[26] As a final illustration of factors which make for attention value in an advertisement we may take variations in the objects displayed. As a rule, pictures of people are much more effective than pictures of other kinds of objects.[27] The greater atten-

[24] Kitson, H D, "Right- and left-hand pages in magazines," *J. Appl Psychol*, 1923, *7*, 10–15

[25] Strong, E K, "Value of white space in advertising," *J Appl Psychol*, 1926, *10*, 107–116 See also Adams, H F, "Memory as affected by isolation of material and by repetition," *J Appl Psychol*, 1927, *11*, 25–32

[26] Burchard, T C, and Warden, C J, "The effect of the size of the advertising section upon the individual advertisements in it," *J Appl Psychol*, 1926, *10*, 162–170

[27] Nixon, H K, "Two studies of attention to advertisements," *J Appl Psychol*. 1925. *9*, 170–187

tion value of pictures of humans is further illustrated by the fact that the tendency to use such pictures has increased markedly during the past twenty years. Pictures of women seem to be more effective than pictures of men.[28]

5. *Repetition.*—In view of the more common facts that are known about learning, it is hardly necessary to argue that repetition would be an important feature in any announcement of a product for this is the only way that the curve of forgetting can be modified.[29] In a wide variety of studies with a wide variety of products it has been shown that the more frequently a given product is announced the more effective will be the announcement. Sometimes this factor of repetition is limited to an advertisement, a slogan, or a trade-mark which remains the same year after year. The reader will be able to name for himself a large number of objects which are immediately associated with a great manufacturer. For example, such articles as cameras, sewing machines, soups, collars, fountain pens, coffee substitutes, cleansers, chewing gums, crackers, and grape juice naturally remind one of Eastman, Singer, Campbell, Arrow, Waterman, Postum, Old Dutch, Wrigley, National Biscuit Company, and Welch, respectively.[30] In most cases, however, the factor of repetition means wide variability in the nature of the displays, although the product remains the same.

The factor of attention as determined by color, size, placement, and repetition becomes all the more important when we recall that the average reader of a journal does not spend a very large amount of time on any given advertisement. Seventy subjects were asked to run through a prominent weekly magazine marking such material as they thought they would normally read as they paged through the magazine. This is, of course, a rather inaccurate way of getting data on this problem, but the inference was drawn that not more than five or ten per cent of the copy in an advertisement is actually read. It appears also that the average reader spends about ten seconds in looking at a display. In general, the younger the subject the smaller the amount of copy read. There was a strong tendency on the part

[28] Kitson, H D, and Allen, I, "Pictures of people in magazine advertising," *J Appl. Psychol*, 1925, *9*, 267–370 See also Laslett, H R, "Relevancy in advertisement illustrations," *J Appl Psychol*, 1918, *2*, 270–279

[29] Cf Burtt, H E, and Dobell, E M, "The curve of forgetting for advertising material," *J Appl Psychol*, 1925, *9*, 5–21

[30] Hotchkiss, G B, and Franken, R B, *The Leadership of Advertised Brands*, N Y, Doubleday Page, 1923 Peterson, E, "A campaign that was built around a label," *Printer's Ink*, 1932, *158*, 53–56

of most of the subjects to read more copy on the left-hand pages than on right-hand pages.[31]

6. *Experimental Methods in Advertising*.—It will be plain to the reader that most of the facts that we have just considered about the nature of advertising have come from the experimental laboratory rather than from actual field experience. This fact raises a question which we met at the very outset of our study. We met it again in our discussion of the relations between psychology and law. It is a problem which both the experimenter and the technologist must always keep in mind, for there is a difference between the laboratory investigation of a problem and the actual situations that one may have to meet in practical life.[32] As we have said before, the experimental method gains its accuracy by experimenting on one thing at a time while other things are kept equal. In actual life, however, other things can never be equal. One may study the size, the color, or the location of an advertisement by making up a dummy and asking one's subjects to page through such material so that attention may be measured and the effectiveness of recall studied at some later time. The man who actually reads a journal, however, is placed in an entirely different situation. He may be waiting in a railway station or comfortably seated by the fire in his home. His main interest is in reading material rather than in the advertising. As a rule, the subjects of a laboratory experiment in advertising are specifically tuned to the display. This means that they have been previously instructed either to look at advertisements or to remember them. The practical reader, however, may be interested in a great many other things. This means that the laboratory cannot easily duplicate the actual conditions which give advertisements what is called their pulling power.

As an example of this factor we may take one or two experiments. It is known, of course, that weekly or monthly journals are purchased not for the sake of the advertising in them but for the sake of the reading matter. It might be possible then to ask a group of subjects to read an assigned article in some magazine and then get them to report on the advertisements that have been noted during the reading or that can be remembered after the reading is over. When this is done it turns out that those advertisements which stand adjacent to read-

[31] Dulsky, S. G., "Factors influencing the amount of copy read in magazine advertisements," *J. Appl. Psychol.*, 1933, *17*, 195–204.

[32] Adams, H. F., "Adequacy of laboratory tests in advertising," *Psychol. Rev.*, 1915, *22*, 402–422.

ing matter are more apt to be recalled than advertisements which appear in other parts of the magazine Clearly, however, the extent to which advertisements standing in the same context with reading matter would vary greatly in their value depending upon the character of the reading matter. The story that was almost certain to capture the full attention of the reader might easily detract from advertising material placed near the reading [33]

As another illustration we may take a study of actual poster board advertising as contrasted with laboratory experiments made up of more artificial materials It is easy to see that there might be a great difference between a prospect who is reading a poster on the street and an observer who was seated in the laboratory before some exposure apparatus In this particular experiment a group of observers was driven past a stretch of poster boards at twenty miles an hour Five minutes later it was given an opportunity to recall spontaneously the signs that had been noted. These could be checked against advertisements seen prior to the experiment Moreover, a recognition test could be given by reading the names of the advertisements seen under the experimental conditions plus a number of others not included in the original set Among other things, it was found that the last board passed seemed to have a considerable advantage over the others The value of the boards was greater when the subjects were riding on the side of the street opposite of the boards. Pictures of people were remembered better than pictures of objects [34]

We may now summarize this chapter by saying that one could almost write the whole story of psychology in terms of the advertisement. Even the short shrift we have given to the topic reveals the many problems that have to be considered. It looked, for a time, as though the whole matter could be finished quickly, for it was only necessary that advertising situations be brought into the laboratory in order that they might be solved. As we have suggested, however, it is one thing to discover facts about sizes, colors, layout, type of appeal, and number of repetitions, and quite another to see all of these features of an advertisement in the setting actually furnished by a possible consumer who has sat down for the evening to read the articles in his favorite journal.

[33] Kellogg, W N, "The influence of reading matter upon the effectiveness of adjacent advertisements," *J Appl Psychol*, 1932, *16*, 49–58

[34] Burtt, H E, and Crockett, T S, "A technique for psychological study of poster board advertising and some preliminary results," *J. Appl Psychol*, 1928, *12*, 43–55

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CHAPTER THIRTY-TWO

BUYING AND SELLING

1 *Introduction.*—The whole study of advertising is, of course, a study of buying and selling. It differs from buying and selling, however, in the sense that it is more impersonal than the printed page or even than the word spoken over the radio. One may take a million printed pages, analyze them, distribute them according to the appeal they make, and tabulate the responses made in answer to them, but all of this is highly impersonal as compared with the direct contact which a salesman makes with his customer over the counter or at a conference table. This means, then, that the psychology of buying and selling touches even more closely than does advertising the personal character of the buyer, on the one hand, and of the seller, on the other. A salesman, for example, seeks through direct personal contact to persuade the customer to accept his merchandise or to commit himself to a contract.

It is for this one reason, perhaps, that the psychology of salesmanship cannot be reduced to principles which are as firmly established as are some of the principles of advertising. Personal interviews between a customer and the salesman, whether in a store or outside of it, depend upon that whole configuration of factors which make up two personalities, and it would neither be possible to analyze all of these factors nor to predict the outcome when one set meets another. The salesman is, of course, a kind of an advertisement in the sense that he announces to the customer the materials that can be purchased. In making this announcement he will take advantage of all of the devices that might be used in any good advertisement, but he has a distinct advantage over the printed page because he may vary the character of his announcement according to the character and the desires of the person being addressed. Moreover, advertising through a salesman may easily lead much more quickly to definite action since, through the processes of suggestion, if not by actual compulsion, the salesman may bring a customer almost forthwith to the desired response.

In general, then, the psychology of buying and selling is just as wide as the whole science of personality traits. He who would make a good

salesman must know a great deal about human nature, about the fundamental desires or wants of human beings, about the various ways in which the different psychological traits may be thrown into personality patterns, about methods of approaching different persons, about types of argument that would appeal to one man rather than to another, about vast ranges of individual differences in mood, emotion, incentive, interest, quickness of decision and action, prejudice and belief, and the like. Obviously, information of this kind cannot be reduced to a few simple laws. Altogether, then, the good salesman is a man who has inspected himself so often that he knows what human nature is about. He is a person who has read freely in biography and in psychology and who is able to apply this information to the direct contacts which he makes with his fellows.

In spite of the very great complexity of the psychology of direct buying and selling, there are a few general considerations which deserve serious attention. One of these general principles comes out of the fact that the buyer is one person and the seller another. This is, of course, obvious, but we may well ask, with respect to the selling-buying situation, which one of these two persons is the more important? That is, where should the psychologist direct his primary attention in his studies of effective salesmanship? Two answers have been given to this question The older answer affirms that the seller should be the main object of interest, for, with goods that have been manufactured in his sample cases, it becomes his duty to sell his goods by selling himself. The other answer runs to the effect that effective selling depends primarily upon the previous buying habits of the consumer and upon the means that may be taken either to strengthen these buying habits or to weaken them in favor of some other habit [1] It is now generally recognized that the consumer is probably the most important factor in the buyer-seller relationship.

2. *Sales Resistance.*—This aspect of the art of salesmanship will come out of a study of what is commonly known as sales resistance. For a long time it has been assumed that selling should start with manufacturing. After a given industry has turned out a large amount of material, it has been supposed that men who could sell themselves should take this material and make the buyer purchase it whether he wanted it or not. The phrase "sales resistance," then, meant that successful salesmanship depended upon the ability of one person to

[1] Cf Link, H C., *The New Psychology of Buying and Selling*, N Y, Macmillan, 1933, Chap I Strong, E K, "Theories of selling," *J Appl. Psychol*, 1925, 9, 75 86

break down the resistance of another person against the object being sold or against the salesman himself.

The various aspects of sales resistance can be stated in several different ways. For example, one may say that the problem of selling a given supply of goods is dependent wholly upon the personality of the salesman himself. So long as manufacturers believed that the salesman was the crucial point in the selling-buying situation, they attempted all sorts of measures of personality. They sought to find out what traits a salesman might have that would give him immediate prestige in the eyes of a prospective customer. In other words, the problems of salesmanship became somewhat like the problems of leadership It was supposed that the successful salesman must be a man of considerable stature, one who was more or less dynamic in his attitude, one who could talk easily and fluently, one who was well trained in the arts of suggestion and argument, and so on. We shall say more about this aspect of salesmanship below.[2]

Another side of this picture is presented by the phrase "buying behavior" As we have intimated above, this phrase means that the emphasis in the selling-buying situation has been shifted from the seller to the buyer Every psychologist knows, of course, that this is not an easy shift for the normal person to make. It is one phase of what has recently been called the "egocentric predicament." [3] The private life of any given person is more important to that person than is the private life of any other person A man's own desires, his own way of looking at things, his own habits, attitudes, and prejudices always seem to be more real than almost any other thing he can name. Since salesmen are human beings, they too are wrapped up in their own view of things and it is this fact which is named by the phrase, the "egocentric predicament." If, then, a salesman is to get out of this predicament, he must come to the place where he can see intimately and appreciatively the wants and desires, habits, prejudices, and opinions of someone else.

The net outcome of these considerations has been a marked change in the psychology of salesmanship In other words, a serious attempt is now being made to find out what the purchaser actually wants, why he wants it, and how he has managed to satisfy his wants. It happens, of course, that many of the wants of most persons are unformulated or unexpressed, in which case it will be the function of the

[2] The reader should refer again to the discussion in Chapter Ten

[3] Link, H C, *op cit*, pp 30 ff

advertisement and of a salesman to supply modes of expression where they are lacking On the other hand, most persons have already established fairly consistent buying habits.[4] It is quite clear, for example, that in the case of such an item as shaving cream a large number of persons are fairly consistent in the kind of cream that they will choose. This result is to be attributed in part to advertising campaigns, in part to an actual appreciation of the merits of the article, and in part to the inertia of human nature. In the case of perfumes, however, the buying habits of the average purchaser are quite different, for it can be shown that women change their buying habits in this respect fairly regularly. In putting a new perfume on the market, then, a manufacturer could proceed as though he had something which must be sold, in which case he would try to secure a salesman who could break down sales resistance. On the contrary, he could proceed upon the well-recognized fact that, so far as this commodity is concerned, the buying habits of the public are rather fickle. In this second case, he would find it to his advantage to keep his research staff busy on the mixture of new perfumes rather than to keep high-pressure salesmen at work in a vain attempt to force an older standardized product on the market.[5]

As a further example of traditional methods of salesmanship, we may take the recent invention of various types of electric device to be used in the home. In these cases one might proceed on the general assumption that any labor-saving device would be an advantage in the sense that it would supply a want. The only problem before the manufacturer, then, would be to create a neat-looking article, wage an intensive advertising campaign, and throw into as many homes as possible a group of salesmen whose main purpose was to sell their instruments by selling themselves. The failure of some of these attempts now stand out as good examples of the change that has taken place in the psychology of salesmanship. A study of the actual wants of housewives, together with an adequate appreciation of the kitchen habits of the average woman, might easily have shown that certain types of devices could never gain a large sale, whereas others might have stood some chance of success if they had been modified somewhat in their form.[6]

3. *Wants and Desires.*—We mean to conclude, then, that the newer

[4] Cf Waters, R H, "A study of customer attitudes," *J Appl Psychol.*, 1931, *15*, 252–258.
[5] Link, H C, *op cit*, Chap IX.
[6] *Ibid*, Chap II.

psychology of salesmanship is a psychology that centers more nearly around the buyer and his buying habits than it does around the seller and his aggressive personality. It follows from this that marketing procedures should aim, first of all, toward the analysis of the buying habits of people.[7]

There are several different ways to approach this problem. In the first place, one may make a more or less scientific study of normal human wants or desires. At a superficial level, one may describe these desires almost immediately. They are the outcome of the fundamental tissue needs of the body. Every human being must have food and clothing, a home, an opportunity for action, and a place for rest.[8] To ascertain these facts, however, marks no more than the beginning of the task, for, as we have seen, the fundamental tissue needs of the body are quickly transformed into a vast array of secondary desires and incentives. So far as the problem of marketing is concerned, the desire for food may be taken for granted. So, too, a desire for home life and parental relationships may be taken as a fundamental hunger, but the variety of objects which a person will place in his home stands on an entirely different foundation.

It is clear that, if a marketing agency is to find out anything about these derived wants and desires, it must push on to a study of actual buying habits and trends. As we have said above, these buying habits and the trends which they follow must be the result in part of previous advertising campaigns, and in part of the satisfaction which certain types of articles have given. Given these habits, one may make a large-scale survey of preferences for certain kinds of objects by sending out questionnaires through the mail or by personal solicitation. Work of this type is being done with increasing frequency and in some places prospective customers are even being asked to suggest modifications of articles in order that the wishes of the potential purchaser may be more adequately met.[9]

We shall say something more about these market surveys in a moment. In the meantime, it is clear that no study of buying habits can be completed until exact facts have been uncovered concerning the financial resources which different persons will depend upon in making actual purchases. In other words, any sales organization must find

[7] *Ibid*, Chap IV

[8] For a good discussion of desires, see Dorcus, R M, and Shaffer, G W, *Textbook of Abnormal Psychology*, Baltimore, Williams and Wilkins, 1934, Chap V.

[9] Consider, for example, the consumer attitude studies being made by the General Motors Corporation

out what the income of the average family is and how this income is normally distributed among such items as food, clothing, light and heat, medical service, luxuries, and other types of merchandise. It turns out, of course, that a vast majority of American families have a low net income. It is not sufficient, however, to get this data for the population at large. Any local concern must have the same sort of information for the community or section in which its goods normally find a market. It goes almost without saying, then, that the buying habits of any particular group of persons will be directly determined by their buying power.[10]

It is not possible to make a complete survey of the large number of facts which have now been assembled regarding the proper techniques to be followed in making a market survey, that is, a survey of the buying habits or preferences of the public. There are, however, certain principles that can be named. In the first place, it is clear that a market survey should follow all of the principles of a good psychological experiment.[11] This means that there should be a precise formulation of the problem. Since a market survey must almost inevitably make use of the questionnaire method, it follows that the information asked for must be precise and directly correlated with the problem under study.[12] Enough is now known about the influence of the form of a question upon the answer given to suggest that the formulation of a proper questionnaire is one of the hardest parts of a market survey.[13] Before the questionnaire is submitted to any large number of buyers, it must, of course, be tried out on a few subjects in order to see whether, as a matter of fact, the results from it will be statistically reliable and whether they will have a proper correlation with the problem as it is stated. The replies that come in should then be tabulated and tested for reliability in accordance with all of the statistical measures that are now available for such purposes.[14]

As an illustration of possible sources of error in market surveys, we may take the loading of results which often occurs because of selection among the consumers. If, for example, an industry were to conduct a market survey through some popular advertising medium,

[10] Starch D., *The Income of the American Family*, Market Study No. 3, Cambridge, Daniel Starch, 1930.

[11] Cf. Link, H. C., *op. cit.*, Chap. III.

[12] The various aspects of making out an effective questionnaire are discussed by Symonds, P. M., *Diagnosing Personality and Conduct*, N. Y., Century, 1931, Chap. IV. See also Ruckmick, C. A., "The uses and abuses of the questionnaire procedure," *J. Appl. Psychol.*, 1930, *14*, 32–41.

[13] Consult again the data presented in Chapter Seventeen.

[14] Wild, L. D. H., "Measuring your market by statistical correlation," *Adver. and Selling*, 1932, *18*, pp. 32 ff.

say a weekly or monthly journal, it might be supposed that the replies would be representative of the point of view of the consumer because of the sheer number of copies of the journal sold. Obviously, however, even such widely circulated magazines as *The Saturday Evening Post* or *Liberty* would come more frequently into the hands of some consumers than others. There is no reason to suppose that the replies gained from subscribers to either of these journals would be representative of the population as a whole. Even if this fact could be taken for granted, it would not necessarily follow that the replies were representative of all of the readers of these magazines.

Another phase of this situation is to be seen in the question as to how many replies it will take to make the results statistically reliable. If it should turn out that the first 500 replies have a high correlation with the second 500, the chances are that the problem has been so definitely stated and the questions so intimately related to the problem that a relatively small number of replies will give an adequate sample of a very large market field. On the contrary, if there is no such correlation between the first and second 500 sets of data, either of two inferences may be drawn. On the one hand, it may be that the number of replies is, as yet, not sufficient. On the other hand, it may be that the formulation of the problem and the questions asked about it in the questionnaire involve some fundamental error. In this second case, the data that came in could not possibly be reliable even though thousands of answers were received.[15]

4. *The Qualities of the Salesman.*—It is clear from the preceding discussion that the era of the high-pressure salesman is probably past. As we have said, it was his business to make the public buy what the manufacturer made. Now, however, the manufacturer is trying to find out what the public wants In this changed situation, the qualities of the salesman will be somewhat different than they once were.[16] We do not mean to imply by this, however, that anyone has ever known just what qualities the good salesman should have. It has been quite easy for those interested in this phase of applied psychology to take some of the principles of normal human behavior and translate them into the buying-selling situation. It is now known that translations of this sort may not be very significant.[17]

[15] Consult any good book on statistical method See the references at the end of Chapter Thirty-Nine

[16] Cf Freyd, M., "Selection of promotion salesmen," *J Person Res*, 1926, *5*, 142–156

[17] Cook, H E, and Manson, G E, "Abilities necessary in effective retail selling and a method of evaluating them," *J. Person Res*, 1926, *5*, 74–82.

Of one thing about the salesman we may be fairly sure. He is, so to speak, a kind of a substitute for a good advertisement. It is fairly easy to say, after a salesman has succeeded, what his particular qualities were, just as it is easy to say what the qualities of a successful advertisement were after it had brought in results. It is quite another thing, however, to formulate these qualities in advance of actual success. As we have said above, selling is not so much a matter of the personality of one man as it is a product of the way in which two men work together in a very complex setting. In view of the great variety in human nature and of the multitudes of configurations into which two or more persons can be fashioned, predictability in this field is scarcely possible That is, it cannot be said that some men belong to a special type called the salesman type.[18]

Some of the possible traits of the salesman have been approached in the following ways. There is, for example, a test known as the ascendance-submission test. From the thirty-three questions which make up this test we may select only one, viz, "At a reception or tea do you seek to meet the important person present? Habitually ———— Occasionally ———— Never ————." The point is that questions shall be asked that throw some light upon the social dispositions or traits of the person tested. When this test is properly treated for reliability, it does seem to say something about the traits of submission and of aggressiveness, and it seems also to say something about the relative aggressiveness of the good salesman.[19] It would not be fair to assert, however, that a person who scores high in aggressiveness would, on that account, make a good salesman. There are other traits which might also have a bearing on the whole situation. It is sometimes argued, for example, that the extrovert is more apt to be a good salesman than an introvert. If selling is, in large part, a problem of finding out what people want, the extrovert would have an advantage since, by definition, he is a person who is interested in the objects and events which take place around him rather than within him. In other words, a successful salesman cannot possibly be disinterested in what the buyer wishes.

Among the other traits which have been attributed to the successful salesman are industry and energy, persistence, imagination, optimism, initiative, sense of humor, intelligence and alertness, tact, a good

[18] Allport, G. W, "A test for ascendance-submission," *J. Abnorm. and Soc. Psychol.*, 1928, *23*, 118–136

[19] Allport, G W, "A test of ascendance-submission," *J Abnorm and Soc. Psychol*, 1928, *23*, 118–136.

memory for names and faces, ability to talk well, ability to judge people, a pleasing personality, neatness, good moral habits, and experience.[20] When, however, any one of these traits is measured and correlated with actual success, the results are rather disappointing. As a single example we may take intelligence. It has not been shown that good salesmen are, on the average, much better in intelligence than the poor salesman, where intelligence is measured by any one of the common tests.[21] As a matter of fact, it is frequently said that the intelligence quotient of a salesman or a sales clerk need not be higher than the average, that is, somewhere around one hundred per cent. One student of these matters has said that selling costs are usually low if the salesman is predominantly an extrovert, active, alert, aggressive, convincing, ambitious, responsive, pleasant, and well integrated. On the other hand, high costs of selling frequently appear when salesmen show marked tendencies toward introversion, under-activity, tendency toward mental reverie, lack of ambition, unresponsiveness, and instability [22] No doubt the student will remark and remark truly that these same statements could be made regarding people who are successful in other occupations than selling.

The general conclusion to be drawn from these facts is that the seller-buyer relationship is a relationship which may be established through any one of a very large number of factors. These factors might vary from time to time in the same person and with changes in the product being sold One salesman, for example, might be able to approach a customer with a given product in terms of enthusiasm, whereas another customer who is interested in another product might have to be approached at an intellectual level. This does not mean, however, that the salesman should make no effort at all to prepare himself for his work On the contrary, the whole trend in the experimental study of merchandising is toward sales campaigns and sales efforts that are planned with great thoroughness. This means, of course, that the salesman must use his intelligence, to take only a single factor, in outlining his selling campaign and in keeping himself alert to the various kinds of contacts which he may establish with his customer. It seems to be quite clear, however, that actual selling experience rather than laboratory tests will contribute most to this goal.

5. *General Observations.*—It is clear that the experimental study of

[20] Snow, A J, *Psychology in Business Relations*, Chicago, Shaw, 1925, Chaps XX–XXVI.

[21] Beckham, A S, "Minimum intelligence levels for several occupations," *Person. J.*, 1930, 9, pp 309 ff

[22] Anderson, V V, *Psychiatry in Industry*, N Y, Harper, 1929, Chap VIII.

the situations being described in this chapter has not gone very far. This is true because the experimental examination of buying and selling is a recent development and because most of the situations described by these words are extraordinarily complex. It would hardly be fair then to leave the topic without making a few general observations which have been precipitated out of the practical experience of successful salesmen and out of the judgments of those who have tried to be reasonably accurate in their appraisal of salesmen.

It is hardly necessary to argue that a successful salesman must be thoroughly acquainted with the merchandise which he is laying before a presumable buyer. This knowledge should include prices not only of the goods actually presented but of competing goods, colors, the most significant changes in style, differences in the grade of material offered, guarantees, the number and quality of items accessory to the main purchase, all of the conditions which surround delivery, and so on. In the case of mechanical instruments, the salesman should be so expert on the technical side that no failure in the device during the demonstration is beyond his competence to discover and repair. Where there is sufficient information about the goods being sold, there will be considerable measures of confidence and enthusiasm. There are, to be sure, some persons who can argue convincingly even against their own knowledge and their own principles, but genuine enthusiasm usually runs in direct proportion to knowledge which one has about the goods being displayed.

Most of the books on methods of salesmanship spend several chapters in the discussion of such items as the way in which a customer should be greeted, the studies that should be made of the customer's interests and attitudes, the appropriate use of arguments for different occasions, methods of meeting objections and of handling disputes. Such common-sense matters as a friendly "good morning" are frequently cited as means of establishing rapport with a customer. We have already intimated that the buying-selling relationship is essentially the result of a contact which has been established between two personalities and the successful salesman, therefore, can well afford to find out something about his customer even before he meets him, if that is possible. In any case, the salesman should take advantage of every clew given to him by his customer which will reveal his likes and dislikes, his probable buying desires, his preferences for modes of approach, and his habits with respect to quality of goods and price level. It is often reported in the practical books on the art of sales-

manship that a salesman should first lay a number of different samples before the customer, noting carefully the reactions of the customer to each. Whenever it appears that the customer has displayed preference for some particular article, the books argue that the salesman should then proceed to concentrate upon this particular article. This fact is said to hold true in particular if the article is one of a large "line" of articles. The more difficult phases of salesmanship arise when the increased pressure brought to bear by the salesman on his customer excites objections and disputes. In meeting objections, there is only one steady support to which the salesman may return, viz., his intimate acquaintance with his own goods and with the goods of his competitors. The chances are that if a salesman has fallen into a dispute with his customer, he has created the occasion for the dispute by attempting to approach the customer in the wrong manner. The obvious escape from a dispute is to take the initiative in avoiding the issue that has been raised.

It is ordinarily argued that the act of closing a sale marks the natural culmination of the buyer-seller relationship. The attitude of salesmen and of students of selling on this point seems to have changed somewhat from a former position. Heretofore, it has been supposed that the act of getting a customer to "sign on the dotted line" required some unusual and even mysterious psychological power. At the present time, it is being held that a salesman should try to avoid sales resistance rather than to beat it down. One means of avoiding sales resistance has already been discussed, viz., that the manufacturer must design his goods so as to satisfy existing demands. Large manufacturing establishments, therefore, are devoting their time and energy to a discovery of the buying habits and the personal desires of potential customers. His products, then, are built around his customers. The older method required the salesman to try to build the customer around the product.

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CHAPTER THIRTY-THREE

THE PRINCIPLES OF PERSONNEL SELECTION

1. *Introduction.*—The time has now come to bring to completion a series of problems which have been implied in all of the preceding chapters and which have received a partially adequate treatment in Chapter Five where we spoke of some of the general principles of vocational guidance. The present chapter is related to Chapter Five in the sense that we now take a firmer grip upon the psychological factors which may help a person to adjust himself efficiently and happily to a particular occupation or which will make some of the details of the occupation more adequate to the traits and talents of the worker. If enough were known about human nature, it might be possible to train a child from the very start in such a way that he would fit into a profession or into our modern industrial system without creating friction for himself and for the people who employ him As we have seen, from our study of some of the problems of vocational guidance, experimental psychology is still far short of this goal. Moreover, it seems fair to argue that it should remain short of the goal, for any system of education and training that would be so highly determined from the outset would hardly be compatible with a common human desire to be as free as possible in the choice of an occupation and even to shift at times from one task to another. In our discussion of vocational guidance, therefore, we have tried to point out some of the main principles to which proper attention must be paid if one is to use one's education as an aid to increasing competence Now, however, we may suppose that the major part of the reader's training lies behind him and that he is actually faced with the necessity of finding an occupation that will be suitable both to his skills and knowledge and to his temperament.

We shall do well, then, to follow other students of these problems in drawing a certain distinction between vocational guidance and vocational or personnel selection.[1] Vocational guidance calls for the analysis of the particular traits both actual and potential of a person and the selection of a profession or of an occupation that will be ade-

[1] Poffenberger, A T., *Applied Psychology*, N Y., Appleton, 1928, Chap XIV.

quate to the applicant's particular pattern of achievement. In other words, vocational guidance looks at this whole problem from the point of view of the individual himself. Vocational or personnel selection, on the other hand, looks at the whole situation from the point of view of the job or of the occupation. It assumes that some study has been made of the psychological qualities that are necessary in performing some particular task, and the personnel officer then starts out to find an applicant who will meet these requirements. Most of the general problems of vocational selection have been adequately stated as follows. To quote: "My feeling about the fundamental policy of employment is that we often stop short in our thinking. We buy a machine, you and I We are, as I have suggested, very careful about that machine In the first place we do not buy the machine unless we understand it. There is not one of us who would think of putting an apparatus into our office or shop that we did not understand. That means that we have given attention to the laws of that machine. We know what it can do. We should consider ourselves very, very absurd if we put into our factory any apparatus about which we could say that we had not studied its laws, and did not know how it operated, what its capacity of output might be, to what extent it would bear overstrain . . . How many of us apply the same kind of thinking to the man or the woman we take into our shop, so infinitely more complex a machine than the loom or the shaper or the planer or the paper machine,—an infinitely more complex thing with all sorts of qualities to which most of us pay no attention. In fact, there is a word we use in that connection which by its very use shows the limitation of our thought. We say we employ so many 'hands' The very use of the word shows that we do not appreciate the situation. We are not employing 'hands', we are employing brains and hearts and dispositions, and all sorts of elements that make for personality—we are employing them all " [2]

It will be worth our while to find out just how serious the problems of vocational selection are in terms of what is called "labor turnover." This phrase means that the cost of production in industry and the cost of professional service is increased in part because workmen who are unfitted for their tasks and who are unhappy in their labor tend to drift rapidly from one occupation to another. In the meantime,

[2] Quoted by Viteles, M S, in *Industrial Psychology*, N Y, Norton, 1932, p. 13, from Redfield, W C, "The employment problem in industry," *Ann Amer Acad Pol and Soc. Sci*, 1916 *65*, pp 10–11.

they will have cost their employers the money expended on training programs, they will have worked more slowly than more skilled operators, they will have made a great many mistakes, and, as we have seen in Chapter Twenty-Nine, they are more or less subject to accidents. In one extensive survey of labor turnover during a period of ten years including 350 companies which employed an average force of 600,000 people, it has been shown that the average annual turnover amounted to approximately forty-eight per cent Nearly two-thirds of the laborers who drifted from one occupation to another did so voluntarily A little over twelve per cent of the total turnover was made up of persons who had been discharged or who had been laid off [3] In another study of the same problem it has been shown that a little over six times as many people had to be hired as were actually necessary in the operation of the plants studied. There is, of course, in every large industry a certain amount of labor turnover that can be explained by normal changes in rate of production and by such unavoidable circumstances as accident, sickness, and death. It should hardly be expected, however, that these causes could account for the high ratio just mentioned. This same study includes an attempted evaluation of the amount of unnecessary expenditure occasioned by large turnover It was discovered, for example, that after making due allowance for unavoidable causes of turnover, the unnecessary employment of workers in the twelve factories studied had led to an economic waste of upwards of $800,000 a year [4] It must be clear to the reader, then, that the problems of personnel selection have a real significance not only to the psychologist but to the most practical employer. It is for this reason that large concerns are rapidly putting their employment problems into the hands of personnel officers who have been well trained in the experimental examination of human nature and who at the same time have an intimate acquaintance with all of the operations of the plant to which they are attached. The work of these personnel officers extends to all of the traits that have been studied in the experimental laboratory. It is necessary, for example, to know something about the physical characteristics of each applicant for a job, about his special skills, his intelligence, his temperament and character, and his major interests.

Even though the rapid development of trade schools has gone a

[3] Berridge, W. A., "Measuring labor turnover," *Person. J.*, 1929, *8*, 197–206

[4] Alexander, M W., "Hiring and firing its economic waste and how to avoid it," *Ann. Amer. Acad. Pol and Soc Sci.*, 1916, *65*, 128–144.

long way toward giving students a wide variety of special skills, it still holds true that most factories must place persons who have been newly employed through a period of special training. In anticipation of this training, it is helpful to have some preliminary knowledge of the general aptitude of a person.[5] In a good many occupations differential levels of intelligence are also of considerable importance. It looks, for example, as though persons having a low I.Q. are much more apt to be unsatisfactory in certain jobs than are persons having a higher I Q. Moreover, within limits, the higher the I Q. the more permanent the tenure.[6] It must not be inferred, however, that any predictions can be made from scores on intelligence tests to the likelihood of success in the given occupation. It is one thing, of course, to say that a person who holds a given position for a longer period of time than another will have a higher I Q than the other, but it is quite another thing to say that all persons of higher intelligence will, therefore, remain longer in a given occupation.[7] It has not even been possible to state with any assurance what the minimum intelligence scores shall be for any particular occupation This problem is, however, under constant experimental attack and it may be possible in the future to speak with more authority about it.[8]

It begins to look as though temperament and character traits are more significant for success in an occupation than intelligence and perhaps of equal significance with proper skills. Obviously a man in a factory must not only know how to do his work but he must know how to get along with people and what it means to be regular, dependable, willing, and adaptable.[9] We have already had occasion to say something about the factor of motivation in work. We have also described in various places the differences in efficiency brought about by such attitudes as introversion and extroversion, the variety of one's

[5] Cf Hull, C L, *Aptitude Testing*, N Y, World Book Co, 1928 See also Pear, T H, *Fitness for Work*, London, Univ London Press, 1928, *passim*, "The nature of skill," *J Nat Inst Indus Psychol*, 1928, *4*, pp 193–202

[6] Bills, M. A, "Relation of mental alertness test scores to positions and permanency in the company," *J Appl Psychol*, 1923, *7*, 154–156 Also Viteles, M S, "Selection of cashiers in predicting length of service," *J Person Res*, 1924, *2*, 467–473

[7] Some of the experimental material bearing upon this problem is as follows Otis, A S, "The selection of mill workers by mental tests," *J Appl Psychol*, 1920, *4*, 339–341 Thurstone, L L, "Mental tests for prospective telegraphists," *J Appl Psychol*, 1919, *3*, 110–117. Taylor, A D, "Intelligence of young printers," *Person J*, 1929, *8*, 29–35 Viteles, M. S, "Research in the selection of motormen," *J Person Res*, 1925, *4*, 193–195.

[8] Cf Burr, E T, "Minimum intelligence levels of accomplishment in industry," *J Person. Res*, 1924, *3*, 207–212 Burt, C, "The principles of vocational guidance," *Brit J Psychol.*, 1923–24, *14*, 336–352

[9] Cf Symonds, P. M, *Diagnosing Personality and Conduct*, N Y, Century, 1931, pp. 10–11 and *passim*

interests, and the appropriate relation between interests and attitudes. All of these factors are known to have a definite bearing upon occupational efficiency.[10] Here again, however, further work is much to be desired. The success of a worker when compared with his ability must be measured in terms of the amount of his product and its relative cost. When success is measured in terms of interest, however, the chief factors are not his actual output but his satisfaction in his work. Actual output is something that can be measured objectively, but satisfaction and other dispositions and attitudes suggested by this word are not so easy to take account of.[11]

2. *Letters and Interviews.*—When the reader comes to the point of actually seeking placement in a school system or in an industrial plant, he will think first of a letter of application supported by letters of recommendation leading perhaps to a personal interview. There are certain features of these various methods of getting into touch with an employment officer that should guide the reader in his search for placement. These features concern not only his own part of the undertaking but the part played by the employment officer as well. We may consider, first, the letter of application and the supporting letters of recommendation. The letter of application is really an attempt on the part of the applicant to lay his personal qualities before the employment officer for inspection. It is clear that such a letter should be thoroughly straightforward and honest, leaving as little to the imagination of the employment officer as possible. The form and the content of the older letters of application were left entirely to the applicant. More recently school boards and personnel officers connected with large industries have sent out more formal application blanks which contain those questions upon which specific information is desired. This newer form has a good many advantages over the older because it has been shown that judges may differ widely from one another in their appraisal of a spontaneous effort on the part of an applicant.[12] The ordinary application blank asks, of course, for the name, the address, the age, race, birthplace, height, weight, and health of the applicant. It asks too for a recital of the educational history of the applicant, including a description of the subjects in

[10] Cf. Bingham, W. V., "Personality and vocation," *Brit J. Psychol.*, 1926, *16*, pp. 359 ff. Freyd, M., "The personality of the socially and mechanically inclined," *Psychol Monog.*, 1924 (No. 151). Bathurst, J. E., "Emotional specifications and job happiness," *Indust. Psychol.*, 1928, *3*, 520–525.

[11] This problem has been discussed by Viteles, M. S., *op. cit.*, Chap. XXV.

[12] Poffenberger, A. T., and Vartanian, V. H., "The letter of application in vocational selection," *J. Appl. Psychol.*, 1922, *6*, 74–80.

which he has specialized. Further inquiries are made about previous employment, length of service, reason for leaving service, wages secured, and reasons for seeking a new position. A request is also made for the names of other persons who can send in letters of recommendation.[13] It looks as though the data given on a well-constructed application blank may have a reasonably high value in predicting the presumable success of the applicant. This is true, in particular, where attempts are made to score on a suitable scale the answers presented in the blank [14] In the case of one large firm, it has been shown that success of college students can be predicted with reasonable assurance from reports on scholarship, campus achievement, and age at graduation [15]

Letters of recommendation from other persons than the applicant himself increase in value in direct proportion as they satisfy the recognized requirements of an application blank. The ordinary letters of recommendation, the form and content of which is left to the writer, is subject to such weaknesses as the following. It often happens that the applicant will ask only those persons to support him who already have a favorable opinion of him. The appeal to the local minister is a common practice. Both the applicant and those who are asked to support him have a common weakness in describing strong points while omitting all reference to those factors that might lead to failure. As we have said above, then, the letter of recommendation, like the letter of application, should be as objective as possible. Wherever direct scores can be used, such as academic records, intelligence test scores, and the like, they should be mentioned.

The personal interview has some psychological features in common with the relation between the buyer and the seller The person who is being interviewed is attempting to sell himself to the employer. The employer is, so to speak, in the market for the purchase of certain goods. It is entirely reasonable, therefore, to find that the personal interview has been examined from a good many different points of view.[16] One of the students of these matters [17] has appraised the

[13] Cf Goldsmith, D B, "The use of the personal history blank as a salesmanship test," *J Appl Psychol*, 1922, *6*, 149–155 Manson, G E, "What can the application blank tell?" *J Person Res*, 1925, *4*, pp 128 ff

[14] Russell, W, and Cope, G V, "A method of rating the history and achievement of applicants for positions," *Public Person Stud*, 1925, *3*, 202–209

[15] Bridgman, B S, "Success in college and business," *Person J*, 1930, *9*, 1–19

[16] Woodworth, R S, "Psychological experience with the interview," *J Person Res*, 1925, *4*, 164–165

[17] Cf Griffitts, C H, *Fundamentals of Vocational Psychology*, N Y, Macmillan, 1924, pp 119–126

personal interview as follows. It is pointed out first of all that the judgments of one person regarding another may suffer bias because the person under examination arouses in the examiner a judgment or an attitude created by an altogether different person. The student will recognize this situation for he has often said, upon meeting a new person, that for some unknown reason he dislikes that person. The "unknown reason" arises out of the fact that the immediately observed person and the remembered person hold some trait in common. If then, one's reaction to a prior acquaintance has been unfavorable, and if that person holds some single trait in common with the person being interviewed, the old attitude is likely to recur.[18] A certain source of error in the personal interview arises out of the fact that most people tend to judge their fellows as though some obvious feature, either for good or for bad, must be symptomatic of all features. In the third place, the interviewer may reveal some of his own biases by the way in which he phrases his questions. Obviously, the responses of the person being interviewed would be modified by this fact.[19] Other factors that are known to affect the character of an interview are the ambiguity of words, the extent to which the person being interviewed responds adversely to social pressure (for example, his nervousness), and the tendency of almost everyone to imitate the attitudes and the dispositions they discover in others.

Several attempts have been made to correct these faults in interviews. These attempts have looked in the direction of selecting interviewers more carefully, give them training in proper techniques of approach, selecting and defining with care the traits with respect to which judgments are to be made, and otherwise standardizing the several procedures involved.[20] Unless such steps as these are taken, the interview is apt to be extremely unreliable. As a matter of fact, it has been shown that several different judges of the same person may rate such a person both near the top and near the bottom with respect to a larger group.[21]

Some considerable improvement has been effected both in letters of application and in the technique of conducting an interview by resorting to what is commonly known as a rating scale. Such a scale contains

[18] Cf. Magson, E H, "How we judge intelligence," *Brit J Psychol Monog*, 1920 (No 9), *passim*

[19] Rice, S A, "Contagious bias in the interview," *Amer J Sociol*, 1929, 35, 420–423

[20] Consult, for example, Bingham, W V, and Moore, B. V, *How to Interview*, N Y., Macmillan, 1931, *passim*

[21] Hollingworth, H L, *Vocational Psychology and Character Analysis*, N Y, Appleton, 1929, pp. 115–119

the names of all of the traits that are assumed by the employer to bear some relation to the occupation under consideration. With respect to each one of these traits, it is possible to judge the applicant on a scale described in terms of high, average, and low, or in terms of numbers from one to five or from one to seven. It is clear, of course, that the terms used in such a scale must be clearly defined so that if one applicant is being judged by a number of different men, they will all be making their judgments with reference to exactly the same trait. Where questions are asked, they must be formulated in such a way as to be wholly unambiguous. When all of the results are in, the interviewer may assign certain values to each of the traits and to each of the ratings that have been placed on the traits. He will then have a sort of score which represents the approximate position of any one subject with respect to other subjects. If such numerical values are attached to a rating system, a purely descriptive rating scale has been turned into a numerical rating scale. In some cases, however, all of the applicants for a given position are simply arranged in order of merit.[22]

3 *Tests and Measurements.*—It is now possible even in our own complex society to isolate and to define a very large number of different occupations. Each of these occupations requires, among other things, a particular pattern of special skills and special dispositions. One of the big tasks of employment psychology, as we shall see in the last section, is to analyze all of these occupations in order to find out just what they require in the way of skill and temperament It is also necessary, however, to subject the entire process which has been described in the preceding sections to a more detailed analysis, for it is just as essential to discover accurately the special traits and talents of the worker as it is to analyze any given occupation. Each person who has come to early maturity will have acquired a certain number of special skills which stand at any particular moment at different levels of efficiency and he will also be the center of a great many different attitudes which may be highly variable from moment to moment. Employment psychology may wish to know, however, not only what skills a person already possesses but what his general promise is for the acquisition of new skills. A large part of vocational selection then has come to be distinctly experimental in character. These experiments

[22] Some of the literature on the practical application of rating scales is as follows Rugg, H O, "Is the rating of character possible?" *J Educ Psychol*, 1921, *12*, 425–438, 485–501; 1922, *13*, 30–42, 81–93 Kornhauser, A W, "What are rating scales good for?" *J Person. Res*, 1926, *5*, 189–193, "Reliability of average ratings," *J Person Res*, 1926, *5*, 309–317. Bradshaw, F F, "Revising rating techniques," *Person J*, 1931, *10*, 232–245

may be carried out not only in "pure" form in the psychological laboratory but in a highly practical form in an industrial plant, on the highway, or in the schoolroom.

As we have seen in previous chapters, there is an immense amount of information from both of these sources. We can do no more at this time than outline a few of the typical procedures that are in common use. Every personnel officer will, of course, administer a test of intelligence, a test of character traits, attitudes, and dispositions, and in some cases a test of interest [23] Since we have already discussed the nature of intelligence tests and since other varieties of tests will be treated at least briefly in Chapter Thirty-Nine, we shall say no more about them at this point. The more exact studies of specific psychological functions may take, in general, either of two forms. On the one hand, a good many attempts have been made to bring practical industrial situations into an experimental laboratory, simplify them, and thus attempt to discover whether anything can be said about human traits independently of the particular places where they are to be used. As an illustration of this type of procedure we may take all of those studies known as tests of motor skill. The reader will recall that in our discussion of the nature of intelligence we found some evidence for the presence of two factors in intellectual activity, viz., a specific factor and a general factor This same question has been asked about motor skills. The experimenters have wondered whether there was any such thing as a general motor or mechanical ability or whether motor types could be described. A typical research in this field runs somewhat as follows The apparatus invites the subject to test his skill at a number of different activities For example, the subject may be asked to follow a target which is moving at a fairly high speed along a circular path, turn a small crank, pack quickly and accurately small objects like common spools, discriminate quickly between and react to a series of visual signals, tap as fast as possible upon the telegraph key, and the like.[24] In general, studies of this type turn in a negative report upon the existence of a general factor in motor skills. In other words, it looks as though all motor skills are specific to the task performed. If they are not specific, it seems almost certain that a great many general factors must be involved.

[23] A high competent discussion on the application of test to the various situations of industry can be found in Viteles, M S, *op cit*, Chaps XI to XV

[24] Cf Seashore, R H, "The Stanford motor skills unit," *Psychol Monog*, 1928, *39*, 51–65; "Individual differences in motor skills," *J Gen Psychol*, 1930, *3*, 38–66 Perrin, F, "An experimental study of motor ability," *J. Exper. Psychol.* 1921, *4*, 24–56.

A large number of attempts have been made to reduce the more complicated practical operations of a mechanic to a simpler laboratory level. This is the procedure which is usually implied when it is said that a test for some particular vocation has been developed. As examples of such efforts we may take some of the methods that have been devised for selecting motormen, a test of clerical ability, a test for typists and stenographers, and a mechanical ingenuity test. We have already caught a glimpse of one of the methods that may be used in the selection of motormen. This test required the use of a moving belt which carried cards representing street scenes. The cards were marked in such a way as to represent the street car tracks, the presence and rate of movement of pedestrians, horses, and other objects. The subject was required to react as quickly and as accurately as possible to the situations presented.[25] A more recent test includes the following features. It furnishes, first of all, a signal board on which are seven irregularly placed square windows. Each window is lighted, the wiring being arranged in such a way that various combinations of lighted windows can be presented. For each situation there is a definite mode of reaction. An analogous signal board furnishes auditory stimuli to which definite reactions must be associated. A third part of the test is made up of two handles and two pedals somewhat similar to those that would be used by a motorman in the actual operation of a street car. The fourth part of the test furnishes a source of distraction. In the application of this test it was found possible to detect those men who would be most liable to accident.[26]

Tests for clerical ability often include such features as the ability to check errors in addition and subtraction, the ability to underscore incorrectly spelled words, the ability to cancel out certain letters in solidly printed matter, the ability to translate letters or numbers into a prearranged code, the ability to arrange names alphabetically under designated cities, the ability to classify insurance policies, a variety of arithmetic tests, and a set of proverb tests wherein the subject is to match one group of proverbs with another group so that two proverbs in each pair will have the same meaning.[27] These and other tests have

[25] Munsterberg, H, *Psychology and Industrial Efficiency*, Boston, Houghton Mifflin, 1913, Chap VIII.

[26] Viteles, M S, "Research in the selection of motormen," *J Person Res*, 1925, *4*, 179–181 Shellow, S M, "Research in the selection of motor men in Milwaukee," *J Person. Res*, 1925, *4*, 222–237 Dewhurst, J A, "Personnel selected and trained in Milwaukee on a scientific basis," *Elect Railway J*, 1926, *67*, 624–629

[27] Thurstone, L L, "Standardized tests for office clerks," *J Appl Psychol*, 1919, *3*, 248–251

been much used by the United States Civil Service Commission. Other features, however, have been added, such as spelling, penmanship, practical clerical activities, and the like.[28]

Tests for typists and stenographers may take either of two forms. In the first form, it is assumed that these persons have had no previous training and that an attempt is to be made to find out what their potential ability may be. In other words, tests of this class are very much like other tests of motor ability and of learning.[29] The other type of test is devised simply to find out how competent a typist or a stenographer has actually become through previous training and experience. Such tests would require the applicant for a position to type as rapidly as possible a page of material of predetermined length. The time taken and the number of mistakes would enter into the score. The copy may vary in form. That is, the applicant might be asked to type from plain copy, to use the tabulating device on the machine, or to copy from a rough draft The student will recall that in many of these cases it is to be taken for granted that tests of intelligence, and perhaps even of character traits, will be included.[30] There are, of course, tests for those persons who will be required to use some of the more modern types of office equipment, such as adding machines and auditing devices.[31] Tests of mechanical ingenuity have had a fairly long history. A part of this history is due to the fact that intelligence was once supposed to rest upon the major use of the perceptual apparatus and the clever use of the hands. As long as men believed that the eyes were, so to speak, the windows of the soul and the hands the chief instruments of the soul, tests of visual perception and of manual accuracy seemed to offer themselves as an appropriate avenue of approach to the operations of the soul. This older belief has now been much modified, but the tests have persisted. One of the most elaborate of such tests is known as the Minnesota mechanical ability test. Among other things, the subjects are presented with a box containing a large number of different mechanical contrivances.

[28] Filer, H A, and O'Rourke, L. J, "Progress in civil service tests," *J. Person. Res*, 1923, *1*, 484–520

[29] See, for example, Tuttle, W W, "The determination of ability for learning typewriting," *J Educ Psychol*, 1923, *14*, 177–181 Muscio, B., and Sowton, S C M, "Vocational tests in typewriting," *Brit. J Psychol*, 1923, *13*, 344–369

[30] Cf Burt, C., "Tests for clerical occupations," *J Nat. Inst. Indust Psychol*, 1921, *1*, 23–27, 79–81.

[31] Cf Bills, M A, "Methods for the selection of comptometer operators and stenographers," *J Appl Psychol*, 1921, *5*, 275–283. Viteles, M. S, "Job specifications and diagnostic tests of, devised for the auditing division of a street railway company," *Psychol Clin*, 1922, *14*, 83–105.

The contrivances are torn apart upon presentation and the subject is asked to identify and to assemble in the proper manner these various parts. The spatial relations test lays before the subject a considerable number of geometrical forms which are to be assembled into proper patterns Then, too, there is a card sorting test, a test of the subject's ability to pack a set of blocks into a box, and a test of steadiness [32] Each one of these tests has had, of course, a fairly long history and some of them have been given so many times that definite standards of excellence can be laid out for them.

4 *Job Analysis.*—We have now given an exceedingly brief outline of some of the methods that may be used in analyzing the fitness of a candidate for a given occupation A review of this whole field would require a great many chapters Such a review stands beyond the limits of this book The same thing holds true of the attempts that have been made to analyze different occupations in order to find out just what they demand in the way of psychological trait and talent.

Gradually some progress is being made in the identification of those items that should be included in any analysis of an occupation. It is clear, of course, that a rough identification would come out of a general statement of the duties required by the occupation, the machines used, the general conditions surrounding the work period, the incentives that can be offered for superior performance, and the like [33] Each of these specifications must, of course, receive detailed analysis and wherever possible they must be subjected to experimental examination.

Accurate experimental analysis can be approached by describing, first, a method of job analysis which leads to what is sometimes called a job psychograph The psychograph is composed of a series of terms which describe the various psychological operations necessary to competence. These operations can be rated on a scale running from one to five or from one to any other number that seems reasonable to the examiner. In the case being referred to, viz., the job of a quiller in the department of cotton winding in a textile industry, the psychograph includes, first, a statement of the duties of a quiller, the nature and conditions of the work, the machine used, personal data about the applicant, his degree of training, and other qualifications. Some of the terms used in the psychograph proper are energy, endurance,

[32] Paterson, D G, *et al*, *Minnesota mechanical ability tests*, Minneapolis, Univ of Minnesota Press, 1930

[33] Viteles, M S, "Job specification and diagnostic tests of job competency," *Psychol. Clin*, 1922, *14*, 83–85.

concentration, alertness, discrimination, accuracy, memory, and intelligence.[34]

We have space for only one illustration of a direct experimental examination of the traits and talents demanded by a particular occupation. This study involved the motion picture analysis of the type of movement made by an operator in handling his machine. It was quickly discovered that in a great many occupations an operator was inclined to make a large number of unnecessary movements. It could be shown from the moving picture analysis that some of these movements might easily lead to injury. Even where possible injury was not involved, the results showed plainly enough that many workmen could be led greatly to improve their skill and their rate of production by learning how to make only those movements actually necessary to the operation of the machine.[35]

In this brief discussion of the general field of vocational selection, we have limited our attention almost entirely to those features of employment which obtain at the moment a man is being placed in a new occupation. It is hardly necessary to argue, however, that this is only the beginning of the problems of vocational selection, for every personnel manager can render a great service to his company by following his men through the years after their service to the company has begun. In spite of the care that may be taken in the selection of an employee, there will still be some cause for labor turnover There will be men who must be discharged and others who can profitably be promoted. Continuous personnel work is necessary, then, in order to detect as early as possible those persons who are not proving themselves effective in their position. Sometimes ineffectiveness is the result of changed environmental conditions at home or of new companions or of increased speed in operation. For these and other reasons, a good many industries maintain a constant check upon their employees, even to the extent of working out a new psychograph for them at regular intervals.[36] As a rule, promotions are based upon such factors as experience, age, continued training, and those less easily measured traits named by the words responsibility, leadership, and general morale. Among the reasons that stand high in bringing about discharges, we may name incompetence, insubordination, unreliability,

[34] Cades, E., "The textile industry in Philadelphia," *Psychol Clin*, 1924, *15*, 203–228.
[35] Gilbreth, F B, and Gilbreth, L. M, *Applied Motion Study*, N Y, Van Nostrand, 1916.
[36] Ho, C. J., "Finding the real causes behind labor turnover," *Indust Psychol.*, 1928, *3*, 246–248.

and frequent absence from work.[37] Even in these cases, personnel officers may render service to their superiors by discovering the causes of incompetence, insubordination, and the like. Where no remedy can be found, discharge is almost inevitable, but, as we have seen at the beginning of the chapter, most industries can afford to spend a considerable amount of money on their personnel department in order to keep labor turnover at as low a level as possible.

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[37] Brewer, J M, "Causes for discharge," *Person J*, 1927, *6*, 171–172.

PART SEVEN

PSYCHOLOGY AND ART

CHAPTER THIRTY-FOUR

THE NATURE OF AESTHETICS

1. *Introduction.*—Up to this point in our survey of the problems of applied psychology we have been mostly concerned with those actions and procedures which everyone would think of in practical terms. If we have learned how to study a book of this kind to the best advantage, it has been for the purpose of securing immediate advantage, either by way of knowledge or by way of a grade in the course. If we have discovered some of the principles which show how the conduct of single persons can be modified by their membership in a group, we have done so because we ought now to relate ourselves more effectively to the life of a group. Our survey of some of the psychological events which take place in a courtroom might help us to evaluate legal procedure to better advantage. Our study of the relations between psychology and medicine has been wholly beside the point if we have not learned how psychological disorders may be avoided and how they may be treated if they arise in spite of our provisions against them. A brief glance at some of the major problems of education ought to have suggested some very practical ways in which men of parts can be manufactured out of untrained and untutored children. The service which psychology renders to society and to the individual appears to no better advantage perhaps than in industry and commerce where, as we have seen, efficiency as measured by income and by the saving of energy has been a major objective. For the present, however, we shall appear to leave topics which are so obviously practical, for it is the purpose of this and of the following chapter to see what contributions the laboratory of the psychologist can make to the aesthetic impulses and to artistic creation.

No one needs to argue the fact that the very use of the word "aesthetics" seems to take his attention away from practical matters. Even though we may speak of an ornamental bridge, a graceful steamer, an artistic building, a lovely human figure, or a beautiful experiment, we still know that the words "ornamental," "graceful," "artistic," "lovely," and "beautiful" refer to an impalpable and even impractical aspect of objects that are highly useful. We know the mean-

ing of such words as "learning," "habit," and "skill." We even know some of the main outlines of thinking or problem solving, but artistry seems to imply insight, creation, and other psychological operations which are distinctively spiritual rather than material in character. A bridge serves the very practical purpose of bearing traffic across a river, but it may serve also the intangible purpose of creating a sense of enjoyment. This fact holds true in a much greater degree when a painting, a piece of sculpture, a few bars of music, or a poem are under consideration. In general, we wish to ask why men resort to aesthetic behavior, how they create aesthetic objects, and why other persons who are themselves not artists can find enjoyment in the products of a creative genius.

In its broadest sense, the word "art" means intelligent and directed modification of nature. If we may think of nature as original or untouched, then the word "art" means that nature can be made over more to our own liking In this respect the study of art would be as wide as the whole domain of culture or of invention. It seems worth while, therefore, to distinguish between the fine and the applied arts. When it is used in this second sense, the word "art" means skill or artistry in adapting nature to the uses of human beings. It is for this reason that a science such as logic or mathematics may be spoken of as an art. Likewise, the applications of scientific principles to such social concerns as industry and commerce may be spoken of as an art. The first arts, accordingly, were those which enabled primitive men to gather food, build shelter, devise clothing, and engage in other types of primitive handicraft. The modern equivalent of these arts is to be found in all of the machines and other devices which contribute to the same end. We may even speak of the art of living or of the art of conduct. In this case, we are very apt to have in mind those ethical and moral principles which lead to what men have often called a good life.

The fine arts, on the contrary, are not used primarily for gain or for profit, but for the sake of enjoyment. This attitude of enjoyment may range all the way from the purely sensuous, on the one hand, to the intellectual, on the other; but regardless of this fact, enjoyment is a dominant characteristic of the fine arts. To be sure, a painting or a piece of music may enter into commerce. All famous products of artistic genius have a commercial value, and from this point of view they become very practical objects indeed. It is not on this account, however, that they are cherished. On the contrary, they

serve a distinctive human need. It is one of the purposes of this chapter to find out what this need is and under what circumstances it can be satisfied. In the meantime, we may draw a further distinction between the fine and the applied arts by saying that the former are apt to be more individual in their expression than the latter, that they imply a more subtle and refined use of materials, and that they are more productive of symbolism, suggestion, and meaning.

2. *The Sensory Bases of Art.*—One of the first problems in the study of the nature of aesthetics centers around the long search that has been made for the psychological foundations of beauty, of melody, of symmetry, and of the aesthetic feelings. This search has been conducted for the most part by persons who had a philosophical or religious interest in the nature of art. This is to say that experimental methods have been applied to this problem only for a comparatively short time. Tradition has it that such aesthetic terms as "beauty" have a real, objective foundation. That is, instead of describing beautiful objects, some of the early philosophers sought to establish beauty as an idea or concept having an existence in its own right. It is clear, however, that beautiful objects are just as relative to an observer as is the value of an object. The paintings or symphonies which appear beautiful to some persons may be wholly neutral or positively discordant to other persons. It is generally conceded, therefore, that because of the extreme relativity of objects of beauty, there can be nothing outside of immediate human experience which is beautiful or aesthetic in and of itself.

This conclusion has driven the experimental psychologist to a search for other possible ways of explaining the aesthetic properties of objects. One of the most fruitful fields of research has been found in what may be called the sensory bases of art. Studies on vision and sound have been most productive. The reader knows, of course, that vision includes all of the color qualities. He knows, too, that he has fairly well-established preferences for certain colors and for certain combinations of color. It has become customary in psychology to speak of the perception of color in terms of hue (color quality), tint (lightness or darkness: intensity), and saturation (richness). A large number of studies have been made upon color preferences. It is known, for example, that hue may be more important in determining preference than either saturation or brightness.[1] It is known, also, that

[1] Dorcus, R. M., "Color preferences and color associations," *Ped. Sem.*, 1926, 33, 309–434. Also Hirohasi, B., "Some experiments on beauty of color," *Jap. J. Psychol.*, 1926, 1, 406–432.

certain colors are regularly preferred to others, a slight difference between the sexes being taken for granted. Girls, for example, usually prefer colors in the order, r, g, v, and boys, in the order, b, y, o.[2] Adults, as a rule, prefer blues to reds and greens to yellows After the age of forty, however, yellows are often preferred to greens.[3] Studies of this type cannot be taken too seriously, however, for a given color chosen by one experimenter may not be identical with a color of the same name chosen by another experimenter. Then, too, preferences for colors vary according to the background upon which they are placed, upon the immediately preceding experiences of the subject, upon temperament and mood, and upon a great many other variable factors. Furthermore, it is known that colors may be judged in a great many other terms besides pleasantness and unpleasantness. Among the words used most frequently to describe the attitudes induced by colors are "lifeless" and "flat," "cheerful" and "sad," "warm" and "cool," and "light" and "heavy." [4]

It begins to look as though some of the earlier studies on the affective value of colors have assumed that these values are more stable than they really are More recent studies have shown that observers disagree sharply even in their order of preference for plain colors and in the other attitudes induced by colors, depending upon the question as to whether they are presented singly or in pairs and as to the character of the background, the color that has just been presented, and the general attitude of the subject. Great variations in judgment occur when such qualities as dimness, paleness, harshness, vigor, warmth, cheerfulness, aggressiveness, and the like, are called forth. It looks as though most colors, especially when they are saturated, show varied moods to best advantage when they are placed on a gray background that is either slightly lighter or darker than the color itself. Both saturated and unsaturated colors are apt to appear flat and lifeless if they stand out in too much contrast against their backgrounds. In other words, then, colors cannot be described from the point of view of aesthetics simply by saying that they are either pleasant or unpleasant.[5]

[2] Imada, M, "Color preferences of school children," *Jap J Psychol*, 1926, *1*, 1–21.

[3] Miyiguchi, F, and Aoki, S, "Color preferences in adults," *Jap. J. Psychol*, 1926, *1*, 22–33 Dorcus, R M, *op cit*, *passim*

[4] Some of the recent experiments on visual aesthetics, together with a bibliography, can be found in Chandler, A R, "Recent experiments on visual aesthetics," *Psychol Bull*, 1928, *25*, 720–732.

[5] Allesch, G J von, "Die aesthetische Erscheinungsweise der Farben," *Psychol Forsch*, 1925, *6*, 1–91, 215–281.

There are, of course, a good many other features of vision which may furnish a basis for aesthetic judgments. We may think, for example, of form or shape, and of proportion. The phrase "the golden section" is a phrase which comes to us from Greek architecture. It refers to the fact that a line may be divided in such a way that the smaller dimension is to the greater as the greater is to the whole. When applied to rectangles the phrase would mean that the width should be related to the length as the length is to the sum of the two. It has usually been assumed that lines and figures displaying these proportions are inherently satisfying; but the experimental evidence has not been altogether convincing on this point.

As an illustration of another type of experimentation we may take the ability of the average person to estimate the middle of a line. In one study on this problem it was found that even unpracticed persons could estimate the middle of a horizontal line, not longer than 500 mm., with an average total error of but a little over one per cent. Practice leads to quick improvement in skills of this type. As the length of the line increases, the size of the error increases slightly, the right half of the line usually being overestimated.[6] Similar studies have been carried out on the ability to draw different types of figures and to duplicate forms which have been presented for short periods of time by means of a tachistoscope. The attempt has even been made to measure, by means of the psychogalvanic technique, the affective qualities aroused by plain and colored rectangles. In general, it was found that judgments were not apt to be emotional in character save when rectangles resembling the golden section were objectionably colored.[7]

The number of experiments that have been done on the aesthetic qualities of tones is even greater than is the case with vision. Just as colors may be described in terms of hue, tint, and chroma, so tones may be described in terms of pitch, volume, and intensity. Supplementary to these qualities of tone, it is sometimes said that they may have a vocal quality.[8] In addition to the so-called attributes of tonal sensations, the student of audition must take account of melodies, of consonance and dissonance, of rhythm, and of the

[6] Wolfe, H. K., "On the estimation of the middle of lines," *Amer. J. Psychol.*, 1923, *34*, 313–358.

[7] See Gordon, K., "A study of aesthetic judgments," *J. Exper. Psychol.*, 1923, *6*, 36–43. Granit, A. R., "A study on the perception of form," *Brit. J. Psychol.*, 1921, *12*, 223–247. Feasy, L., "Some experiments on aesthetics," *Brit. J. Psychol.*, 1921, *12*, 253–272.

[8] See Ruckmick, C. A., "Facts and theories of audition," *Psychol. Bull.*, 1928, *25*, 229–244; "Recent researches in the field of audition," *Psychol. Bull.*, 1930, *27*, 271–297.

way in which aesthetic judgments may depend upon the ending of a melody.

It is not within the competence of this book to survey the critical studies that have been directed toward the attributes of tonal sensations. The person who is interested in the aesthetics of tone should, however, be familiar with the literature.[9] Our first concern will be directed toward a curious phenomenon known as memory for absolute pitch. There are some persons who can, when they hear a tone, place it definitely on the musical scale. It is even possible for them to tell the key in which a piece of music has been written. There is, in short, no doubt but that some persons have an immediate and direct appreciation of pitch quality; but considerable doubt has arisen over the origin of this skill. Some experimenters have shown that the skill can be acquired through practice, whereas others report an innate element in it. Although the problem cannot be said to have been solved because researches have not been undertaken at a sufficiently early age the indications are, nevertheless, that large measures of this ability are due to training [10]

There is an ancient tradition to the effect that an almost mystical association may be established between sequences of tone, as in a melody, and the ratios which numbers may sustain to one another. As the reader knows, middle C on a stringed instrument is created by 256 vibrations per second. Doubling this number gives C one octave higher. Other intervals are created by adding a third, a fourth, or a fifth to middle C. The interval from one tone to another is expressed by the fraction one-eighth. Some of these intervals, when taken in succession, give a satisfying melodic sequence and it has sometimes been argued, therefore, that the whole of melody may be described in terms of favored intervals.[11] Other students of melody find

[9] See Seashore, C. E., *The Psychology of Musical Talent*, Boston, Silver Burdett, 1919. Meyer, M., "On the attributes of sensations," *Psychol Rev*, 1904, *11*, 83–193. Rich, G J, "A study of tonal attributes," *Amer J Psychol*, 1919, *30*, 121–164. Ruckmick, C A, "A new classification of the tonal qualities," *Psychol Rev*, 1929, *36*, 172. Ogden, R M, "The tonal manifold," *Psychol Rev*, 1920, *27*, 136–146

[10] Mull, H K, "The acquisition of absolute pitch," *Amer J Psychol*, 1925, *36*, 469–493. Gough, E, "The effects of practice on judgments of absolute pitch," *Arch Psychol*, 1922, *47* See also Watt, H J, *The Foundations of Music*, London, Cambridge Univ Press, 1919, *passim*

[11] The literature on this phase of melody is very large See, for example, Meyer, M, "Unscientific methods in musical esthetics," *J Philos, Psychol, and Sci Meth*, 1904, *1*, 707–715. Watt, H J, "Functions of size of interval in the songs of Schubert and of the Chippewa and Teton Sioux Indians," *Brit J Psychol.*, 1923–24, *14*, 370–386 Bingham, W V D, "Studies in melody," *Psychol. Monog*, 1910, *12* (No 50), 1–14 Moran, H, and Pratt, C. C., "Variability on judgments of musical intervals," *J. Exper. Psychol*, 1926, *9*, 492–500.

the satisfyingness of musical intervals to rest upon the nature of the whole configuration of tone. In this connection it is pointed out that all of the actual tones used in a melody may be changed by changing the key or by lifting the melody into another octave. An auditor will still recognize the melody, however, and react to it in much the same way that he did when listening to it in its original key.[12]

The problems of melody are intimately related to the problems of consonance and dissonance. Consonance describes the fact that two or more tones which are presented simultaneously will fuse together in different degrees of smoothness. Where there is almost, if not quite, complete fusion the tonal complex is rich in consonance. On the other hand, when the fusion is incomplete or is lacking altogether, an auditor will describe the pattern as dissonant.[13] The presence or absence of consonance has been explained in a number of different ways. A very large part of the experimental work favors the appeal to degrees of fusion which we have just mentioned. It has also been argued that consonance may depend upon the absence of beating partials. The student may already know that when a violin string is plucked it will vibrate not only as a whole but in sections as well. The vibration of the string as a whole yields a fundamental note, whereas the vibration of the string in smaller segments will yield the so-called partial tone It is clear that if two strings were plucked at once, the partials from the one might be slightly different in pitch from either the fundamentals or partials of the other and thus create a harsh tonal complex. It is clear from these considerations that the problems of consonance are closely related to the problems of melody. As we have said, tones may be described according to the ratios that obtain in their vibration numbers. A large number of studies have been made in order to discover those particular patterns of interval which will be received most favorably by auditors. The criteria which are reported most frequently are fusion, smoothness, roughness, unpleasantness, and simplicity-complexity.[14] In terms of these criteria, tonal patterns which vary all the way from quarter-tone intervals to thirds, fourths,

[12] Humphrey, G , "The effect of sequences of indifferent stimuli on a response of the conditioned reflex type," *J. Abnorm Psychol*, 1927, *22*, 194–212 See also Bingham, W V D., *op cit*

[13] Guernsey, M , "The rôle of consonance and dissonance in music," *Amer J Psychol*, 1928, *40*, 173–204 Moore, H T , "The genetic aspect of consonance and dissonance," *Psychol Monog*, 1914, *17* (No 73). Ogden, R M , *Hearing*, N Y , Harcourt Brace, 1924, *passim*

[14] Pratt, C. C , "Some qualitative aspects of bitonal complexes," *Amer J Psychol.*, 1921, *32*, 490–515. Heinlein, C P , "An experimental study of the Seashore consonance test," *J Exper. Psychol*, 1925, *8*, 408–433.

fifths, and octaves may be arranged in an order of preference.[15] It is clear, then, that the aesthetic value of a musical pattern must depend upon other factors than the simple pleasantness that is sometimes associated with single tones. This fact appears to gain particular importance when the way in which a melody is brought to a conclusion is under consideration.[16] It has been shown, however, that the satisfyingness of endings and even the order of preference for chords is highly subject to training.

Another important feature of tonal sequences is described by the word "rhythm." In spite of the enormous amount of work that has been done in this field,[17] the sufficient bases for the existence of rhythm have not been discovered. It has been easy to suppose that human beings have an innate time sense, but the experimental evidence seems to favor an intimate relation between auditory rhythm, on the one hand, and kinaesthetic factors, on the other.[18] In other words, it may be assumed that the neuro-muscular apparatus of a human being has certain preferred sequences of movement. These sequences have sometimes been attributed to time or pace skills that have been acquired during early infancy or under the influence of rates of working. It has even been supposed that the origins of music are to be found in the rhythms which frequently characterize concerted action among primitive people

We have, of course, referred in the briefest manner possible to only a small fraction of the immense number of studies that have been made on the sensory basis of aesthetic feelings and judgments. The student will easily see that, even though one may think of aesthetics as a very impractical matter, it lends itself nevertheless to a wide variety of experimental studies

3 *The Imaginative Basis of Art.*—The older psychologies were inclined to draw a distinction between peripherally aroused sensations and centrally aroused sensations. All of those processes which were

[15] Bruce, A M, "The fusion of non-musical intervals," *Amer J Psychol*, 1927, *38*, 624–638. Emerson, L E, "The feeling value of unmusical tone intervals," *Harvard Psychol. Stud*, 1906, *2*, 269–274. Pratt, C C, "Quarter tone music," *J Genet Psychol*, 1928, *35*, 286–293

[16] Farnsworth, P R, "Ending preferences in two musical situations," *Amer J Psychol*, 1926, *37*, 237–240, "The effect of repetition on ending preferences in melodies," *Amer. J. Psychol.*, 1926, *37*, 116–122.

[17] Ruckmick, C A, "A bibliography of rhythm," *Amer J. Psychol*, 1913, *24*, 508–519; 1915, *26*, 457–459, 1918, *29*, 214–218, 1924, *35*, 407–413.

[18] Ruckmick, C. A, "The rôle of kinesthesis in the perception of rhythm," *Amer. J. Psychol*, 1913, *24*, 303–359 Stetson, R B, "A motor theory of rhythm and discrete sensation," *Psychol Rev*, 1905, *12*, 250–270, 293–350

immediately contingent upon stimulus patterns were said to be peripherally aroused. After having looked at an object, however, the student can easily close his eyes and reconstruct the object or revive it in imaginal terms. These imaginal processes are usually described as more or less direct duplicates of sensory material save that they are more flimsy in texture. They run all the way from the after-images which follow immediately upon direct perceptual experience to memory images which are said to be revivals of past experience.

There was a time when psychologists were inclined to make a very large matter out of differences in imagery. It was early discovered, for example, that some persons were much given to visual imagery in the sense that they recalled past experience more freely in visual terms than in other terms Then, too, some persons were characterized as belonging to the auditory type, while still others were said to be kinaesthetically minded.[19] For our purposes the important point about imagery lies in the fact, first, that these processes are alleged to have an important functional value in our psychological operations and, second, that poets and artists must be more strongly visually minded than the average person More recently it has been asserted that the study of individual differences in imagery, and even the existence of imagery, is an irrelevant matter. This claim is made in particular by the behaviorists who, if they speak of imagery at all, do so in terms of implicit vocal responses.[20]

All things considered, it seems that no good purpose is to be served by throwing out of psychology all of the facts that are named by the words imagery and imagination. It becomes important to inquire, therefore, whether artists and poets do, as a matter of fact, display more vivid imagery than is the case with more practical persons. The evidence on this point is still conflicting, but it tends toward the belief that a man may be highly creative in his artistic work without having recourse to rich imaginal processes There is certainly no evidence to show that a painter must be visually minded or that a musician must be auditorially minded.[21]

In general we may say that artistic effort serves two purposes. On the one hand, the artist undertakes to reproduce natural scenes and

[19] Titchener, E B, *The Experimental Psychology of the Thought Processes*, N Y, Macmillan, 1909, *passim*

[20] Cf Hunter, W S, "Anthroponomy and psychology," in *Psychologies of 1930* (ed. C Murchison), Worcester, Mass, Clark Univ Press, 1930, Chap XIV.

[21] Consult Agnew, M, "A comparison of auditory imagery of musicians, psychologists, and children," *Psychol Monog*, 1922, *31*, 267–278, "The auditory imagery of great composers," *Psychol Monog*, 1922, *31*, 279–287.

objects. For this purpose he usually finds the scene or the object which he wishes to depict and, by making constant reference to it, reproduces it on the canvas or in a piece of stone. On the other hand, there is said to be a creative element in art. The poet, for example, attempts to put words together in wholly new patterns that shall be suggestive of meanings which are not an ordinary part of the daily run of affairs. The painter and the sculptor attempt to translate unsuspected or unobserved nuances of life into a canvas, into plastic clay, or into marble The musician, likewise, undertakes to fashion new melodies out of familiar tones All of these facts are said to rest upon the operations of a creative imagination In other words, imagination is sometimes described as purely reproductive and sometimes as genuinely creative.

It has not been possible to transform popular and traditional opinion about the creative functions of imagination and intuition into concrete psychological form. Some of the studies on the imaginal life of children show that images may sometimes acquire almost the same level of reality that we commonly attribute to perception. As a matter of fact, this imaginal life of children is so rich and varied as to have earned a special name, viz , eidetic imagery.[22] It has not been shown, however, that there is any significant relation between the presence of vivid eidetic imagery and success in drawing or painting. On the contrary, it may be that vivid imagery of this type represents a more primitive mode of psychological functioning and that in normal cases artistic effort must be explained in terms of skill in observation and skill in translating observations into appropriate muscular movements. It still remains to be seen whether poets and artists are able to make much use of eidetic imagery.

4. *The Affective Basis of Art* —We do not intend to dismiss in this quick way the vexing problem created by imagination, but it will be more helpful to consider this problem further in our study of the origin and creation of works of art than in connection with the problems of this chapter. We pass on, therefore, to a brief study of the affective basis of art. The word "affective" refers to the fact that all psychological operations appear to be accompanied by feelings of pleasantness or of unpleasantness.[23] When we say this, we run immediately into a vexatious series of psychological problems, for some experimenters

[22] For a summary of some of the literature, see Kluver, H , "Eidetic phenomena," *Psychol. Bull* , 1932, *29*, 181–203

[23] Titchener, E B , *The Psychology of Feeling and Attention*, N. Y., Macmillan, 1908, *passim*

report that the feelings must include more than the two qualities just named. However this may be, it is a plain fact that our psychological operations are not "colorless." They are, instead, rich with preferences and dislikes. It is for this reason, perhaps, that so much of aesthetics is based upon the nature and sources of mood and emotion.

In a later chapter we shall try to show that the feelings and the emotions, both from the point of view of conscious experience, and from the point of view of behavior patterns, are a reflection, in part, of the energy levels at which the body is working and, in part, a reflection of the fact that all modes of behavior take place in living organisms. That is, the sense organs, the nerves, and all of the muscles of the body are living structures. It is easy to see, therefore, that the psychological operations should somehow reflect the vital processes which make them possible. The first movements of an infant are, as we have seen, highly generalized in character and related negatively to noxious stimuli and positively to "pleasant" stimuli. The processes of education quickly see to it that differentiations in affective and emotional responses are made to large varieties of objects which may not initially have aroused emotionalized forms of action. As we have seen, even colors may be exciting or depressing, cheerful or sad, and soothing or disquieting. Almost all of the other objects with which we commonly deal acquire feeling tones of the same order.

In view of these circumstances the reader can see why it is that art can be defined as objectified pleasure. During the normal processes of learning we come to associate distinctive moods and attitudes with many of the objects and events around us so that these objects and events, in turn, become the sources of satisfaction and pleasure. If we say that a sunset, on the one hand, and a painting of a sunset, on the other, appear beautiful to us, we may do so because the colors themselves and the particular pattern in which they happen to be placed are really satisfying or pleasurable. In other words, if the reader will review the things that have been said in the earlier part of the chapter, regarding the sensory basis of art, he will see that preferences for colors, tones, intervals, melodies, rhythms, and endings are just what we say they are, viz., preferences. Sometimes one object is preferred to another because of the operation of the factor known as attention. Most other preferences, however, appear to be the result of variable degrees of pleasantness.

It is commonly recognized that likes and dislikes are highly individual or personal in character. This fact may be explained by saying

that human beings have an instinctive liking for some objects and an equally instinctive distaste for others. The implication is that the affective basis of aesthetic appreciation must be largely original or native. We shall return to this matter later. In the meantime, we may say that the only thing native about our likes and dislikes must be the machinery by which likes and dislikes are made possible. As long as we are alive, some objects will promote our well-being and favor ease and comfort in behavior. By the same token, other objects will thwart us and lead to conflict in action. As we have said above, the original situations which bring about these two disparate types of organic condition are quickly supplanted through the processes of conditioning, perhaps, by an immense number of other objects. We mean to say, then, that aesthetic appreciation ought to be highly subject to training.[24]

Some attempts have been made to measure the relationship between musical stimulation and the organic responses. It is not possible, of course, to distinguish emotional attitudes from one another in terms of the electrical resistance offered by the skin or in terms of any of the other variations of the psychogalvanic method. It does appear, however, that definite organic conditions similar to those produced by other emotion-exciting stimuli will appear when various types of music are played.[25] In stating these facts it must not be supposed that the organic reverberations induced by musical stimulation are equivalent to the higher forms of aesthetic appreciation. In other words, it is one thing to describe the vascular changes that take place while a person is listening to music and quite another to give witness to those wistful yearnings, vague meanings, and pervading satisfactions that arise when one has found real pleasure in a work of art.

5. *The Functions of Art.*—From a formal point of view it is easy to say that the functions of art are representative, imaginative, symbolic, decorative, and technical. In its representative functions art undertakes to do over again that which nature has already done. This means that there may be beauty in nature, but not because beauty is an immediate property of natural objects. If there is beauty in nature, it is there because human beings have found it and sensed it. We may

[24] Schoen, M., "Tests of musical feeling and understanding," *J. Comp. Psychol.*, 1925, *5*, 31–52, "The aesthetic attitude in music,' *Psychol. Monog.*, 1928, *39*, 162–188, Weld, H. P., "An experimental study of musical enjoyment," *Amer. J. Psychol.*, 1912, *23*, 245–308.

[25] Diserens, C., *The Influence of Music on Behavior*, Princeton, Princeton Univ. Press, 1926, *passim*. See also Erickson, C. L., "The basic factors in the human voice," *Psychol. Monog.*, 1926, *36*, 82–112.

say "found" because not all parts of nature have always been taken as beautiful. It is commonly reported, for example, that mountainous regions have acquired the property of beauty only in recent times. Men see that which they have the means of seeing, which is to say that the attitudes which we take toward objects may make them appear beautiful or ugly.

The imaginative functions of art can be discussed to better advantage in the next chapter where we shall consider in more detail the phenomena of artistic creation. One could, of course, try to make a science out of art simply by putting lights, colors, and sounds into all possible combinations through the principle of trial and error. It is usually assumed, however, that the imaginative functions of art are fulfilled only when the artist is able to transform some fleeting mood or thought into a satisfying object.

The best example of the symbolic function of art is to be found in the dance where bodily movements and patterns of movement are said to symbolize both social and natural events. For example, instead of going through all of the movements involved in hunting, the dancer can symbolize these movements by making suggestive summaries and abbreviations of a much larger behavior pattern. In the same way, rainfall, growing crops, and other natural events can be depicted.

Of all of the functions of art, the decorative are, perhaps, the oldest. As a matter of fact, it is sometimes said that bodily clothing had its origin in the decorative impulses. In any case, the earliest records we have of human fellowship and of the products of socialized living betray evidences of color, line, and form which have no known practical value. As we shall see in the next chapter, there is some evidence to suggest that decoration may be a form of symbolization. In modern times these various functions of art have been supplemented by a practical function. That is, serious attempts have been made to build bridges, factories, and other forms of technical culture with an eye to aesthetic as well as to practical considerations.

This statement of the formal functions of art is fairly simple as compared with the personal functions of art. As an example, we may take the statement that art is really a form of sensuality as distinguished from reality. There is a puritan mind which finds only the sensuous or surface appearance of things in art, whereas ordered reason, moral purpose, and aesthetic rigidity are to be found in reality. The one is described as an excitement of the flesh, whereas the other is described as an incentive to reason. Then, too, art is sometimes said to describe

the imaginative features of living in the sense that it entices the onlooker to turn away from the actual order of things toward an unreal world. As Plato has put it, the arts must be censored in order that the mind shall be kept on mundane things. This means that to describe a "light that never was" must have something of the socially dangerous about it.

From some points of view it may be admitted that art does provide one avenue of escape from reality. One phase of this fact is to be found in those societies which depend upon industrial efficiency and which have, therefore, no use for art as opposed to those societies which are excessively romantic and, therefore, effete. There is every reason to believe, however, that human beings are incurably aesthetic in their reactions to objects and that even though we were to suppose that no serious adult in an industrial society could find any place for aesthetic enjoyment, attempts will still be made to discover the aesthetic values of chimneys, transformers, radio aerials, and other symbols of a technical culture.

When the comment is made that there is an unsocial or unreal element in art, it must be recognized that art has probably had a distinctively social origin. Some students of the history of art attribute its origin to play activities and, as we shall see in the next chapter, others attribute it to sublimation of the sex and other native impulses. Irrespective of these theories, it seems to be fairly clear that artistic expression has usually been highly socialized in character. It has, for example, stood in close association with religion, with war, and with work, especially in primitive societies. As one writer has put it, the history of art may be described as a history of social imagination which has become embodied in stone, in painting, and in literature. If, therefore, it can be argued that artistic expression is one of the products of organized reason or intelligence, a product that objectifies pleasure, it might have the same value for the group that play has for the individual.

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CHAPTER THIRTY-FIVE

SOURCES OF ARTISTIC CREATION

1 *Introduction.*—There has always been such a halo of inscrutability surrounding artistic creation that neither the artist himself nor the psychologist has been able to do much more than theorize about the processes involved. This means that the process of artistic creation bears some similarity to the experience of the mystic in religion who, after having enjoyed an ineffable trance, can only report the magnificence of his experience without being able to analyze it or to tell others precisely what the magnificence consists of. In this respect, then, the psychology of art differs from the problems that were discussed in the last chapter. In some cases, one may make an approximate guess as to why some combinations of color are more pleasant than others, why some tones seem to flow into others, and why some forms and figures are to be desired over others. Then, too, the experimental laboratory may say a great deal about the actual mechanical process of playing a concerto on the piano or even of mixing paints and applying them to a canvas. That is, the art of creating music in the sense of actually translating the score into tone form is a skill that is acquired more or less quickly according to the amount of practice and in much the same way that other skills are acquired. There is some reason to suppose that even painters have a manual and digital skill which can be compared only with that of a skilled surgeon.

These several phases of artistic performance are, however, fairly simple as compared with the actual process of bringing colors together in the right pattern, creating a new harmony, or divining proper proportions. Even when artistic effort is of the purely reproductive type where an attempt is being made to copy a natural object, one must have a keen eye for proportion and a capacity for the observation of detail and of perspective which certainly lies beyond the limits of a more average person. When, however, we come to imaginative construction where forms of tonal complexes and combinations of color have no duplicate in nature, the problem of artistic creation becomes puzzling indeed. What do men do when they create a new tone form? Where are the sources of inspiration for a subtle but wistfully power-

ful combination of words? Where shall one go in one's search for the roots of symmetry, balance, depth, perspective, implied motion, and satisfying color?

In order to make these questions seem more real, we shall recite briefly some of the comments made by a musician about his own creative processes.[1] This musician reports that, as a child, he was compelled to make a musical instrument out of his mind because, between the ages of eight and fourteen, he had no other resources for musical enjoyment. It appears that he experienced very early in life a deep craving for music. Since he could not attend enough concerts to satisfy his craving, he formed the habit of rehearsing to himself the compositions that he heard and liked. This was at first an awkward process, for he was able to recall only brief snatches of harmony. Shortly, however, the task became easier, whereupon he began to have experiences of the type that are so often reported by men of science, viz., sudden insights into the tone world which came without any obvious effort and in seeming independence of previous experience. As we have seen in one or two of the earlier chapters, thinking is often of this type. Persons who have engaged for a long time in the contemplation of some problem may feel that they have made no progress at all. Suddenly, however, something "clicks," as the saying goes, and a solution to the problem has arrived or a new clew to its solution has been discovered. To quote from the musician whose experiences we are describing: "No sooner did I begin this self-training than I had at times curious experiences of having glorious sounds leap unexpectedly into my mind—original melodies and complete harmonies such as I could not conjure forth at will, and exalted qualities of tone such as I had never heard nor before imagined. I had at first not the slightest control over what was being played in my mind at these times, I could not bring the music about at will, nor could I capture the material sufficiently to write it down. Perhaps these experiences constituted what is known as an 'inspiration.'" [2]

There is evidence, of course, both for the effects of practice and for the mysterious factor called "inspiration" in the above quotation. The musician, however, did not allow himself to remain at this point. On the contrary, he attempted as often as possible to gain some sort of control over his "inspiration." This effort was practiced until at last a high measure of success was achieved. That is, a more or less

[1] Cowell, H., "The process of musical creation," *Amer. J. Psychol.*, 1926, *37*, 233–236.
[2] Cowell, H., *ibid.*, p. 235.

random type of inspiration had been converted into a directed flow of tone. The next step was to translate these tone patterns into a formal system of musical notation. Even when this was done, however, "most of the indescribable flowing richness had been lost by the imperfect playing of it on the imperfect instrument which all instruments are. Since then I have become resigned to the fact that no player can play as perfectly as the composer's mind; that no other instrument is so rich and beautiful, and that only about ten per cent of the musical idea can be realized even at the best performance possible" [3]

There is, in the report of this musician, no suggestion other than his appeal to constant practice as the source of his musical genius. We may say, perhaps, that according to his own observations he was strongly tone-minded. During the early periods of his development, tone patterns and melodies seemed to come to him spontaneously and it is in this feature of artistic creation that the psychological mysteries arise. We do not even get help from the comment that the musical ideas which ran through the mind of the musician referred to above were described as an exact mirror of his emotions at the moment. The point is that, during periods of variable mood, tone complexes appeared which seemed to be an expression of or a satisfying outlet for, the affective life. We may say again, then, that the problem of artistic creation is full of difficulties, but we must, nevertheless, make an attempt to push a little further into the field.

2. *Inheritance of Musical Talent.*—As in so many other cases, one of the simplest answers to the problem of artistic creativeness is furnished by the word "heredity." This is the simplest answer because the word "heredity" has a meaning which everyone understands, viz., that there is something in the germ plasm or in the original nature of a few human beings which simply makes musicians out of them whether they desire such a career or not. As a precise example, we may refer again to our brief note in the last chapter about absolute pitch. The student will recall that there are some persons who have an immediate and direct memory for pitch levels. Some of the experiments that have been done on this trait seem to suggest that memory for absolute pitch is hereditary in the sense that there could have been nothing in the experience of a child that could have contributed to its development. Other studies, however, have shown that memory for absolute pitch can be tremendously improved by practice. It would

[3] Cowell, H., *ibid.*, p. 236.

seem that, before closing the matter through an appeal to heredity, a series of crucial experiments ought to be performed on small children for the definite purpose of finding out how tonal discrimination begins and what changes take place in it during the first few years or even during the first few months.

As a result of more superficial investigations of the statistical type, there is some evidence to show that musical ability runs in families. The Bach family is usually cited as an instance of the way in which distinction in musical art may be passed on from one generation to the next. It must be remembered, however, that the first Bach to become eminent did not have musical ancestors. It is to be remembered also that musical ability in this family appeared in diminishing amounts for only three or four generations. If, then, one were to apply the laws of heredity to this trait, one must argue for a particularly fortuitous combination of traits which persisted for a short period of time and then broke down. Since breeding experiments of the order that are carried out on the lower animals cannot be performed so as to keep other things constant, this one trait being variable, it seems fair to say that a solution for the problem of the inheritance of musical talent cannot be found from these sources.[4]

It is sometimes argued that tests of musical and of other types of artistic talent throw some light on this problem. In the case of the musical person, for example, one might easily measure various phases of hearing (acuity, pitch discrimination, memory for tones), the motor functions involved in playing a musical instrument, and a set of functions which are usually described as the intellectual functions, viz., the ability to interpret musical compositions and to create new musical ideas. One of the most serious students in this field has been rather successful in standardizing tests for pitch intensity, time, consonance, rhythm, and tonal memory. These tests have been made available through the use of phonograph records.[5] They represent an approach to musical talent through an appeal to primary psychological functions. Other attempts have been directed at the more complex phases of the problem, as, for example, composing, reproducing, hearing, remembering musical elements, transposing, improvising, modulating, and playing at sight.[6] There are also proposed

[4] Cf Stanton, H M, "The inheritance of specific musical passages," *Psychol Monog*, 1922, *31*, 157–204 Miller, R, "Uber musikalische Begabung und ihre Beziehungen zur sonstigen Anlagen," *Zsch f Psychol*, 1925, *97*, 191–214

[5] Seashore, C E, *The Psychology of Musical Talent*, Boston, Silver Burdett, 1919, *passim.*

[6] Révész, G., "Das musikalische Wunderkind," *Zsch f. pad. Psychol*, 1918, *19*, 29–34.

tests of the ability to judge the aesthetic value of paintings. One experimenter, for example, used a set of fifty dual choice themes from famous paintings. The judgments of the original painters were used as the standard of comparison. Four groups of subjects were tested, viz., high school students, college undergraduates, college students of art, and members of the art faculty. College undergraduates were discovered to be eight points better than high school students, college art students five and one-half points better than college undergraduates, and members of the art faculty six and one-half points better than the college students of art.[7] In a study of poetic talent two groups of subjects were used, the one group presumably possessing some poetic talent, and the other group possessing, according to their own estimation, no talent. A series of tests was given to each of the subjects. For example, after having heard a word read to them, they were to report as many words as they could which rhymed with the given word. A controlled association test asked the subjects to report as many adjectives as they could think of in relation to a series of nouns. There were further tests on imagery, rhythm, affective reaction, skill in devising similes, memory, and ability to judge poetry. It was clear from the results that poets displayed a greater ability to discover rhyme than the control group. They possessed also a larger vocabulary. The poets, in general, exhibited a larger amount of imagery, but their sense of rhythm was not so superior as might have been expected. In a test of the ability to see forms and shapes in ink blots, the poets exceeded the non-poets. Memory for poetic material was also better. The greatest distinction appeared in the ability of the two groups to devise figures of speech.[8]

Several tentative conclusions have been drawn from these various tests of artistic ability.[9] In the first place, it looks as though the many features of musical talent are more or less independent of one another. That is, a child may rate high in one skill and low in another. The inference is that the outstanding musician would be a person who rates fairly high in all of the essential traits. In this connection it has been estimated that not more than five or ten per cent of all school children can really be called musical.[10] In the second place, it looks as though musical ability may be positively related to other types of

[7] Meier, N. C., "A measure of art talent," *Psychol. Monog.*, 1928, *39*, 184–199.
[8] Stumberg, D., "A study of poetic talent," *J. Exper. Psychol.*, 1928, *11*, 219–234.
[9] A summary of tests and measurements in music has been prepared by Kwalwasser, J., *Psychol. Bull.*, 1928, *25*, 284–301. See also Seashore, C. E., *op. cit.*
[10] Schussler, H., "Das unmusikalische Kind," *Zsch. f. angew. Psychol.*, 1916, *11*, 136–166.

ability and especially to intelligence.[11] The evidence on this point, however, is not absolutely clear for it has often been recognized that prodigies in artistic talent do not necessarily show good academic records. This fact might be explained by saying that considerable progress in musical talent is so time-consuming that no person could be expected to display considerable ability in other respects after he had achieved distinction as a musician. It looks, then, as though further work must be done on this problem, even though recent surveys of the general all-around ability of superior children appear to be rather convincing.[12] In the third place, an argument for the hereditary factor in musical ability may be drawn from the fact that many of the great musical artists have been remarkably precocious in their development. It has become almost a usual rather than an unusual thing for seven-, eight-, and nine-year-olds to achieve distinction.

In the face of these facts one must give due regard to the experience factor. Even though the Seashore tests, when applied to large numbers of children, show marked differences in the fundamental traits involved in musical aptitude, these differences cannot be attributed to heredity until it has been shown that there is nothing in the early training of children which promotes excellence. Tests of musical and artistic ability simply describe the *status quo* in skill. They do not describe the genetic processes which may lie behind the attainment of a *status quo* It seems fair, then, to leave the question of the hereditary basis of artistic talent open, pending the genetic researches that are essential to the final solution of the problem.

3. *Intuition.*—If we may refer again to the illustration of musical creativeness with which the chapter began, the student will recall that there are times when tone patterns and sequences arrive without warning and without any necessary connection with previous training. It is this sort of event which is commonly described by the word "intuition" More recently the so-called intuitive operations of human beings have been given a more stable scientific value through studies on insight.

The word "insight" has come into psychology partly as a result of studies on the problem-solving functions of the lower animals. We have already referred to these researches in several of the previous chapters. The significant point about them is that they verify age-

[11] Miller, R., *op. cit.*

[12] Cf. Terman, L. M., *et al.*, *Genetic Studies of Genius*, Palo Alto, Stanford Univ. Press, 1925.

long confessions to the effect that judgments may be arrived at and meanings discovered even in the absence of any discoverable antecedents. The tendency in the researches on insight has been to show that quick judgments, either of the intellectual or of the aesthetic type, may depend upon the creation of new patterns in the whole brain field. In other words, intuitions and insights are being increasingly attributed to a mode of nervous functioning rather than to the operation of some hidden or subconscious faculty.

As a practical illustration of the problems suggested by intuition and insight, we may suppose that a child has been given a considerable amount of training in listening to musical compositions, in singing, and even in playing some one of the common instruments. If the brain were purely reproductive in character, the only thing we could ever hope to expect from such a child would be a repetition of the melodies and tone patterns that had already been presented to it. As we have tried to show in Chapter Sixteen, however, one of the most important functions of the brain is to transpose events from one spatial and temporal setting to another. If, for example, having heard the scale played upon a piano from middle C to the point two octaves above middle C, a child were unable ever to reproduce these notes save in the order initially presented, it would not be possible for him to create a new tone pattern. As it happens, however, recall for tones may occur irrespective of the order in which they were initially presented This means that the notes between middle C and C two octaves above might be reproduced in an imaginative order. Some of the orders would be highly pleasing, while others would be neutral or actually discordant. If the problem were made still more complex by playing two or more notes simultaneously, even greater preferences could be developed. The experimental literature on insight seems to suggest that the togetherness of tones in new chords and melodies may be explained by the creation of new configurations or patterns of tone These configurations and patterns need not be duplications of previous patterns, although the readiness with which they appear might easily depend upon the training that one had already had in listening to and rendering a musical composition.

One of the significant facts in the illustration of musical genius with which the chapter began is to be found in the transition from random "intuitions" to some measure of control and direction over tonal sequences and patterns. This means, apparently, that a musician might begin with some chord or melody and then seek to complete

the pattern either through imaginative trial and error or through what is sometimes known as controlled intelligence. After all, there is no practical limit to the total number of tonal patterns that are possible, just as there are no practical limits to the items of information which a detective might put together in tentative pattern looking toward the solution of a crime. We mean to infer, then, that artistic creation must involve types of intellectual operation similar to those that are used elsewhere. This inference is, of course, subject to further experimental studies of musical genius in actual operation, but we make it in part because no more advantage is gained by appealing to a vague and indescribable faculty known as intuition than is gained by similar appeals to instinct or to the subconscious. The most perplexing feature about artistic creation is the intimate relation between tone and color and word patterns, on the one hand, and the moods, emotions, and affective attitudes, on the other. As we have already pointed out, melodies and paintings seem somehow to be a direct expression of one's moods or to yield deep-running feelings of satisfaction. The proper answer to obscurities of this type is further research in the field of aesthetics, together with new appraisals not only of artistic creation but of all types of creative effort.

Those who say that artistic creation must be explained in terms of the operation of an unconscious mind are probably right if they mean that the word "unconscious" is a substitutional way of saying that the operations of the nervous system are much broader in extent than those operations or events which can be described by the introspective method. Irrespective of the theory to which one may adhere regarding the relation between mind and body, it seems to be fairly clear that a person's private view of his own experience cannot touch all of the mechanisms involved in any type of creative intellectual effort. If, however, the word "unconscious" implies the existence of a mind which is below the normal pattern of experience, an appeal is being made to mystery rather than to experiment. Men who devote themselves as freely to the world of tone, to the world of color, or to the world of form and proportion as they do to the world of information, ought eventually to come to the place where they could say something about their respective worlds which may seem mysterious to the uninitiated.

4. *Motivation in Artistic Effort.*—We have, up to this point, considered some of those facts which have to do with the machinery of artistic effort. That is to say, we have not considered any of the driv-

ing forces which lie behind such effort unless it be assumed that intuition and the subconscious describe such forces. We are led to ask, then, whether the incentives behind artistic effort differ materially from those that have been discussed in Chapter Four and which are known to be operative in more secular or more practical affairs.

As we have seen, it looks as though most of the incentives which men use in their work are derived from primary tissue needs. If these needs furnish the answer to the question asked above, then we ought to be able to say that the ecstatic experiences of the creator are converted into objects of art for much the same reason that normal incentives lead to self-denial in carrying out any other task. This answer has not been convincing, however, for a great many artists give the impression that they are working under degrees of tension that do not obtain in highly intellectualized tasks. We must, therefore, turn to sources of motivation that will be strenuous enough to account for the measures of achievement actually reached by musicians, poets, painters, sculptors, and architects. This other source of motivation is said to be found in conflict. There are those who argue that human beings become artists because they are emotional, that is, because they are full of conflicts. As we have said before, some situations may be met in terms of well-established habit systems. Under these circumstances there would be no emotion, and hence no art. Other situations may be met by resorting to the problem-solving functions. As a rule, this is the way the man of science and the philosopher operate when they are faced with difficulties. There would then be no conflict and consequently no art in this mode of response. There is, however, a third class of situations which can be met neither in terms of habit systems nor in terms of problem solving. Chapters Nineteen and Twenty-One have shown us that some situations lead inevitably to conflict. When a person is faced with a conflict it is natural that he should seek to escape from his difficulties by using any one of the methods described in the chapters just mentioned. It is argued that, under certain circumstances, it is an attempted escape from conflict that furnishes the motivating power behind artistic expression.

These processes of escape from conflict have been interpreted in several different ways. As a first example, we may take descriptions of the behavior of small children which makes it appear that play, fantasy, and imaginativeness are the products of a youthful conflict. It has been pointed out that children are apt to have a good many wishes that cannot be fulfilled. Moreover, the world in which they

are placed is full of prohibitions and perplexities. Play of the "make-believe" form could then be interpreted as a type of compensatory substitute for modes of action which the child is not able to control. Using this situation as an analogy, it could be said that artistic creation is also motivated by the necessity for compensation. That is, the artist is a person who had resorted to compensatory play at the imaginative level. In dealing with tones and colors he is not confronted with objects and events that have for him a compelling sense of reality.[13]

From one point of view a great many people could be called artists if we were to discover that artistic creation is motivated in this way, for most people resort frequently to harmless daydreaming. It can be argued that daydreaming is also a means of escape from conflict, and a way of evading the responsibilities created by reality. If the habit systems in a person were not adequate and if problem solving required doubtful levels of strict attention to duty, spontaneous daydreaming on the one hand, and substitutional daydreaming, as in a moving picture theater, on the other, might well be used as a means of escape. There is, however, an intellectual quality about the achievements of the artist which distinguishes him from the ordinary daydreamer. Moreover, the work of the artist appears to be sustained by emotional resources that are long-continued and fairly powerful in their effects. These and other considerations have led some men to search still deeper into the domain of conflicts for the real sources of artistic effort.[14]

One of the possibilities is furnished by some of the facts already discussed in an earlier chapter regarding the distinction between native urges and reality. Leaving aside for the moment the primary sex urges, a good case may be made out for the proposition that in view of the primary tissue needs and in view of the mode of living which would completely satisfy these needs there must be a sharp conflict between them and that part of the whole context of a person which may be called the more real part. Even if we think of such a general proposition as that all persons are natively disposed to seek for and maintain a state of pleasure, inevitable conflicts would arise between those situations that lead to pleasure and those situations which thwart a person. The students of creative effort argue, therefore, that the de-

[13] Cf Langfeld, H S, "Conflict and adjustment in art," in *Problems of Personality*, N Y, Harcourt Brace, 1925.

[14] Cf. Langfeld, H. S, *The Aesthetic Attitude*, N. Y., Harcourt Brace, 1920, pp. 6–13.

sire to escape from reality will express itself in some substitutional form. The whole field of abnormal psychology is made up of persons whose substitutions are wholly inadequate or absolutely inimical to the best interests of society. The religious enthusiast and the artist furnish the best examples of persons who build for themselves a fictitious world in which they can live as they will, and yet gain some measure of social approval. Since all of the primary tissue needs of the body are closely related to emotionalized forms of action, it would follow that permanent emotional drives would stand in support of religious and artistic fantasy.[15]

We have already discovered that Freud and his followers hold to the view that the sex urges are the primary tissue needs. They are so primary, according to Freud, that they constitute almost, if not quite, the sole driving force of the libido. Before birth, the infant rests in a maximal state of pleasure. Immediately upon birth, however, he is thrust into a world of reality, one of the sole functions of which is to thwart the primary urges of the *id*. Thwarting holds true, in particular, of the sex urges, and this, as we have seen, leads to conflict. Such conflict may be resolved by resorting to purely abnormal types of behavior or it may be resolved through the use of symbolisms. As the student will recall, a symbolism is some imaginative or substitutional form of fantasy or behavior which will relieve the tensions created by the operations of the *id* but which will at the same time remain unoffensive to society. Those persons then who cannot acquire normal modes of expression may resort to fantasy, that is to say, to a free but substitutional play of their erotic impulses, by creating a new kind of reality. This would mean that happy people, that is, people who have found more stable types of compensation for their erotic impulses, never resort to fantasy. Where fantasy fails, art would also fail. This means that art could arise only from the dissatisfied.[16]

This interpretation of the sources of artistic effort is subject to all of the comments that have been made in Chapter Twenty-One concerning the Freudian point of view. The historical facts which seem to give support to Freud's contentions are that a great many distinguished artists do give every evidence of unhappy lives. It is one thing, however, to make this observation and quite another to build up around it the fanciful theory of human nature to which Freud

[15] Cf Paulsson, G, "The creative element in art," *Scan Sci Rev*, 1923, *2*, 11–173. Walder, R, "Schizophrania and creative thinking," *Internat Psychoanal*, 1926, *7*, 367–376. Clark, L P, "Psychological study of art versus science," *Arch Psychoanal*, 1927, *1*, Part III.

[16] Freud, S, *Collected Papers*, London, Hogarth Press, 1925, IV, pp 19 ff, 176 ff.

appeals. It is difficult to see, for example, why a very small child should be highly precocious in artistic development because he is attempting to give symbolic expression to his erotic impulses. The chances are that the methods which are now being employed by the experimental sciences in their investigation of artistic effort will be more useful in the long run than a speculative appeal to *ids*, libidos, censors, and symbolisms of the Freudian type. No student of human nature, of course, can doubt the prevalence and high significance of symbolisms. Neither can anyone doubt the persistence of conflicts. It still remains to be seen, however, whether these mechanisms must be interpreted as Freud has interpreted them or whether they can all be caught up in a system of thinking which is based upon the normal associative mechanisms.

GENERAL READINGS

The student should refer to the list of General Readings cited at the end of the last chapter.

PART EIGHT

THE BASIC MATERIALS OF APPLIED PSYCHOLOGY

CHAPTER THIRTY-SIX

THE MAIN PROBLEMS OF EXPERIMENTAL PSYCHOLOGY

1. *Introduction.*—We have now finished our inspection of the various special interests of applied psychology. That is, we have finished our inspection of the reader as he goes about the multiplied tasks of an average day of living, for the one character who has been ever present in all of the events we have described is the reader himself. He has studied this book, he has driven an automobile, he has played a game and rested thereafter, he has sought to adjust himself to the objects around him and to his fellow-men, he has tried to decide on a vocation, he has seen himself in the multitude of associations created by the existence of other persons and of large groups of persons, he has been in a court of law and has acted as a witness, a detective, or a judge, he has been the victim of worries, depression, complexes, nervousness, and of other types of functional disorder, he has been the subject of an educational process, he has sought to express himself in various types of artistic creation, he has been a worker in the factory and a buyer in a store.

As we say, the reader has been an ever-present actor in all of these affairs. His daily life has meant the steady and more or less efficient use of every trait and talent of which he is a sum. Now we shall ask a few general questions about these psychological traits and functions. Of what stuff are they made and which of them are the most important? What, precisely, do we mean by the phrase "human nature"? That is, just what are the main problems of experimental psychology? What is the genus of the facts which stand as the foundation for all that has been said up to this point? How do psychologists differ from the uninformed man in their descriptions of human action?

The first answer to these questions may be phrased as follows. Almost all experimenters are agreed that the psychological operations of the typical, normal adult are the point of reference from which other phases of psychological research shall take their departure. Moreover, it is assumed that there are fundamental modes of operation which can be described no matter where they may appear,

whether in children or in animals, whether in social groups or in bizarre and abnormal specimens. In every case that might be named, a few basic modes of operation are alleged to assume their most natural and typical form in the normal human adult.[1]

We shall, then, take the psychological operations of an average adult as our starting point. We must, however, say a great deal more about these operations before we can go very far toward naming the main problems of experimental psychology. One of the most urgent questions about them has to do with their essential character. What is the nature of human nature? Are the functions of which psychology speaks mental and spiritual, or should we think of them in terms of action and behavior? Does experimental psychology treat of mental processes and of states of consciousness or is the whole of human conduct made up of such simple types of action as the reflex? Must applied psychology jump back and forth from minds to muscles and glands or is there any other way of looking at human nature? Are we really twins, the one a spirit and the other a body, or are we single persons displaying certain properties or traits called psychological?

For a long time, men have supposed that human beings are made up of two fundamentally different parts, viz., a body and a mind.[2] Since bodies are known to be material objects, they can be studied in the same way that other objects are studied. That is, they can be handled in much the same manner that a physicist or a chemist would handle falling objects or test tubes. All men of science know that most objects and events are very complex. The whole domain of nature must, therefore, be analyzed into its parts. It follows that the basic facts of physics and chemistry, to say nothing of the other sciences, have to do with units, elements, and similar items which represent the least common denominators in nature. It is the increasing amount of knowledge about the elementary things that helps modern science not only to put nature back together again (that is, to study the way in which parts can be assembled), but to make a great many new things out of the parts as well.

Minds, on the contrary, are not *physical* objects. Men have supposed, nevertheless, that a mind must be some kind of an object, say, a spiritual or non-material object and that it can be studied in much the same way that physical objects are studied. That is, minds

[1] The reader may profitably review, at this point, what was said in Chapter Twenty-Eight, about the concept of normality. He will find, moreover, that the textbooks in psychology are usually written from this point of view.

[2] For a history of this belief, see McDougall, W., *Body and Mind*, N. Y., Macmillan, 1920.

are alleged to be very complex and the first experimental psychologists set out, therefore, to analyze the human mind so that its least common denominators could be found. In doing this, they were successful. That is, they were successful if we may grant the fundamental assumptions which were made concerning the nature of their work.[3]

It is not our purpose, however, to say anything about these assumptions now. On the contrary, we are interested in the relation between this phase of psychology and the task which has been assigned to us in this book. We may say, without further argument that, by their own words, no such relation was possible The first experimental psychology was a pure science in the sense that it had no interest in what the mind did or enabled human beings to do, but an interest only in what the mind was and of what it was composed. That is, the first science of human nature was purely descriptive of mental processes.[4]

We may look at this situation in another way If we say that human nature is made up of two parts, viz., a body and a mind, we are speaking with the voice of a theologian and not with the voice of an experimental scientist. This is not to assert, however, that there is no such thing as a mind, that is, a series of conscious experiences which could be described if only the means were at hand. On the contrary, we intend to argue that the actual stuff which the psychologist studies in his laboratory is not mind-stuff but action, conduct, or behavior. Human beings are directly observed to be at work or at play among their fellows while surrounded by a large variety of objects. It may be true that this work or this play takes on a peculiar character because there is mind or consciousness behind it, but this fact is no longer of first-rate significance to the experimental psychologist even though it may be of great significance to the systematic psychologist and to the theologian, who seek to explain conduct rather than describe it. The point is that the behavior or the conduct of human beings can be directed and controlled wherever it has been studied with sufficient care within the matrix of conditions which bring it about, and this is the main thought behind the new psychology.[5]

In other words, the experimental psychology of today has three terms which lie at the basis of all that it does. In the first place, there must be a situation (called the stimulus or the stimulus-situation)

[3] This is the point of view emphasized by introspective psychology See the references to this topic cited among the General Readings at the end of this chapter

[4] Consult Weld, H P, *Psychology as Science*, N Y, Henry Holt, 1928, Chap I, and *passim*.

[5] Cf Hunter, W S, "The psychological study of behavior," *Psychol. Rev.*, 1932, *39*, 1–24.

which the experimenter can define and control, either in his laboratory, in the workshop, or on the field of play. In the second place, there must be response or some distinctive posture which is recognized as standing in a significant relation to the stimulus-situation. This reaction may be a posture of the whole body, some movement among the members of the body, some change within the body related to the movements (changes in the secretions of the glands), or some movement of the vocal apparatus. It is essential that these movements be counted, timed, or otherwise measured before facts about stimulus and response achieve any value. In the third place, there must be some set of connections between the stimulus-situation and the response. That is to say, there must be some mechanism or device by means of which a stimulus-situation can be converted into action This device is known as the central nervous system and it follows, therefore, that the psychologist often works in close union with the neurologist.

There are two things to be said about this brief statement of the tasks set before the psychologist If we speak of stimuli, of responses to stimuli, and of connections between stimulus and response, we seem to leave the mind out altogether. There are, to be sure, some psychologists who would draw just this inference [6] On the contrary, there are others who assert that responses are observed to be adapted to the situations which excited them because the mind, using the nervous system, or remaining somehow implicit in it, gives to behavior just the psychological character that it is known to possess.[7] We have already argued, however, that it is one of the tasks of the psychologist fully to describe and account for behavior in its relation to stimulus-situations. If the behavior of human beings differs from the behavior of physical objects, the difference must be taken account of. It must be described as it is found. To explain it by saying that there is a mind behind it is quite another matter.[8]

In general, then, the new psychology has to do with human and an-

[6] Pavlov, I P, *Conditioned Reflexes*, Oxford, Oxford Univ Press, 1927 (trans by G V. Anrep) For a history of the reflex concept see Fearing, F S, *Reflex Action*, Baltimore, Williams and Wilkins, 1930 See also the references cited on behaviorism under General Readings at the end of this chapter

[7] Ruckmick, C A, "The use of the term function in English textbooks of psychology," *Amer J. Psychol*, 1913, *24*, 90–123 Weiss, A P, "The relation between functional and behavior psychology," *Psychol Rev*, 1917, *24*, 301–317 See also the references on functionalism cited under General Readings at the end of this chapter

[8] Tolman, E C, *Purposive Behavior in Animals and Men*, N Y, Century, 1932 McDougall, W, *Outline of Psychology*, N Y, Scribner's, 1923, Chap II Bentley, M, "A psychology for psychologists," in *Psychologies of 1930* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1930, Chap V. Hunter, W S, "The psychological study of behavior," *Psychol. Rev*, 1932, *39*, 1–24.

imal behavior. Now it happens that behavior gets things done. Some types of behavior are efficient and adequate to the situations which aroused them, whereas other types are inadequate, immature, or inefficient. For example, a worker may be found who suffers more than his share of accidents. It seems reasonable to ask why this should be the case. Are his reactions too slow or do his arms and other parts of his body coordinate improperly? We have asked hundreds of questions of this type throughout our study of applied psychology. Our purpose now is only to illustrate the fact that the new psychology touches a man at the very point where he makes contact with all of the events and objects around him. We might, if we wished, speak of the *mind* of the worker, but as a matter of fact, his mind is not open to inspection. His conduct, however, is open to inspection. Moreover, the relation between conduct and stimulus-situation is open to inspection. Finally, it is possible to guide and promote the growth of a person so that his conduct may become better adapted to situations or to alter situations so that conduct which was formerly unsuitable will now become more suitable This is, in short, the general task of an applied psychology.

In spite of the various ways in which philosophers, theologians, and psychologists have thought about human nature, whether by way of a soul, by way of a mind, or by way of behavior, everyone has agreed that the psychological functions of a normal, typical adult can be approached from several different directions. We do not mean to imply, of course, that intelligence and personality can really be divided into parts but only that, for simplicity in discussion, our attention may be centered now upon this and now upon that aspect of human nature. In the first place, it is possible to take behavior patterns by themselves. The study of psychology would then disclose the total variety of actions which human beings can carry out, how quickly they may be carried out, and into what general patterns they may be organized. In the second place, it is possible to name and identify all of the varieties of stimulus-situations which may become effective in regulating behavior. This task includes not only a list of all adequate stimulus-situations but a description of the smallest changes in such situations that can call forth a differential response. In the third place, it is easy to show that, whenever a stimulus-situation is presented to an animal or a man over and over again, the reactions to this situation may change so that they will become more effective or more appropriate so far as that situation is concerned. The facts about human nature which are set off in this way have earned a large number of descrip-

tive terms, such as "learning," "memory," "habit," "skill," "recognition," "recall," and the like. In the fourth place, it can be shown that all stimulus-situations, that is, the total range of the effective environment, can never become effective in exciting behavior at one and the same moment. On the contrary, because of circumstances which are easily described under laboratory conditions, they will take their proper turn, one situation now becoming more important than others and then becoming less important. This fact about the relation between stimulus and response has been known as attention. Correlative facts go by the name of interest. In the fifth place, the study of the relations between stimulus and response shows that there are times when the energy or the intensity of the response stands out of all proportion to the energy or intensity of the stimulus. It can be shown, moreover, that this difference between intensities depends, in part, upon the activity of glands within the body, the secretions of which modify the bodily energies involved in response. In addition, the instruments which are used in the making of responses, viz., the muscles and the entire apparatus which establishes connections between sense organs, on the one hand, and muscles, on the other, are embedded in a living organism. It is almost inevitable, therefore, that stimulus-response sequences should somewhere reflect the vital properties of the matrix in which they are placed. These facts have all been described by the words moods, emotions, and feelings. That is, action may become emotionalized. In the sixth place, it can be shown that not all of the stimulus-situations which excite human beings to action are external to the body and sporadic in their effect On the contrary, many of them are internal, and they may persist for long periods of time. Moreover, it turns out that stimulus-situations which are internal to the body may be tied up with other stimulus-situations through that type of learning known as conditioning. In either case, such stimulus-situations are fairly enduring in their relation to responses and they are, on that account, called motives, incentives, urges, or desires. The word motive, then, has come to describe all of those psychological functions of adults which used to go by the names "will power" and "determination." In the seventh place, it can be shown that some stimulus-situations, instead of leading to a modification of glandular behavior, may lead to a quick reconstruction both of behavior and of the stimulus-situation itself. Moreover, it can be seen that such quick modifications of stimulus-response patterns are largely dependent upon the previous history of the individual. This

type of relationship between stimulus and response is called problem solving. The older terms were thinking and reasoning. Finally, it turns out that if we take a long-time view of any normal adult, we shall discover that he has developed certain permanent preferences for stimulus-situations and a concomitant preference for certain kinds of response. These preferences become so characteristic of him that they frequently serve to identify him as a distinct entity. Such facts, therefore, have to do with what we may call his self or his personality. These words may refer, also, to the total patterning or mode of integration of the whole stream of behavior.

If we now go back over this list of the problems of general psychology, we shall see that it does not make any difference, so far as practical matters are concerned, whether we think of them in mental terms or in terms of behavior. The point is that every kind of psychologist, whether he belongs to the old school or to the new school, has to approach the psychological operations of human beings from the eight directions we have named. This fact will become clearer as we now pass on to a more detailed description of each of these dimensions of behavior

2. *Modes of Action.*—The responses of human beings to stimulus-situations are made possible by the fact that the human body is equipped with a large number of muscles arranged on a bony framework in such a manner that various parts of the body may be moved with respect to other parts. In the study of these organs of response, and of their functions, the psychologist has a great many interests in common with the physiologist [9] This fact holds true, in particular, of the glands of internal secretion which, as we shall see, play an important part in all behavior.[10] There are, however, some phases of the action mechanism which are especially important to psychology.

For example, we may wish to know how quickly any given type of response can take place after a stimulus-situation has been presented to the subject. It is now common knowledge that such reactions are not instantaneous. On the contrary, they are known to take an appreciable length of time and a study of this factor in response is known, therefore, as reaction time or as the personal equation.[11] We have already seen that we may find out how quickly a motorist can press the

[9] Watson, J B, *Psychology from the Standpoint of the Behaviorist*, Philadelphia, Lippincott, 1919, Chap V Consult also any good physiology

[10] Murchison, C (ed), *Foundations of Experimental Psychology*, Worcester, Mass., Clark Univ Press, 1929, Chaps XII and XIII.

[11] Garrett, H E, *Great Experiments in Psychology*, N. Y., Century, 1930, Chap. IX.

brake pedal after having seen a danger signal, how quickly a batter may swing his bat after having seen that the ball is coming over the plate, how quickly an airplane pilot may handle his controls when his ship is thrown off balance by a gust of wind, and the like.

In addition to quickness of reaction, we may wish to know something about the general pattern of reaction. The problems which have to do with patterning are known as the problems of coordination. Coordination, in turn, may be of two kinds. On the one hand, there is a type of coordination which we may call stance or posture and, on the other, a kind which we may call rhythm. As an example of the first type, we may think of a runner crouching at his marks or of an actor assuming some posture on the stage. Even though many events are taking place in nerve and muscle during these postures, we may call them static movement systems. As examples of the second type, we may think of a gymnast who is going through a series of graceful movements or of a machine operator who is adjusting his finger and arm movements to his machine. These actions may be described as phasic movement systems.[12] In short, then, wherever human work or play is being studied, it is possible to find examples of the way in which variations in quickness or variations in modes of coördination will make a big difference in the grace or effectiveness of human effort.

Both quickness and coördination apply to all of the various actions which human beings may carry out. That is, they apply to movements of the fingers, hands, arms, and legs, and to all combinations of these organs. Of most interest in human psychology, however, is the way in which they apply to movements in the vocal apparatus, for it is these movements which make possible that unique type of action called language. It is language, of course, which makes the great psychological difference between a typical adult, on the one hand, and a child or any one of the lower animals, on the other. As we have seen, it is by means of language that responses to objects made by other parts of the body may come to be shortened in form and highly symbolical in character.[13]

[12] Washburn, M. F., *Movement and Mental Imagery*, Boston, Houghton Mifflin, 1916, *passim*. Halverson, H. M., "An experimental study of prehension in infants by means of systematic cinema records," *Genet. Psychol. Monog.*, 1931, *10*, 107–286. The texts on child psychology mentioned at the end of Chapter Twenty-Four contain many accounts of the development of motor coordination.

[13] A summary of language development is to be found in Murchison, C. (ed.), *Handbook of Child Psychology*, Worcester, Mass., Clark Univ. Press, 1933, Chap. VIII. Some of the theories concerning the nature of language can be found in De Laguna, G., *Speech. Its Function and Development*, New Haven, Yale Univ. Press, 1927.

The first reactions of the small infant to the objects and events around it are general bodily reactions involving most of the musculature. A colored object or a bit of food is reached for or run toward, not merely with the adequate movements but with a good many others as well. Some of these excessive movements are verbal reactions, and they quickly come to be associated with objects and with the actions of other persons. Moreover, the adults who surround the infant have learned many varieties of words which they may use as substitutes for objects. It is almost inevitable that the infant shall pick up these substitutes When true language begins, the child has learned how to use them in the place of other types of reactions.[14] Instead of moving toward a bright object, for example, the infant may learn how to call for it by using its vocal apparatus. Through processes which do not concern us in this book, the child is soon able to call for objects which are not actually present, and later on, a large part of its dealings with its environment and with other persons will be carried on in terms of the vocal apparatus instead of in terms of other groups of muscles. It happens, then, that the child psychologist spends a good share of his time in a study of the relation between stimulus-situations, on the one hand, and the kind of verbal responses which his subjects make, on the other It is out of this situation that the introspective psychologies have developed.[15]

3 *Stimulus and Perception.*—It is almost impossible to talk about modes of behavior without having said something already of the situations which excite behavior. This is natural since both stimuli and responses are two aspects of a compact and highly integrated series of events. The psychologist finds it useful to speak of them separately only in the interest of clearness, but if he does so, he does not mean that a stimulus-situation is something that can exist independently of the character of the response made to it and neither can he think of the response as something that is independent of the stimulus which gave rise to it.[16]

The general problems having to do with the stimulus side of human behavior concern (i) the total number and variety of objects or situa-

[14] Cf Watson, J B, *op cit*, Chap IX Consult also Hunter, W. S, *Human Behavior*, Chicago, Univ of Chicago Press, 1928, *passim*

[15] See Dodge, R, "The theory and limits of introspection," *Amer J Psychol*, 1912, *23*, 214–229 Dunlap, K, "The case against introspection," *Psychol Rev*, 1912, *19*, 404–413. Hunter, W S, "The symbolic process," *Psychol Rev*, 1924, *31*, 478–497 Hunter, W S, "The subject's report," *Psychol Rev*, 1925, *32*, 153–170. Washburn, M F, "Introspection as an objective method," *Psychol Rev*, 1922, *29*, 89–112

[16] Cf Bode, B H, *Conflicting Theories of Learning*, N Y, Macmillan, 1929, Chap XV.

tions which can become effective in regulating the behavior of a person, (ii) the minimal changes that can be made in a situation in order that different responses to the changes will appear, and (iii) the extent to which a person may go in reacting to similarities among objects in spite of their differences. In connection with the first group of problems, the psychologist finds it convenient to put all visual stimulus-situations in one group, all auditory stimulus-situations in another, all tactual stimulus-situations in still another, and so on for each of the major groups of sense organs in the body.[17] It goes without saying, of course, that the number of visual, auditory, and other objects and events which may become effective in the regulation of human behavior is almost beyond counting. Moreover, these objects and events come to stand in all sorts of relations with one another. They may be large or small, stand behind one another or in front of one another, follow one another in time, appear singly or in very complex groups, and so on In every case, the problem of the experimenter is to find out what kind of specific reactions can be made to every possible type of stimulus arrangement. This means that he must be able to define a stimulus-situation and control it in such a way that, on any given occasion, it will have the same stimulus value for the person who is being experimented upon as it had on the first occasion.[18]

The other side of this group of problems may be illustrated in the following way. Let us suppose that a stenographer is complaining about her typewriter She reports that she cannot turn out good copy because some of the keys have less tension than others. The repair man who is called in to adjust the machine will seek to change the tension on the keys so that the stenographer will not be able to detect any difference in the pressures. This does not mean, of course, that the tension on any one key will be exactly like the tension on any other. On the contrary, if the tensions were to be measured by an appropriate device, it could certainly be shown that there are wide variations. The average stenographer, however, will not be able to detect such variations up to a certain limit. This limit is called her threshold for sensitivity to pressure. The threshold is that point at which she just cannot distinguish differences in the tension. As we have seen above, there are certain kinds of activities in industry and elsewhere which require that the worker shall have a very low thresh-

[17] Cf Troland, L T, *Principles of Psychophysiology* (3 vols), N. Y, Van Nostrand, 1929–32. See Vol. I, *passim*

[18] Cf Dashiell, J F, *Fundamentals of Objective Psychology*, Boston, Houghton Mifflin, 1929, Chap XIII.

old of sensitivity. In any case, a great number of studies have been carried out on this phase of stimulus-situations.[19]

The third phase of stimulus-situations has often been described by such words as concept formation, abstraction, and comparison. It used to be supposed that these terms related more nearly to reasoning than to perception, but studies on the perceptual behavior of small infants show that they, too, can form concepts and make abstractions. Let us suppose that a child has been presented to a number of objects which are dissimilar from one another in all respects save one. The experimental situation is then arranged so that the child can, if it has developed sufficiently, react to this common feature of all of the objects rather than to those aspects which distinguish them from one another Even the lower animals are able to behave in this way under certain conditions. In any case, the psychologist is deeply interested in problems of this sort.[20]

4 *Modes of Learning.*—Since the whole of the next chapter will be given over to the topic of learning, we shall make only a brief reference to it here. In general, learning describes the fact that, when a situation is presented to a living creature over and over again in such a way as to invite the subject to respond to it, the behavior patterns of the subject will pass through a progressive series of changes looking toward a more efficient, a quicker, or a more mature mode of response. In short, learning describes the fact that all of the psychological functions of a person have to be looked at in a time-wise or longitudinal way so as to bring into view the history of the reacting system. If all of the problems of physics and of biology were of this type, that is, if every reaction which took place in a test tube were somehow a product of the temperature, pressure, and other conditions around the test tube plus the previous history of the substances in the tube, the physical sciences would be very much more retarded than they are at the present time. Almost all psychological events are of the genetic type. From day to day, the behavior patterns of a person change not because of changes in the context of the person but because of his own past history.

[19] There is a vast literature on this group of problems They are known as the problems of psychophysics Cf Titchener, E B, *Manual of Experimental Psychology Instructor's Manual*, Part II, N Y, Macmillan, 1905 There are even practical consequences of the principles of psychophysics See Wendt, G R, "Two industrial applications of a psychophysical method," *J Appl Psychol*, 1932, *16*, 269–276.

[20] Cf Hazlitt, V, "Children's thinking," *Brit J Psychol*, 1930, *20*, 354–361 Hicks, J A, and Stewart, F D, "The learning of abstract concepts of size," *Child Develop*, 1930, *3*, 195–203

There are, of course, a great many ways in which these changes manifest themselves The important thing, however, is that all learning describes a sort of change in performance which is much more like growth or development than it is like biological adaptation or that kind of increasing fitness which takes place when the untried engines of a steamer are shaken down. The first reactions which a person makes to any given stimulus-situation may be inadequate in the sense that they are awkward or immature. Through practice, that is, through continued response to a given type of stimulus pattern, every human being grows more mature. This kind of increasing maturity is called learning [21]

The student will easily see, then, that learning is not so much a separate type of psychological operation as it is a method or process by which the true psychological functions may be brought to greater maturity. The older psychologies used to say that men had a special memory faculty and, more recently, it has been assumed that learning must be like perceiving, reacting, or solving problems. When we recall, however, the extreme helplessness of a small infant and when we recite the way in which the learning situations that are presented to the infant help him quickly to become more competent, we shall realize that learning is essentially a means of promoting and guiding the growth of a person. As we have said, we shall discuss this matter in more detail in the next chapter.

5. *Attention and Interest.*—Up to this point we have argued that the problems of psychology consist (i) of an examination of all of the behavior patterns of any given person, (ii) of the total range and variety of objects, events, and situations which can become functionally related to behavior patterns, and (iii) of the fact that situation-response patterns are mightily subject to their own previous history. The next group of psychological operations is suggested by the fact that no animal can make all of the responses of which it is capable at any single moment and neither can it be excited into any single response or even into a total pattern of response, by the simultaneous presentation of all of the objects and events which make up its effective environment. On the contrary, both actions and objects take their turn. Every person is now responding in one way and then in another

[21] For a workable definition of learning, see Hunter, W S, "Experimental studies of learning," in *The Foundations of Experimental Psychology* (ed. C. Murchison), Worcester, Mass, Clark Univ Press, 1929, p. 564.

kinds of stimulus-situations than it has in terms of some alleged faculty or property of the mind.[29]

7. *Mood and Emotion.*—Let us suppose that we have been studying electric discharges in a gas. Let us suppose, also, that there is no way in which we can control the temperature of the gas Furthermore, unknown to us, we may say that some demon is filling the gas every now and then with some other substance which will quickly and greatly modify the conductivity of the gas. It is clear that, no matter how much control we are able to exercise over the intensity of the current, and no matter how carefully we measure the distance between the points of discharge, we shall get vast irregularities in our data on the nature of electric discharges Fortunately, in such experiments, the temperature can be controlled and there is no demon which changes the character of the gas without our knowledge.

The experiment just described may be taken as a rough analogy to a situation which has to be met by the psychologist. The paths of conduction between stimulus and response, together with the very receptor organs and muscles themselves, are living entities This means that every part of the body involved in a stimulus-response pattern may be living at a higher rate at one time than it is at another. This fact holds true, in particular, of the sensory apparatus which lies at the extremities of the sympathetic nervous system and of the motor apparatus which controls the organic functions of the body It is inevitable, then, that every stimulus-response pattern shall be embedded in a matrix which enjoys, so to speak, wide variations in vitality. Moreover, the glands of internal secretion may, under certain conditions, change vital processes in such a way as to make vast energies almost instantly available for use during response.[30]

All of these facts about the general condition of the body, which acts, so to speak, as a host to the nervous system, appear in psychological functions in several ways On the one hand, a private view of them gives what are commonly called the moods and emotions. On the other hand, a public view of them gives what is called an expression of the emotions. Modes of expression may be measured either directly, in patterns of behavior, or indirectly through measurements of the changes in the resistance of the skin to the passage of electric currents. They may be measured even by variations in the development of

[29] Cf Hunter, W S, and Hudgins, C V, "Voluntary activity from the standpoint of behaviorism," *J Gen Psychol*, 1934, *10*, 198–204

[30] Cannon, W. B., *Bodily Changes in Pain, Hunger, Fear, and Rage* (2nd ed.), N. Y., Appleton, 1929.

electric currents in the body itself. In any case, all of the facts described by the words mood and emotion comprise a very important segment of the whole field of psychology.[31] The point is that action is always energized at some precise level. Moreover, variations in energy level may come to be associated with situations which, in the beginning, bore no relation to them.

It has been fruitful to distinguish between the so-called emergency emotions, such as fear, anger, rage, and sex, on the one hand, and the moods or affectively-toned attitudes and dispositions, on the other. In the case of emergency emotions, reserve energies of the body are made available for response, whereas in the moods and dispositions the responses made by a person seem to give an intimation of the general tonus of the body. The important fact, however, is that the mechanisms which produce the moods and the emotions are highly subject to training or to education. That is to say, given such mechanisms and, in the case of the emergency emotions, given an unexpected situation which will call out reserve energies, almost any other situation or event may come to serve these same purposes through conditioning. The great variety of such objects and events has been suggested in Part Four where we have tried to say something about the development of personality traits and about the way in which these traits may suffer maladjustment.

The facts which have just been described stand, perhaps, among the most important achievements of psychology. It used to be supposed that emotions were a special kind of psychological function. Moreover, it was supposed that emotional actions could easily be distinguished from one another, fear, for example, having qualities which separated it sharply from anger or love. It now begins to look as though emotionalized actions were more extreme forms of action, all of which fall in a single continuum.[32] That is, no action of the psychological type can ever take place in a non-living body. In some cases, the matrix of vitality in which actions are placed does not become dominant. This holds true of highly automatized skills. In other cases, however, the rate of living (of metabolism) is readily apparent and such cases give rise to moody or emotional action. Obviously, then, emotionalized action should be as much subject to training as other forms of action.

[31] Landis, C., "The expressions of emotion," in *The Foundations of Experimental Psychology* (ed C Murchison), Worcester, Mass., Clark Univ Press, 1929, Chap XIII

[32] Duffy, E., "Emotion An example of the need for orientation in psychology," *Psychol. Rev.*, 1934, *41*, 184–198

8. *Problem-Solving.*—We have argued in several different places that most human beings possess three different ways of meeting situations. In the first place, there are all those ways described by the words "habit," "skill," and "remembering" Even at the time of birth, most infants have grown to maturity in such specific types of action as are named by the word "reflex." For our purposes, it is not necessary to say how much of a reflex is a product of innate organization and how much is a matter of actual training for, in either case, the newborn infant quickly grows or matures in a vast number of other patterns of behavior so that, at any given stage during childhood or in adulthood, immense numbers of situations may be met simply in terms of habit patterns [33] It can be shown, however, that some situations, even in early infancy, will result in what we have just called an emotional action The situations which will do this are usually unexpected, strange, or very intense situations.[34] Through the processes of conditioning, other types of situations may become equally effective in producing emotional actions. In any case, emotion describes a second way of meeting large numbers of objects and events

At some undetermined period after birth,—perhaps, between the second and third year,—certain types of stimulus patterns will be responded to neither in terms of habit nor in terms of emotion but in terms of a quick reorganization of previously acquired behavior patterns. Sometimes, these reorganizations of behavior patterns mean an equally quick reorganization of stimulus-situations. Objects and events which have hitherto stood in one context now come out of their old context and enter into a totally new configuration. This type of performance on the part of human beings has been fairly described as thinking, reasoning, or problem-solving. Problem-solving stands, therefore, as another major group of psychological functions which have to be considered by the experimenter.[35] Since we have already considered the nature of problem-solving in previous chapters, we may pass on to another topic.

9. *Self and Personality*—The final group of problems which make up the whole science of psychology is named by the words "self," "personality," or "character" Both for historical reasons and because of direct experimental evidence, these words describe the fact that

[33] Cf Murchison, C (ed), *Handbook of Child Psychology*, Worcester, Mass, Clark Univ. Press, 1933, *passim*

[34] Jones, M C, "The elimination of children's fears," *J Exper Psychol*, 1924, 7, 382–390

[35] Kohler, W, *The Mentality of Apes*, N Y, Harcourt Brace, 1925, *passim* See also Dewey, J, *How We Think*, N Y, Heath, 1933, *passim*

every human being has a total character or quality about him which is more than the sum of his particular traits. The very fact that we have found it possible to name several different kinds of psychological function seems to suggest that human nature can be described piece by piece or function by function. This method of talking about the problems of psychology is useful only because it makes discussion of human nature intelligible. One cannot discuss everything at once. A method of division which leads to fruitful discussion is not a proof, however, of the mosaic character of human nature. All of the functions which have been described in the preceding seven sections enter into a composite picture which has a total patterning for any given person. It is on that account that men are called persons rather than things.[36]

In other words, self and personality describe the fact that a long-time view of a person will show certain persistent trends of behavior, the origin and development of which deserve special attention. These trends may come out of a total long-time view of human nature or out of the particularly insistent and persistent way in which certain persons adhere to given types of action. If, for example, one person is insistently and persistently quick or zestful in his actions as opposed to another who is insistently and persistently slow and moody, we describe the difference by saying that the two individuals display different personality traits.

10 *Points of View toward Behavior.*—This is not the place to go into a detailed examination of all of the points of view which have been taken toward the problems of psychology as they have been described above. The student of applied psychology, however, will have met many of these points of view if he has studied some of the references appended to the various chapters and it will be helpful, therefore, if we describe briefly the major differences between psychologists as they appear at the present time.[37]

The situation from which we may start is as follows. At rock bottom, there is the fact that living organisms make various kinds of actions or take various attitudes which are a more or less direct answer to a tremendous variety of stimulus-situations. We have, then, (i) stimulus-situations, (ii) connections between these situations and organs of response, and (iii) modes of response. We have tried to say that direct scientific evidence can be got about each of these segments

[36] Hartshorne, H., *Character in Human Relations*, N. Y., Scribner's, 1932, *passim*

[37] References on the different types of psychology are given in the General Readings at the end of this chapter

of any stimulus-response pattern, and especially about the first and the third. It happens, however, that a great many of these stimulus-response patterns carry with them a series of events which make up what each person calls his own private view of himself. These events have been variously called states of consciousness, states of awareness, mental processes, minds, or souls. Introspective psychology is that form of psychology which asserts that the description of this private world is the primary function of psychology It attempts, then, to offer a description of the mental processes which are excited by stimulus-situations, by various types of conduction between sense organs and muscles, and by various kinds of action.

Introspective psychology may be divided into several different types. One of the earliest forms was called "rational psychology" because it was inferred that there must be some central core of mental or spiritual stuff of which discrete mental processes were an expression. Introspective psychology, in a more narrow sense, took what may be called an analytical point of view. Just as the physical sciences describe the least common denominators in nature, so analytical psychology sought to describe the least common denominators in the private or mental world of a person. It happens, however, that least common denominators, whether in nature or in mind, are never found alone. They are always patterned with other units or elements These patterns have certain properties or characteristics which seem to be unique to the pattern but in no wise predictable from the elements. Those psychologists who describe the properties or traits of such patterns have called themselves Gestalt psychologists or configurationists. There is still another way, however, to take the results of introspective psychology A good argument can be made out for the fact that living creatures are always adapting themselves to their environments. One may wish to know, then, how mental processes, on the one hand, and patterns of mental process, on the other, promote adaptation or adjustment. That is, what part do mental processes play in action? This mode of approaching human nature has been called functional psychology.

It is clear that each of the psychologies described up to this point pays particular attention to one's own private view of psychological behavior. When it is said, therefore, that this view can be described, it is taken for granted that language is a way of bringing out into the open a series of events which are strictly private. As we shall see in one of the next chapters, an experiment carried out according to the

introspective point of view would run somewhat as follows. Individual A, who is the experimenter, presents a situation to individual B, who is the subject. This situation is of such a character as to get from B some manual response and also a verbal description of B's own private view of himself. Individual A, then, is not the direct observer of B's private world. He assumes, however, that what B says about his private world is just as good as a direct inspection of it. As we have intimated, we shall speak more about this matter in a later chapter. In the meantime, we wish to point out that some psychologists have held this procedure to be nothing short of nonsense. Since individual A can get direct records only of the manual and verbal responses of B, and since the verbal responses are not a direct inspection of B's private view of himself, one may proceed in psychology as though B did not have a private view of himself This kind of psychology is sometimes called radical behaviorism. Radical behaviorism may take a great many different forms, only two of which we shall name. The one form actually proceeds as though neither A nor B had any private view of themselves The other form may tacitly admit that there is such a view but that for the purposes of a science it is not worth while to consider it.

11. *Mind and Body*—It is not possible to settle the differences between these varieties of psychology without saying something about the very perplexing problem of the relation between mind and body.[18] We may take it as a plain fact that the psychological functions both of men and animals do present two sides. The one side is that private side made familiar to every human being by whatever terms he wishes to use He knows that he is conscious or that he has mental processes, that he remembers and thinks, chooses and feels, and so on. The other view is made up of behavior. As we have tried to say, this is the only view which can serve the purposes of an applied psychology for, as a matter of fact, the things that count in education, in law, in industry and in medicine are actions and attitudes.

It looks, then, as though the question of the relation between mind and body is simply a question as to how far the private view which the average person has of himself coincides with the public view which one person may have of another. If there are states of consciousness or varieties of experience in a man's own private view of himself which do not reflect themselves in any kind of behavior or in any kind of posture, at any time, it is clear that such items could not become a

[18] McDougall, W., *Body and Mind*, N Y., Macmillan, 1920.

matter of discourse between men of science. The introspective psychologist takes the verbal responses of his subject as a sufficient basis for drawing inferences about the mental processes of his subject. He feels justified in making these inferences because he knows that his own stimulus-response patterns are associated with certain definite items in his own private view of himself. If, however, the subject of a psychological experiment made no such verbal responses and if there were nothing already in his behavior which might suggest the existence of his private world, no experimenter could find out anything about it.

It must be assumed, then, that the various aspects of behavior which can be studied by the psychologist are in some ways exactly commensurate with the private world of each person. It does not look, however, as though there were anything about behavior itself which would lead to this conclusion On the contrary, such an inference can be drawn only when the experimenter is able to relate the behavior of his subjects to stimulus-situations in such a way that the facts described by learning and memory, attention and interest, mood and emotion, motivation and incentive, reasoning or problem-solving, and self or character, reveal themselves.[39]

We may now ask why it is that one person who has not and cannot see, or otherwise directly inspect, the mental processes of another person can ever hope to formulate an experiment which will reveal these processes. The answer to this question is quite obvious It is now recognized in the physical sciences, as well as in the psychological sciences, that every experiment must include the experimenter as a part of the total laboratory equipment. The type of question which a physicist may ask of nature depends, in part, upon the nature of the apparatus used and, in part, upon the nature of the experimenter himself In studying the properties of light, for example, it is now commonly recognized that these properties are scarcely more than the geometrical properties of lighted objects. In other words, not much is known about light when nothing is lighted. This holds true not only of objects but of the physicist himself, as well. If, then, a psychologist asks a white rat to solve a problem, that is to say, if he places a white rat in a situation which has the quality or property described by the word "problematic" he does so because he himself is a problem-solver. He may, of course, put a white rat in a situation which is problematic for himself but not problematic for his subject. The very

[39] See, however, Tolman, E C., *Purposive Behavior in Man and Animals*, N Y , Century, 1932

fact, however, that psychologists continue their experiments on the psychological functions of other persons means that every experimenter is that kind of a person who can carry out the functions which are asked about with reference to other persons. In so far, then, as one's own private view of one's self makes a difference in the kinds of function which one can carry out, just so far will the relations between stimulus and response in the stimulus-response pattern of another person become indicative of psychological functions.

12 *Conclusions.*—We are now ready to state in a very brief way the general point of view toward the problems of psychology which has lain behind our survey of the field of applied psychology. The clew to our position is furnished by the actual tactics of an experimenter in his laboratory. Let us say that an experimenter wishes to find out whether or not a chimpanzee can solve a problem. The answer to this question will require of the experimenter that he set up some apparatus or some particular stimulus-situation which will be problematic so far as the chimpanzee is concerned. Even though the experimenter is not visible while the chimpanzee tries to solve the problem, he is, nevertheless, an intrinsic part of the experimental situation for the very fact that the situation presented to the chimpanzee is called a problematic situation means that the experimenter himself is not only a problem-solver but that he can recognize such a situation when he sees it During the course of the experiment, the behavior of the chimpanzee will stand in variable relations to the situation Long experience with behavior has made it certain that some types of relation between stimulus and response will be called emotional, while other types will be called habitual or remembered. Still other types may be called rational or thoughtful or problem-solving At no time during the experiment does the experimenter actually see what some persons would call the mental processes of the chimpanzee. The data which the experimenter gets are made up altogether of descriptions of the behavior of his subjects and of the unique relations which obtain between this behavior, on the one hand, and relevant stimulus-situations, on the other.[40]

Since a chimpanzee does not often respond to experimental examination by using its vocal apparatus, some men have been inclined to say that chimpanzees do not have a mind. This conclusion is based upon the false premise that the words which a human subject would

[40] Consult Johnson, H M, "Did Fechner measure 'introspectional' sensations?" *Psychol Rev*, 1920, 36, 257–284

use in a similar situation are identical with a direct inspection of the mental processes of the human subject. It is easy to see, however, that this is not the case. If human subjects are used in the experimental situation in which the chimpanzee was first placed, the human subjects may respond more frequently with verbal types of action than the chimpanzee did. These verbal reactions are data which have the same general psychological value that is attributed to other types of movement In other words, at the end of his experiment with human subjects, the experimenter would possess accounts of postures, spoken words, and the manual movements of his subjects. All of these patterns of action will stand in unique relations to the stimulus-situations which excited them. It is out of these relationships that facts of psychological import are derived.[41]

Every experimenter, then, has to use the methods of a behaviorist. This means that psychological research is always committed to what we may call methodological behaviorism. The function of methodological behaviorism is to search out the variable relations which obtain between stimulus-situations and responses so that, given a stimulus-situation, a reasonable prediction can be made about the character of the response, or given the response a reasonable guess can be made as to what the stimulus-situation was. The student of applied psychology is not forced to go beyond these considerations. He is faced with the practical necessity of controlling human action. He may, if he wishes, however, interest himself in the problems of systematic psychology or in the problems of explanatory psychology,—that is, he may still insist that a man's private view of himself is a view of real existences which may be called "mental" or "conscious." It is possible to assert that existences of this type are the only agents which can make the difference between the behavior of human beings and the behavior of matter. Obviously, it is not the function of applied psychology to consider these problems.

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[41] Hunter, W. S., "The subject's report," *Psychol Rev.*, 1925, *32*, 153–170.

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See also Murchison, C (ed), *Handbook of General Experimental Psychology*, Worcester, Mass, Clark Univ Press, 1934 Murchison, C (ed), *Psychologies of 1930*, Worcester, Mass, Clark Univ Press, 1930 Heidbreder, E, *Seven Psychologies*, N Y, Century, 1933 Woodworth, R S, *Contemporary Schools of Psychology*, N Y, Ronald Press, 1931.

CHAPTER THIRTY-SEVEN

THE PROBLEM OF ORIGINAL NATURE

1. *Introduction.*—One of the surest traditions from classical times concerns the boast of a certain Zokyrus to the effect that he could judge character from the physical appearance of a man. Some of the friends of Socrates, wishing to put him to the test, asked for a judgment concerning Socrates himself. A burst of laughter and of derision greeted the judgments of Zokyrus when he attributed to Socrates a variety of undesirable traits because of the lowliness of his face and figure, whereupon Socrates made himself known and pointed out that he really was, by nature, that which Zokyrus had alleged of him; but that he had, with the aid of reason, been able to secure an advantage over his baser nature and nourish traits which otherwise would have been denied him.

This tradition is the *locus classicus*, apparently, of the distinction between original nature and training. Even a casual glance at the histories of education, of philosophy, of religion, and of psychology will show that the distinction has had almost all possible changes rung upon it. We have only to remind ourselves of the words instinct and training, innate ideas and acquired ideas, primary and secondary qualities, heredity and environment, nativisim and empiricism, and innate sin and saving grace, in order to sense the many directions in which the distinction has gone There is practically nothing which human beings can say about themselves and their behavior which does not bring in, sooner or later, the question as to what is native and what has been acquired through training or through education.

Curiously enough, it was not until we were well into the twentieth century that this question was brought into the experimental laboratory. We do not mean to say that nothing had been done about the problem before our own times, but most of the research in the latter half of the nineteenth century was directed toward the way in which original nature could be passed on from parents to children rather than toward the question as to what was native and what acquired. That is, the science of genetics, which had its origin in the rediscovery of some experiments on breeding carried out by Mendel, takes as its

main purpose the study of the mechanisms of heredity. This new science simply assumed that all of the traits of human beings which had been attributed to inborn nature by tradition were, as a matter of fact, original rather than acquired. Today, on the contrary, a great many experimenters are actively at work in the study of all human traits in order to find out what their complete history is and how they have gained their adult form and usefulness.

It goes almost without saying that this new study of original nature touches the problems of this book on almost every page. As an example, let us take the driver of an automobile. He may be quicker than his neighbor in putting his foot to the brake at a moment of danger Moreover, he may be able to coordinate his vision with the movement of his hands and his feet much more smoothly than his neighbor. To what, then, is he indebted for this superiority? Was his original nature of such good stuff that he was predestined, as a child, to become a first-class chauffeur, or were there special events in his training as a child that now help him to escape accident and injury? Consider another illustration. Here is a football player who, in the eyes of his coach, has an uncanny ability to run the open field, to dodge a tackler, or to throw a forward pass. From whence comes such skill? Why do a few men become the talk of the newspapers while vast numbers of other men search in vain for even a brief mention on the sports page? Are some men born with the right combination of traits or do all depend upon the way in which they have been trained?

Clearly, then, one of the common problems throughout the whole field of applied psychology is just this problem of the relation between original nature and training. What are the facts? How does the experimenter go about it to identify the original part of human nature, on the one hand, and the acquired part, on the other?

2. *The Evidence for Native Traits.*—The oldest type of evidence in favor of inborn traits comes from long standing traditions to the effect that most of the lower animals carry out their life activities by means of inborn reflexes and instincts. The reflex is a fairly simple and more or less immediate response in some local part of the body to an equally simple and localized stimulus.[1] The instinct is often defined as a much more complex,—even elaborate,—behavior pattern which is set into operation by a complex stimulus-situation [2] In any case, both the

[1] Fearing, F S, *Reflex Action*, Baltimore, Williams and Wilkins, 1930

[2] James, W, *Principles of Psychology*, N Y, Henry Holt, 1890, Vol II, Chap. XXIV.

reflex and the instinct are said to be inherited ways of acting. As far as some of the insects are concerned, it appears that practically everything they do, from building their nests to foraging for food, is the result of the operation of an instinct. The nervous systems of such animals ought, then, to be so patterned by heredity as to lead to the right responses to almost every situation the animal might have to meet.

The same facts are said to hold true of human beings. Any daily observation of very young infants will show that they react to objects and events around them with far greater skill than they could have acquired through practice.[3] The reactions of an infant are fairly simple, and many of them can be called reflexes, but even older children and adults are said to display a great many instincts The reader will remember that we have already had occasion to ask about such activities as the competitive instinct and the collecting instinct, because it is sometimes said that our present economic order and the existence of certain types of social and political organizations are inevitable in view of these aspects of the original nature of man. For the time being, however, we mean only to note the fact that the presence of instincts in animals, including man, is one of the pieces of evidence in favor of native traits.

Further evidence in this direction comes from studies of great families. We may, for example, ask such a question as the following. If there is a great man in a given family, what are the chances that this one great man will have one or more great relatives? Likewise, if there are no great men in a family, what are the chances that any individual in that family will have an eminent relative?

Questions like these have been studied by a number of persons. Galton, for example, selected a large number of eminent men and then sought to find out how many eminent relatives these men possessed. For the sake of proper comparison, he chose an equal number of obscure men and asked the same question of them. It turned out that the chances that one eminent man would have an eminent relative versus the chances that an obscure man would have an eminent relative were as one hundred and fifty to one. The inference is clear. It must be that greatness runs in families.[4]

Supporting evidence comes from the study of low-class families.

[3] Cf. Murchison, C. (ed.), *Handbook of Child Psychology*, Worcester, Mass., Clark Univ. Press, 1929

[4] Galton, F., *Hereditary Genius*, N. Y., Macmillan, 1914.

In one such case, the Kallikak family, where there were two lines of descendants, the one from a normal woman and the other from a feebleminded woman, it was found that feebleminded and unsocial conduct in the one strain appeared over and over again throughout the history of the family Altogether, then, statistical studies of this sort have supported the idea that human nature owes a part of its character to the quality of the family "blood." [5]

Further evidence in favor of inborn traits comes directly from the experimental laboratory. There is in education, for example, a principle known as the constancy of the I Q.[6] Let us say that a child has been given an intelligence test when it was four years old and that its I.Q is found to stand at 127. Let us suppose, also, that the child is tested again each year for a period of years It turns out that the I Q. of this child remains at or near the first value. In other words, the relative brightness of the child does not change from year to year when it is compared with other children. Its intelligence tends to remain relatively constant This fact has been used to prove the original or unlearned nature of intelligence because it does not seem reasonable to suppose that the environment of a child (say, its schooling) could lead to such constancy.

Similar conclusions have been drawn from the fact that individuals differ so greatly from one another One child, for example, may have an I.Q. of 127 while another will have an I Q. of 69. Since both of these I Q 's remain relatively constant and since such differences will appear among children of the same community and who are in the same schoolroom, it must be inferred that the difference is due to inborn factors. Moreover, it has been shown that differences in intelligence and differences in a great many other traits, as well, are not significantly changed by practice. If such traits were developed by practice, it would seem to follow that they must depend in some significant way upon the character of the environment. At first sight, however, the evidence points in the other direction [7]

The most significant support for belief in the existence of a great

[5] Goddard, H H, *The Kallikak Family*, N Y, Macmillan, 1912 Dugdale, R L, *Jukes· A Study in Crime, Pauperism, Disease, and Heredity*, N Y, Putnam's, 1877 Winship, A E, *Jukes-Edwards A Study in Education and Heredity*, Harrisburg, R L Meyers, 1900 Woods, F. A, *Mental and Moral Heredity in Royalty*, N Y, Henry Holt, 1906

[6] Kuhlmann, F, "The results of repeated mental reexaminations of 639 feebleminded over a period of ten years," *J Appl Psychol*, 1921, *5*, 195–224 Hildreth, G, "Stanford-Binet retests of 441 school children," *Ped Sem*, 1926, *33*, 365–386

[7] Terman, L M, "Nature and nurture their influence upon intelligence," *27th Yearbook Nat Soc for the Study of Educ*, Bloomington, Ill, pp 1 ff.

many inborn traits comes from the study of identical twins. Identical twins are to be distinguished from fraternal twins because the former develop out of a single ovum, whereas the latter develop from two ova. The fraternal pair, then, so far as heredity is concerned, are more like ordinary brothers and sisters (siblings). All of the studies that have been made upon identical twins seem to show that the term identical has been used advisedly Such children are not only alike in physical form and function but in all measurable psychological traits as well The degree of correlation in mental traits among identical twins usually runs toward o 90, while the degree of correlation between siblings rarely amounts to more than o 40 [8]

It is possible, then, to bring together a considerable number of facts which support the contention that the psychological traits of human beings are subject to the same hereditary factors as are physical and physiological traits. In other words, in answer to our questions about the automobile driver and the athlete, we might be tempted to say that there was something about their original nature which made them good, bad, or indifferent We could say the same thing about men in the factory, or in the salesroom, or in the office, or on the judge's bench. Obviously, we must be sure that we know whereof we speak when we say that that which a man shall become is determined for him, in part, by his heredity

3 *Criticisms of the Evidence.*—Up to this point we have taken the evidence in favor of original nature at its face value. We have not asked about possible exceptions to this evidence and neither have we said anything about the assumptions that may lie behind the way in which the evidence is used. We must, therefore, hasten on to this side of the picture.

With respect to the existence and universality of instincts this much is to be said. Until the present decade, no student of either animal or human psychology had ever traced an instinctive performance to its origin. Now, however, such studies are being made and it turns out that some of the performances that have commonly been passed off as instincts really owe their origin and their mature form to the guiding and promoting influence of the environment rather than to original nature.[9] As an example, we may take some of the common fears of children. For a long time it has been supposed that children

[8] Gesell, A., "The developmental psychology of twins," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass., Clark Univ Press, 1931, Chap VI

[9] Witty, P A., and Lehman, H C., "The instinct hypothesis versus the maturation hypothesis," *Psychol. Rev.*, 1933, *40*, 33–56.

are instinctively afraid of the dark, of furry objects, and of strangers.[10] Now it appears that each of these fears has been acquired by the child under the influence of the situations which have been presented to it after birth. In a previous chapter, we have said a great deal more about studies of this type. The fact to which we wish to call attention here is that men have always gone on the assumption that any human trait (except those actually trained in the schoolroom) must be taken as original until it was shown to be acquired. Now the situation has changed. A great many experimenters are almost ready to say that all human traits are to be taken as acquired until it has been shown that they are native This point will become a little clearer before we have arrived at the end of the chapter.

We may now turn to the other types of evidence in favor of native traits. All of this evidence is based upon a major assumption which is rarely recognized by those who feel that blood must tell. This assumption runs as follows. Since a group of children who have been raised in the same community, in similar homes, with similar parents, and in similar schoolrooms show wide differences in their psychological traits, it must follow that the ways in which they differ from one another cannot be attributed to identities in their environments. In other words, it is assumed that the phrase "an identical environment" can be defined. It is assumed, moreover, that something is known about the way in which an environment can affect the growth of a child Obviously, we must look at this matter for a moment.

In the first place, it is necessary to see whether or not there are different kinds of environments. The answer here is simple enough. The first environment of a child is the body of the mother. This environment continues, on the average, for nine months. It is made up largely of the physico-chemical substances of the womb and of the blood stream from which the foetus gets its nourishment. Late in the period of foetal development, changes in the intensity of light, and sudden changes in the position of the mother may act as stimuli to the foetus. Moreover, movements made by the foetus are a source of stimuli to itself. Immediately upon birth, these and other stimuli are tremendously increased in number and variety, but even after birth a part of the environment is made up of the food given to the infant and of the general climatic conditions under which it grows. Most important, perhaps, for the development of the psychological traits

[10] Jones, M C, "Emotional development," in *Handbook of Child Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1933, Chap VI

of the child, are the stimulus-situations around it, for it is these which prompt the child to action and which promote, therefore, the normal maturation of its sense organs and its nervous system. Later on, a new factor, viz., the social factor, becomes of great significance in promoting the development of the child.[11]

As illustrations of the ways in which these various sectors of the environment may affect the growth pattern of the child, and hence the nature of his adult traits, we shall take the following. There are certain regions of the United States in which the drinking water is almost if not quite devoid of iodine. It is known that an optimal amount of iodine is necessary in order that the thyroid glands may develop properly. It is known also that the thyroid glands must be normal before the nervous system can reach its best modes of form and function. It follows, then, that some means must be used to provide proper amounts of iodine for the growing child through the diet of the mother. We may take this as a rough example of the control that has been exerted over environments of the physico-chemical type. Unfortunately, as we shall see, control of this sort is exceedingly limited.

Shortly after birth, the more specific types of stimulus-situations become increasingly powerful in promoting the growth of the child. We know, of course, that a child must learn how to reach for an object in front of it. It has been shown that, at first, the infant will reach not only with its hands and arms, but with its legs, its head, its mouth, and with other parts of the body as well. Clearly, an adult would be awkward, indeed, if his reaching behavior remained at this level. Under the stimulus of learning situations, however, unnecessary movements drop out. The number of leg movements, for example, decreases rapidly with practice until, finally, the child may get hold of an object after making only those movements that are normally essential. To be sure, some of this growth might take place without the promoting and guiding effect of a learning situation, but studies on a very few children who have not been subject to such training suggest that a child cannot go very far without such aid. The Wild Boy of Aveyron is a good example.[12]

Within a few months after birth, most children are placed in the company of other children, to say nothing of the company of adults. It is this fact which creates for them a social environment. It is this

[11] Buhler, C., "The social behavior of children," in *Handbook of Child Psychology* (ed. C. Murchison), Worcester, Mass., Clark Univ Press, 1933, Chap IX

[12] Humphrey, G., and Humphrey, M., *Itard's Wild Boy of Aveyron*, N. Y., Century, 1932.

fact, also, which promotes the development of a distinctive group of traits As an example, we may take the social attitudes described by the words introvert and extrovert It used to be thought that one or the other of these attitudes must be a part of the original nature of children, but it is now believed that they are the product of the social situations in which children have been placed during the first three or four years of their lives. We have already reviewed some of the experiments in this field.

It would be possible to name multiplied hundreds of facts of this kind, but we have, perhaps, illustrated our point, viz., that the word environment does not refer in a simple and easy way to the objects and events which may happen to stand around a growing child. We must, however, go one step further The mere presence or absence of an object in the general neighborhood of a child does not mean that that object is really effective in promoting or guiding the growth of the child On the contrary, the object must have entered into a direct functional relation with the action patterns of the child before it can be called an effective part of its environment. That is, there is a very great difference between the general context of a child (this is the meaning which is usually given to the word environment) and the really effective or functionally active parts of its environment [13]

Now it happens that the men who explain the constancy of the I Q., the existence of individual differences and their resistance to change through practice, and other similar data, in terms of original nature, suppose that they know what parts of an environment have been effective and what parts have not been effective. In other words, most methods of proving that a given trait must be original or native are based upon the assumption that something is already known about environments. This is certainly a false assumption Save for those local sectors of an environment which have been called learning situations, there is practically no information as to what a favorable or an unfavorable environment may consist of.

There are several ways to illustrate this fact. In the first place, most persons believe that a schoolroom or some other special learning situation is really the only place where the growth of a person is guided and promoted. In other words, a great many people act as though informal education—the kind of training that takes place in the yard, on the corner, and during the times when the child is "doing

[13] Cf Lewin, K., "Environmental forces," in *Handbook of Child Psychology* (ed C. Murchison), Worcester, Mass., Clark Univ Press, 1933, Chap XIV.

nothing,"—has no appreciable effect upon its growth pattern. It goes almost without saying, however, that no growing child is ever without an environment. It seems to be true, also, that informal methods of training the child do bring to fruition a great many traits. In any case, when a teacher or a parent finds a trait in a child which he himself has not intentionally given to the child, he will explain the trait by an appeal to original nature rather than by a study of the whole of education, both that which takes place in the schoolroom (and for which immense sums of money are paid), and that which takes place at odd hours.

In the second place, even though a child may be given direct practice on a skill, it does not follow that the practice will do him any good until he is ready for it. He cannot get ready for one skill, perhaps, until he has learned another. Infants, for example, have been caused to practice certain movements with their hands and arms in the hope that they would gain skill in throwing with greater speed than unpracticed children. It has turned out, however, that the unpracticed children acquire the same degree of skill with much less practice after they have been allowed to mature a little more. In short, then, it is fruitless to practice a skill before the right foundations for the skill have been laid [14]

This much is known about a very simple situation. When, however, we ask about more complex situations, we meet with complete ignorance rather than with complete knowledge. And yet those who would use the information cited above as an argument in favor of original nature suppose that complete knowledge is available. Who, for example, knows which of a dozen parts of a complex series of acts should be learned first in order that the other parts may be learned to best advantage? Who knows whether or not the learning of one part rather than another part first may not make the learning of subsequent parts much more difficult if indeed not altogether impossible?

These questions mean that we may think of a learning situation in two ways On the one hand, we may try to get a cross-section of it at any single moment. Those who have studied the nature of learning already know a few of the facts which have to do with this source of control over learning. On the other hand, however, we may think of a learning situation from the time-wise or longitudinal point of view. It is barely possible that the rôle which the environment may play

[14] Gesell, A., "Maturation and the patterning of behavior," in *Handbook of Child Psychology* (ed. C Murchison), Worcester, Mass., Clark Univ. Press, 1933, Chap. IV.

in promoting and directing the processes of development must depend, in part, upon which aspects of the environment are presented first, just as the success of an attack in a chess game may depend upon the temporal order in which the pieces are deployed.

Our general conclusion, then, concerning the criticisms of the evidence for original nature is that not enough is known about the functional value of the environment of the child to warrant the ascription of its traits to heredity. In other words, those who argue most vehemently in favor of original nature are put in the position of saying that the native traits of a child are its first observable traits, or, they are put in the position of saying that the native traits of a child are all of those traits which have not been directly trained in the schoolroom or intentionally given to it by teachers and parents. The most general conclusion to be drawn from this section might run, perhaps, as follows, viz., the problems of the relation between original nature and training are just in the process of being stated clearly rather than in the concluding stages of research.

This conclusion makes it plainer than ever that the student of applied psychology must go more deeply into this problem. The criminal lawyer, the physician, the salesman, the teacher, the advertiser, the employer, the buyer, and all other persons have to do with human traits, some of which may be modified, on the one hand, or used as they are, on the other. Success in using them depends, in part, at least, upon further knowledge about their origin and history.

4. *Heredity and Environment.*—The next step in our study of original nature will take us to the words "heredity" and "environment." How may we think of these words? What do they say about the problems of this chapter?

It is easy to state one thing which they do not say. Neither of these terms can now be used as though they named forces or agents which are fused together in the creation of a new individual. The reader will easily grant that this may be the case with environment; but after having heard such phrases as "blood will tell," "a chip off the old block," and the like, he will still insist upon the forces of heredity.[15]

Some light can be thrown upon this situation if we use a very homely illustration. Let us suppose that we have engaged a friend in a game of chess The pieces are laid out on the board ready for play and white makes the first move. After each player has opened up his pieces, the game settles down to complex patterns of attack and defense.

[15] Cf Jennings, H S, *op cit*, *passim* Morgan, T H, *op cit*, *passim.*

Let us now ask certain questions about the position of the men on the board and about the strategic value of their positions. For example, we may ask why it is that a certain white pawn, advanced far into enemy territory, should have tremendous strategic value. The answer seems clear. This piece gets its strategic value by virtue of the positions of the other white pieces and by virtue of the positions occupied by black. If we may say it in that way, white enjoys its strength by permission of black. Were black in any other position, the variety of strategic moves which white could make would be changed The same facts hold true of white. Black is, so to speak, in trouble through the permission of white. Were white's men deployed in some other pattern, black would not be in trouble. Likewise, if black's men were deployed in some other pattern, he might not be in trouble.

We may think, now, of a chess game continuing on through a period of time, any moment of which will reveal a new pattern of situations, where each situation is a product, in part, of previous situations and, in part, of the pattern of position presented by the other side. In short, the whole game has a sort of dynamic character within which a tremendous variety of situations may develop. It is characteristic of each of these situations, however, that they are what they are partly because of the positions occupied by the other side. In other words, each side acts as a kind of buffer to the other side in the sense that white determines what black can do and black sets the limits upon what white can do. Since, however, white always has the first move, it is fairer to say that the time-wise pattern of black's attack and defense is intimately related to the time-wise permission for movement offered by white.

We may now apply this illustration to the problems raised by the words heredity and environment. In the time-wise pattern of organic play which we call the growth of the child, heredity has its pieces which it is prepared to open up whenever the environment offers the opportunity. In the human species, the pieces to be put into play by heredity consist, from one point of view, of 48 (or 49) substances called chromosomes. These chromosomes, in turn, consist of immense numbers of smaller substances (either single molecules of the protein type or small collections of such molecules) called genes The genes are physico-chemical systems of living material, and they appear to be so organized that different kinds of functions may be expected of them, either singly or in groups. That is, in terms of the analogy used above,

some of them may move in one way on the chess board of life while some must move in another way

The pieces first to be put in play by environment are also physico-chemical substances (molecules and groups of molecules), substances which, in general, make up the body of the mother and which, in particular, make up the structures which immediately surround the pieces used by heredity. Later on, as we have seen above, the pieces to be used by environment will consist of learning situations, both of the formal and of the informal or casual type, and of social factors.

The board, then, is set both by heredity and by environment for the game which we call growth, maturation, or development Now there are several ways in which we may look at this game We may say, for example, that heredity is the master player and that his pieces will be moved according to his own plans no matter what attack environment may make This view would accord with a very extreme position in biology to the effect that all human traits, both physiological and psychological, have their essential form determined by the hereditary constitution of the individual. There are, perhaps, no persons who would now take this extreme view, although there are a great many persons who interpret various psychological facts as though the view were correct

In the second place, we may suppose that environment is the master player and that he will move his pieces according to his own plans without regard to heredity This view is held, in particular, by certain behaviorists and it is not wholly uncommon among the sociologists. Watson, for example, has said that, given any child whatsoever, and given the knowledge and the technique which would enable him to control the environment, he could make a rich man or a poor man, a beggar man or a thief out of his subject.

It seems clear, from the illustration upon which we have based our study of heredity and environment, that neither of these positions is defensible. On the contrary, the game of which we speak, viz., the growth of an individual, is a dynamic pattern of events between two sets of pieces which may occupy all sorts of strategic positions with respect to one another. In other words, the attack and the defense of heredity depends upon the attack and the defense of environment. Likewise, the attack and defense of environment depends upon the attack and defense of heredity. Neither heredity nor environment are to be thought of as forces but as a type of organic play where the strategy of each is buffered by the other. The pattern of heredity's

play will become what environment's play will allow it to become, whereas the pattern of environment's play will become what the pattern of heredity's play will allow it to become.

It is almost inevitable, of course, that the various sciences should have a desire to look in on this all-important game. They not only desire to look in but they desire also to try their own hand here and there, as well Instead of allowing heredity and environment to play their own game unmolested, human beings stand around like "kibitzers," offering suggestions to both players at various stages in the game This is natural, perhaps, since it is one of the functions of science to effect greater control over all of the objects and events which have to do with human welfare.

It turns out, however, that not all men of science either can or have the desire to crowd into a single observation point. On the contrary, some of them try to see the game at its very beginning, whereas others come in at various intervals while the game is in progress. Those who have an interest in the beginnings of the game are the geneticists By special training and by disposition they are inclined to find out what they can about the initial positions occupied by heredity. Their data, therefore, are made up of observations on the behavior of the genes and the chromosomes.

Fortunately for the science of genetics, there are two circumstances which make observation at this level both possible and fruitful. In the first place, there is a short time during the game of growth when heredity's pieces can be observed. That is, there are chromosomes whose behavior can be observed. It is known, for example, that heredity discards some of his pieces at one stage of development and accepts in their places a variety of pieces which come from the male. Thus the pieces with which heredity works represent in part the mother and in part the father In the second place, it is a fortunate fact for the science of genetics that certain correlations can be worked out between the presence and absence of certain genes or chromosomes, on the one hand, and the presence or absence of certain traits in the adult, on the other. This fact is taken to mean that some of the pieces with which heredity begins the game of growth are, in some sense or other, the same pieces when growth has brought maturity. Obviously, a gene is not quickness of reaction; but the functional play of a certain gene may lead to quickness of reaction.

The student of genetics, then, can find out a great deal about the growth-game by taking his particular point of observation. It is nat-

ural, perhaps, that, in view of the observations he makes, he should lean toward the argument that heredity is a better player than environment. In any case, the biologist is much more apt to emphasize the functions of heredity in the creation of human nature than is the psychologist or the sociologist.

This fact leads us to ask what stage of the game is preferred by the psychologist. In more general terms, what stage of the game is most accessible to the environmentalist? One thing is clear, viz., that when the individual is still an ovum or a spermatozoon (a female germ cell or a male germ cell), the pieces which environment is going to use are not identifiable as is the case with heredity's pieces. They are not identifiable because experimental methods have not reached the events that take place in a living cell. This means, of course, that the "kibitzers" on environment's side of the table see nothing. Seeing nothing, they can make no pertinent suggestions.

We must, however, hasten to modify this statement a little. It still remains true that nothing is seen, but a few things may be guessed. The most important guess is that environment must be playing the game, even though the nature of the moves cannot be discerned. The environmentalist may, then, broadcast a few general suggestions to his player. He does this in making what may be called a "mass attack" upon the environment of the germ cell. He may, for example, change the temperature around the cell. When he does this, he notes that heredity may markedly change his use of his pieces Such changes are called mutations. It is now known that certain kinds of mutations are dependent upon changes in the temperature surrounding the eggs of certain animals. He may, also, seek to get inside of heredity's play by irradiating him with X-rays. Here, too, mutations appear. His last resource at this level is made up by the science of dietetics; but this science will have to travel a long way as yet before it can make any significant suggestions to environment.

This same situation prevails throughout the period of time during which the growing individual is enclosed within the body of the mother. In the case of some of the lower animals the situation is wholly different for the entire process from initial cell division to maturity can be observed; but in human growth, no man of science can become a direct observer of the growth game until the infant is born. At this time and, indeed, long before, the student of genetics has lost much of his interest in the proceedings. He is ready to say that the outcome of the game is already determined. The psychologist and the sociolo-

gist, however, are just ready to begin their observations. The dietitian, also, stands near at hand. The point is that many of environment's pieces are now open to inspection. The order in which they are moved and the general pattern of movement not only can be seen but many of them can be controlled. It is natural, then, that the psychologist and the sociologist should deny the geneticist when he says that the critical point in the game is already passed. If it is passed, they say, then education and training can be of no particular avail. They are minded to conclude, therefore, that the King, in the form of traits and dispositions, has not been mated by heredity. They proceed, therefore, to make all kinds of suggestions about the environment and to use it in the hope of changing or modifying the whole trend of the growth pattern. As we have said, however, this task is just getting under way. The assumption made by the student of genetics that the task is already done has been one of the main reasons for supposing that heredity must be a better master in the growth game than environment.

We may now ask who is right. The answer seems simple. The geneticist is certainly right when he says that he can see the growth game at a very important stage in its development. He is also right, perhaps, in saying that the King (the various traits and dispositions of the individual) has been mated early in the game. He is not right, however, in his conclusion that heredity is the more masterful player of the two. He can be right only because the advisors to environment cannot give advice until long after such advice is fruitless. That is, the play of environment during the first nine months of the development of a human being is wholly obscured from view. There are no scientific methods which will enable an experimenter to alter the position of any one of environment's men. The best he can do is to make a mass attack on the whole situation much as a hunter with "buck fever" makes a mass attack on the air in the hope that he may bring down a single bird. He may change the temperature or make rough experiments on diet or irradiate heredity's men with X-rays, but this is not sufficient.

The environmentalist, then, is right in the same places in which the geneticist is right. Heredity is playing a game against environment but environment cannot be advised properly until after the human child is born. With respect to certain traits or dispositions,—that is, with respect to certain positions which heredity has occupied,—it may be too late. With respect to a great many other positions, how-

ever, that is,—with respect to a great many traits and dispositions,—environment may still exercise good strategy. He may at least succeed in getting a draw at one place on the board of play rather than upon another place [16]

5. *The Original Nature of Man.*—These conclusions lead naturally to the next step in our study of heredity. Which of the positions occupied by heredity are actually unassailable? That is, which of the traits of human beings are innate or original? Likewise, which of the positions occupied by heredity can be successfully attacked? That is, how far may environment go in displacing heredity's pieces and otherwise causing them to retreat? And, to depart a little from our analogy, how far may the environment go in bringing heredity's pieces to better expression? For there are some native traits of men that should be promoted rather than hindered

In the first place, it is clearly one of the properties of muscle tissue to contract under appropriate stimulation. No child has to learn, therefore, how to make its muscles perform their native function In the same way, it is one of the native properties of nerve tissue to conduct impulses from a receptor to a muscle. It looks as though conduction of this type must always take a certain amount of time, for it depends upon physico-chemical events of the metabolic sort. It is this fact which accounts, in part, for that property of action known as the personal equation or reaction time Moreover, nerve tissue is essentially integrative in its functions. It is at this point that differences between heredity and environment begin to appear. There are some who would say that the nervous system is already organized long before birth,—and certainly in advance of any action by the environment,—in such a way that specific types of movements will be made to equally specific types of stimulus-situations. The fact that most of the movements of the unborn child,—and of the new-born child as well,—are mass movements out of which more specific movements may be individuated seems to suggest that the amount of native or hereditary organization in the nervous system is much smaller than is commonly believed

[16] Jones, D C, and Carr-Saunders, A M, "The relation between intelligence and social status among orphan children," *Brit J Psychol* 1927, 17, 343-364 Freeman, F N, *et al*, "The influence of environment on the intelligence, school achievement and conduct of foster children," *27th Yearbook Nat Soc for the Study of Educ*, Bloomington, Ill, 1928, Part I, pp 312–318 Burks, B S, "Relative influence of nature and nurture upon mental development, a comparative study of foster children—foster child resemblance and true parent true child resemblance," *27th Yearbook Nat Soc for the Study of Educ*, Bloomington, Ill, Part I, pp 219-316

There is, however, another aspect of this question. The nervous system is not an inert system. On the contrary, it is growing rapidly during the years of childhood and other events of a dynamic character are going on within it. One may wonder, then, how much of the alleged prenatal organization of the nervous system may be a simple expression of necessary types of dynamic balance or of organic equilibrium and which represent, therefore, properties of the total brain field in the same sense that conduction is one of the properties of nerve trunks. It will take further research to answer questions of this sort In the meantime, it seems fairly clear that, given muscles, receptors, and a plastic nervous system, the way is richly prepared for the promoting and guiding influence of learning situations

In the second place, no child has to learn to acquire sense organs. Neither does it have to teach these sense organs how to become functionally active in the reception of certain kinds of stimuli The organic and functional basis for all of the perceptual functions, then, is a matter of heredity. From this point on, it seems that the total range of the effective environment of an individual and the fineness of the discriminations that may be made within any specific sector of the environment must depend upon learning This is certainly true of the total range of stimulus patterns. Experiments that have been made upon the development of discrimination seem to suggest that it must be true here also. The first advance that takes place in the perceptual functions renders the child able to distinguish distances, sizes and shapes, and rates of movement. The only native part of these perceptions is the fact of seeing itself. Skill in spatial perception is certainly a product of training.

In the third place, no child has to learn how to learn. As we have seen in the last chapter, and as we shall see in much more detail in the next, learning means that living systems have a unique power of conserving their own history. The child does not discover this through his environment. It is his to begin with. There is some reason to believe that the extent to which previous history may be conserved and the quickness with which it may operate in new situations depend, in part, upon the chemical composition of nerve tissue. Fast and slow learners, therefore, may owe their differences to heredity, but this is only the beginning of the matter. The significant thing about learning as a psychological function is the way in which it may be used Such principles as were described in Chapter Six suggest that the native part of learning is mightily subject to training.

In the fourth place, it is one of the native properties of nerve tissue to enter into the sort of functional relation described by the words inhibition and facilitation. These words simply say that it is not possible for a wave to be at its height and in a trough at the same moment. That is, when some brain fields are in operation, others are out of operation. As we have seen, the processes of facilitation and of inhibition underlie, in part, the phenomena of attention and interest. They represent, therefore, the native element in these functions, but it is one thing to say this and quite another to say that human beings are born with a native interest for certain types of subject matter and with a native distate for other types. There are, to be sure, glandular and bodily states which may affect the relations between facilitation and inhibition, in which case, attention and interest could be natively, that is glandularly, directed toward some objects rather than others. But when we say this we leap, in part, from the problems of attention to the problems of motivation. When a child is hungry, it will be tuned in such a way as to be more interested in food than it is in its playthings. Since it does not have to learn how to be hungry, one might say that a prepotency for food stimuli is native. This may be granted; but it is still a far cry from native mechanisms of this sort to those elaborate phenomena of attention, interest, and motivation which are common to adults. If there is so great a difference as we seem to imply, a large part of the difference must be due to the effects of training.

In the fifth place, all children possess, through the operation of heredity, a normal complement of glands of internal secretion. Moreover, all children are alive. This is to say that the psychological operations of which we are speaking are set down in a living system. Any path of conduction, for example, must use nerve tracts that are in some state of dynamic equilibrium. There is, so to speak, more life in them at one time than there may be at another. So there may be more and less life throughout the whole living organism from moment to moment. The child does not have to acquire all of this through its contacts with the environment, although its chemical contacts with its environment may stand in an intimate relation to it. The point is that the general level of life in the body and the activities of certain glands which may quickly change a level of life form the native part of that whole series of functions described by the words mood and emotion. As in the case of attention and motivation, however, this is only the beginning of the matter. Learning situations make it possible for these vital and glandular conditions to become

associated with an immense variety of objects and events Since there are glands, there will be typical forms of emotional action which are dependent upon their functions and we may speak, therefore, of a hereditary disposition toward emotional expression; but studies on the development of children's emotions certainly show that it is no longer possible to speak of native emotions, as though there were types of hereditary emotional actions that could be identified at birth or at any time thereafter.

In the sixth place, no child is dependent upon the environment for the first appearance of that mode of short-circuiting among brain fields which makes possible the appearance of new configurations, that is, the appearance of problem-solving. If we accept short-circuiting as one of the properties of such a total system of dynamic events as is to be found in the nervous system, we may say that children are born to be problem-solvers. But this is one thing and it is quite another to say that they are born to solve certain kinds of problems or that some of them are born with problems that have already been solved (e g , the native ideas). Short-circuiting, like reaction time, may be dependent for its speed and, perhaps, for some of its other properties, on the chemical nature of the nervous system. By heredity, then, there might be slow problem-solvers and fast problem-solvers, but even this cannot be said until more is known about these functions.

Finally, no nervous system is a totally chaotic series of events. The growth processes must be orderly. They must be just as orderly in the nervous system as they are in the body. Furthermore, the context of a growing individual is not chaotic. Events follow one another with considerable regularity. In the very nature of things, then, the way is prepared for a continuation of organization and patterning in development This much of self or of personality may be attributed to heredity. Furthermore, whatever preferences for action as are created by the glands of internal secretion would make certain dispositions take on the character of native traits. Aside from these dispositions, however, it seems fairly clear that the materials that will be woven into the full-blown personality of the adult will be such materials as are deposited in the individual through the promoting and guiding influence of learning situations.

We should, perhaps, conclude this discussion of the native traits of human beings with a more general statement. One of the great issues between the points of view of heredity and of training lies in

the question as to how much the paths of conduction between stimulus and response are organized in advance of training. Since the nervous system is, in the final analysis, made up of the same kind of stuff of which other physical systems are made, and since this stuff must have certain properties which are unique to each of the total systems into which it may enter, it might follow that brains should have total properties which are just as native to brains as conductivity is to a copper wire If certain types of organization fall among these native properties, this fact must be discovered whenever genetic psychology has pushed its studies further along the line now being followed For the time being it seems fair to say that no trait can be called native until it has been definitely shown that training of some sort is not responsible for it. The significance of this conclusion will appear when we remember that psychologists have usually been wont to say that no trait may be called acquired until it has been shown that heredity is not responsible for it In short, the attitude of psychologists towards the problems of original nature is now distinctly experimental in character. Heretofore, it has been largely anecdotal.

6 *The Science of Eugenics.*—It would not be appropriate to conclude a study of original nature without making some reference to the science of eugenics, that is, the science which argues that improvement in the quality of the human species can be gained through more intelligent mating As thus defined, eugenics stands naturally in contrast with the so-called science of euthenics, that is, the science of creating and maintaining an environment which will bring out the best features of human nature

We cannot enter into a lengthy discourse about either one of these topics, but there are at least two things that ought to be said about the alleged science of eugenics. In the first place, the science assumes that there is some way of judging differences in the quality of persons. To be sure, there are tests of intelligence, of character, and of bodily strength, but eugenics cannot be satisfied with these tests, for they say nothing at all about the values that may be served by any one of the measurable aspects of human nature. We might loosely suppose that selection for intelligence would be a desirable thing to do but it is not at all certain that society is most in need of more intelligence. A fairly good argument could be made out for the proposition that more honesty and more friendliness might have a greater value than more cleverness. There is more to be said, perhaps, in favor of selection for physical strength and stamina than for intelligence.

Even were we to take it for granted that someone could name the traits that ought to be preserved in the members of society, it would still be impossible to use such measures as are now available for selecting these traits. As a rule, measurement is more successful where simple aspects of human nature are concerned than it is with complex functions. Moreover, the position which an individual occupies in society is not often dependent upon the sheer amount of any of his traits. On the contrary, it is dependent upon his wisdom or general good sense in using whatever equipment he may happen to possess. This means that, in the last analysis, intelligent mating would depend upon the good judgment of a few individuals. It is a notorious fact, however, that human beings are not very objective in their judgments about their fellows Even in the world of science where there is a question of electing men to honorable positions because of their attainments, prejudice and selfishness are displayed just as frequently as good sense [17]

Another difficult aspect of the program of eugenics is revealed in the fact that so many rather undesirable traits are recessive rather than dominant. This means that they may be covered over, so to speak, through several generations only to make their appearance again when they are least expected It is commonly believed, for example, that feeblemindedness, in so far as it depends upon hereditary mechanisms, is a recessive trait. There is no evidence to show that one of the greatest eugenic experiments that has ever been performed actually brought about any purification of the race. It is now commonly believed that witchcraft was a phenomenon created in part by feeblemindedness and in part by a fairly large variety of psychopathic disorders. Estimates as to the number of witches who were burned at the stake vary enormously; but even the lowest estimates suggest that a major experiment in eugenics was performed by the use of a stake and a pile of wood. There is no evidence at all to suggest that this experiment had any beneficial effect upon western Europe.

We mean to draw the conclusion, then, that the best hopes of society for the improvement of the individual lie in the use of training or of education. Certain persons will shy at this conclusion, for it seems to place too little emphasis upon original nature It will be argued that the refusal to recognize native traits is one of the surest ways to increase maladjustment. If it could be shown that educa-

[17] Weinstein, A., "Palamedes," *The Amer Nat*, 1933, *67*, 1–32 The reader will find that this article makes a very pungent appraisal of the eugenics program See also Holmes, S J, *The Eugenic Predicament*, N Y, Harcourt Brace, 1933.

tional processes are working in direct contradiction to original nature, nothing but confusion could be the result. Of this fact we may be sure It is one thing, however, to recognize the importance of training and quite another to assume that this recognition is equivalent to a finished applied psychology or to a completed program of educational psychology.

To say the same thing in another way, it is one thing to know that many of the fundamental dispositions of a child are established at a very early age and quite another to let one's philosophy of education be determined by an outmoded way of describing the relation between original nature and training The chances are that, so long as men remain in ignorance of some of the factors which make up an effective learning situation, they will have to proceed as though original nature were a stable element in human nature. The reader will recall that we have tried to show how learning situations may vary not only in their functional value from time to time, but how this value may depend, in an intimate way, upon the order in which learning situations are presented Since practically nothing is known about this phase of education, children do acquire a certain fixity in their nature. It is just as easy to suppose that this nature is the result of certain stabilities in the environment as it is to suppose that it is a reflection of their innate character. A choice between the two should be determined, in part, by their generosity in inviting research. As matters now stand, studies of the environment and of those organizations of the environment which we call learning situations offer more hope to the experimenter than does further appeal to heredity.

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CHAPTER THIRTY-EIGHT

THE NATURE OF LEARNING

1. *Introduction.*—If a kettle of pure water is left over a flame, all of the water will soon be converted into steam. While this is happening, let us suppose that we are able to collect all of the steam and cool it again into water. If our methods are fine enough we will be able to gain as much water from the steam as there was in the kettle to begin with. Now let us suppose that we heat the same water again until, once more, it has been converted into steam. We may assume that we have measured the exact amount of water in the kettle and that we can find out also just how much heat was expended in converting the water into steam. So far as we know at the present time, there would be just as much heat required on the second occasion as was used on the first. Moreover, we should find, no doubt, that this same amount of heat would have to be applied for the same length of time on the second occasion as on the first. In other words, the water would not have "learned" anything by the first conversion into steam. The experiment might be continued for an indefinite number of times but, so far as is now known, the time and the amount of heat necessary to convert a given amount of water into steam would remain constant.

Let us now compare this series of physical events with the behavior of a piece of soft iron while it is being surrounded time after time with a magnetic field. As every schoolboy knows, the piece of iron will acquire magnetic properties when it is treated in this way. If we measure the changing amounts of this magnetic property as the strength of the surrounding magnetic field is increased, we shall find that it changes somewhat slowly at first, then more rapidly and finally, more slowly. In other words, a definite curve can be drawn which will show the relation between the intensity of the surrounding field, on the one hand, and the strength of the induced magnetism, on the other.

When this phase of our experiment is finished, let us reduce the intensity of the surrounding field. Upon doing so, we might suppose that the iron would lose its magnetic properties at the same rate that it acquired them. It turns out, however, that this is not the case. On the

contrary, the bar loses its magnetism (or its flux density) much more slowly than it was gained. In order to reduce the magnetic properties of the iron to zero, it is necessary to reverse the direction of the magnetizing force We may suppose that we have done this and that we are ready to try the experiment over again. In view of our experiment with the water, we might easily imagine that the iron would behave in the same way, but we shall quickly discover that the situation is quite different The iron may now be magnetized much more rapidly than was the case on the first trial. In other words, the iron seems to have "profited by its past experience" Its behavior on a second occasion is different because of the fact that it has already behaved in a certain way on a first occasion.

We may now generalize these two illustrations in the following manner. Let us suppose that X stands for the water which is to be boiled. Likewise, we may let Y stand for the heat which is to be applied to the water. From the first illustration cited above we may say that the behavior of X is always an immediate and direct function of Y In the second illustration, however, the situation is different. We may again use the letters X and Y, where the former shall stand for the flux density which is induced in the magnet and the latter shall stand for the inducing current. If soft iron were to behave in the same way that water does, we ought to be able to say again that X is an immediate and direct function of Y; but it turns out that another factor must be included. We shall call this other factor H, and let it stand for the previous history of X. We may now conclude that the behavior of X is a function of Y and of H In other words, the behavior of a piece of soft iron is conditioned, partly, by the events which immediately surround the iron and, partly, by the previous history of the iron itself

This phenomenon in physics is known as hysteresis, but the reader will see at once that it is just the sort of thing that stands out most prominently in the behavior of all living creatures. If an amoeba is placed in a specific stimulus-situation, it will react in an equally definite way. One might, for example, gradually increase the intensity of a light stimulus and plot against these values the speed with which the amoeba reacts to them. We would soon discover, however, that the behavior of the amoeba is not a simple product of the changing stimulus-situations taken by themselves. On the contrary, it is a product, in part, of these situations and, in part, of the previous reactions that have been made to them and to other situations. In short, the amoeba

can learn. Its behavior is sometimes a function of the existing situation and of its own previous history.[1]

The fact of learning, then, is one of the most important facts that has been discovered about living creatures. Evidence for this proposition has been found on almost every page of the preceding chapters. At the very beginning of the book, for example, an examination was made of the conditions under which the student could make his own study hours more effective. That is, we made an examination of the factors that will allow the past history of any student to become increasingly effective on some future occasion. If the materials in this book are studied as of now, the student does so, first, that he may pass a test at some future time, second, that he may use his information in the better conduct of his own life, and, third, that he may satisfy his curiosity regarding human beings and their ways of behaving. To say the same thing in another way, we study and devote ourselves to practice periods in order that we may move forward from the condition in which we may happen to rest at the moment to a condition which we are willing to call an "improvement." Were an infant unable to learn, it could move toward competence only so far as the growth processes which are inherent within it would allow. As we have just seen, however, it is very doubtful whether these inherent growth processes could ever bring a person to that kind of competence which is the pride of a well-educated and mature man. Learning, then, means that it is possible for a human being to react to a present stimulus-situation not only in terms of the properties of that system alone but in terms of his own previous history. Obviously, any survey of applied psychology must devote more attention to the intrinsic nature of these facts than has been possible in the preceding pages.

2 *Types of Learning.*—As the several topics of this chapter are laid out for inspection, the reader must keep the idea always in view that we are talking about the various ways in which the reactions of any living creature may be considered as a product, in part, of the actual stimulus-situation before him and, in part, of his own previous history. For this aspect of human nature a great many different terms have been invented In addition to the word "learning," there are such expressions as "habit" and "skill," "memory" and "memorizing," "profiting from past experience," "rote learning," "trial and error

[1] The phenomena of learning are known to have a good many parallels in organic and even inorganic substances See, for example, Rashevsky, N, 'Learning as a property of physical systems,' *J Gen Psychol*, 1951, 5, 207 229

learning," "learning by conditioning," "learning by insight," "motor learning," "perceptual learning," "rational learning," "recollection," "recognition," "recall," "memory images," "imagination," and so on The reader will see at once that some of these words describe the products of learning, some describe structures or functions where the learning process may actually become effective, and the rest seem to say that there may be several fundamentally different ways of securing profit from past experience. It is clear that we cannot get at the fundamental facts about learning and neither shall we see all of our previous references to learning in their proper light unless we actually decide what the products of learning are, where learning may become effective, and how many varieties of learning there are.[2]

The first step in this direction is simple enough. The words "habit," "skill," "knowledge," "information," and "memory" certainly describe the products of a learning process As learning gets under way, we all know that the process will end in a given degree of skill or in a given supply of information. This end will be determined by our intentions. If the reader says to himself that he wants to learn how to shoot par golf, then whatever skill it takes to achieve this degree of excellence will be called the end-product of a learning process. It is often more convenient to speak of the end-product as a habit, for habits may be distinguished from skills in the following manner. Habit means, apparently, that some performance has simply been automatized in the sense that one no longer thinks about it A skill, however, is a habit which has been increased in speed, in grace, or in form so as to make it particularly useful in meeting some particular situation.[3]

The terms "motor learning," "perceptual learning," and "rational learning," are often used as though they described different types of learning, but it seems to be fairly clear that they name instead some of the places where, or some of the kinds of psychological operation in which, learning quickly manifests itself.[4] Perceptual learning, for example, means that a child may learn how to increase his skill in the

[2] Lashley, K S, "Nervous mechanisms of learning," in *Foundations of Experimental Psychology* (ed C Murchison), Worcester, Mass, Clark Univ Press, 1929, p 502

[3] Cf Pear T H, "The nature of skill," *Rep Brit Assoc Adv of Sci*, 1928, 168–184. Bruce, W F, "Shall 'habits' be discarded in educational psychology?" *J Educ Psychol*, 1930, *21*, 479–488

[4] Judd, C H, "Practice and its effects on the perception of illusions," *Psychol Rev*, 1902, *9*, 27–50 Tolman, E C, "Habit formation and higher mental processes in animals," *Psychol Bull*, 1927, *24*, 135, 1928, *25*, 24–53 Freeman, F N, *How Children Learn*, Boston, Houghton Mifflin, 1917, pp 128 ff

use of his eyes, his ears, or any of his other sense organs. Let us say that the reader wishes to increase his rate of reading. As we have seen, rate of reading depends, in part, upon the way in which the eyeballs are moved during the act. If he wishes to see more quickly he must give his eyes that sort of training which will make eye movements more useful in reading printed material. The phrase "perceptual learning" is also applied to that type of change in such a function as vision as will make a person more observant of the events going on around him. He may observe not only more events but more details in these events. Motor learning is a term which is frequently used to describe increases in manual skills. Learning to typewrite, to drive a golf ball, to pole-vault, or to operate a telegraph key are examples of what would commonly pass as motor learning.[5] It is a little more difficult to describe rational learning, but this phrase is frequently used to name the progressive change which may take place during thinking. A small infant can solve only the very simplest of problems and it differs, therefore, from its parents who may solve not only more problems but more difficult problems. The difference between the child and its parents, then, is sometimes described by the fact that rational learning has taken place.[6]

It is clear that the terms just used do not really name different types of learning. On the contrary, they simply say that the process of learning may become effective either in the use of the sensory apparatus, in the use of the muscles of the body, or in the use of the higher associative functions of the brain. We have left over from the list mentioned above such terms as "trial and error learning," "rote learning," "learning by conditioning," and "learning by insight." These terms seem to name different kinds of learning. What are the facts?

It will be helpful, first, to say something about a distinction which runs through all of the words we have used up to this point. This distinction can be seen in two words, viz., "learning" and "remembering." We say, for example, that we learn how to drive a golf ball but that we remember the time when a friend of ours drove a ball much better than we have ever done. We do not, for a moment, con-

[5] A summary of the experimental literature has been made by McGeoch, J. A., "The acquisition of skill," *Psychol. Bull.*, 1931, *28*, 413–466.

[6] Dashiell, J. F., "A physiological-behavioristic description of thinking," *Psychol. Rev.*, 1925, *32*, 54–73. Hull, C. L., "Quantitative aspects of the evolution of concepts," *Psychol. Monog.*, 1920, No. 28. Pratt, C. C., "Experimental studies of thought and reasoning," *Psychol. Bull.*, 1928, *25*, 550–561.

fuse our own driving skill with our memory of someone else's skill or of the circumstances under which it was displayed. On other occasions, however, we will report that we have memorized an oration. When we say this, we mean that we have practiced our vocal apparatus so that we can deliver the oration in the same unthinking way that we might drive a car. In other words, the term memorizing, too, is sometimes used as though it led to the development of a skill rather than to a supply of memories. Even in this case, however, we do not confuse our skill in delivering the oration with our understanding of what the oration means. Are we to conclude, then, that learning describes one genus of learning process and that memorizing describes quite another, or do these words name different aspects of a single process?[7]

At the present time, two different answers are given to this question. On the one hand, it is argued that learning refers to that type of profit from past experience which is gained slowly and which has intimate kinship with organic growth. This means, apparently, that gradual changes must be brought about in the nervous system by the repeated exercise of a function. A memory, on the other hand, is said to be something mental rather than nervous in character and to come as the result of a single experience rather than of a long-continued practice period. In short, one might say that the mind remembers whereas the body learns. Obviously, behaviorists would prefer the term learning while mentalists would prefer the term memorizing.

Before we can throw much light upon this divergence of opinion, we must examine in more detail some of the other types of learning. First, we may say that learning an oration or learning a poem is an example of rote learning. If rote learning were instantaneous, one ought to be able to read the poem through and then repeat it just as it was read. We know, however, that it must be read through a great many times before it has been fixed in our memories. In reading the material, however, we do not have to learn how to pronounce each word as we come to it. Neither do we have to learn how to pronounce words in succession. The phrase rote learning, then, seems to describe the fact that a series of "little skills" which have already been acquired may be fused together into a single coherent pattern through sheer repetition. Clearly, we cannot be very much interested in this type of learning, for we want to know how any skill whatsoever may be

[7] Cf. McDougall, W., *Body and Mind*, N. Y., Appleton, 1920, Chap. XXIV. Also Bentley, M., *The Field of Psychology*, N. Y., Appleton, 1924, pp. 251 ff.

acquired. The secret of learning and of remembering is not to be found in the way in which skills that have already been acquired can be fused with one another in a new pattern but in the very origin and development of these skills to start with.[8]

"Trial and error learning" is one of the phrases which is used to describe the way in which learning is begun and is brought to fruition. If a person has not as yet faced a given stimulus-situation, his first response to this situation will take the form known as an over-response. That is, he will make more varieties of movement than are actually necessary to handle the situation effectively. Not only will there be more responses than are necessary but even those that are made will be made slowly and somewhat awkwardly. After the situation is repeated a sufficient number of times, the number of excess movements grows smaller and the so-called right movements become better coordinated and much faster in their action. If the learning situation is of such a nature that some movements will be wrong whereas other movements will be right, that is, if the learning situation offers a number of choices and if the choices become more frequently right than wrong, the whole process can readily be described as a trial and error process Even from the first, the learner tries to meet the situation effectively, but he will make a good many errors before he will have become satisfied with his performance.[9]

Trial and error learning, then, does say something about the way in which a skill may begin. It also says something about the process through which a person must go in order that some measure of perfection may be achieved. There is, however, another type of learning which looks in the same direction. Let us say that two stimulus-situations have been presented to a person at one and the same time. Under certain conditions, it may happen that these two stimulus-situations will be fused with each other in such a way that the one of them which heretofore could not call out the response usually associated with the other will henceforth come to do so. As we have seen in an earlier chapter, a child may be confronted simultaneously with a loud noise and with a furry object. It can be shown that, prior to this experience, the child will not display an emotional reaction to the furry object but that, after the experience, the furry object will

[8] Consult James' famous chapter on habit James, W, *Principles of Psychology*, N Y, Henry Holt, 1890, Vol I, Chap IV

[9] Hull, C L, "Simple trial and error learning a study in psychological theory," *Psychol. Rev*, 1930, *37*, 241–256 Kuo, Z Y, "The nature of unsuccessful acts and their order of elimination in animal learning," *J. Comp. Psychol*, 1922, *2*, 127.

excite much the same sort of response as was previously associated with the loud noise This kind of learning is known as conditioning. If the reader will run back over the chapter on the relation between psychology and athletics and over some of the various aspects of psychology and medicine, he will see that there are a great many illustrations in everyday life of this type of learning.[10]

Learning by conditioning differs from learning by trial and error, partly because the former usually takes place rather quickly. In some instances, a single presentation of two stimuli is enough to condition the one to the other There is, however, another type of quick learning, viz., learning by insight. This form of learning has already been outlined in Chapter Sixteen where we spoke of the way in which a detective may solve a crime. It has long been known, of course, that some types of learning may take place very quickly, as when a man of science has a sudden insight into the significance of some hitherto unrelated facts. This type of learning came into the experimental laboratory by way of studies on animal behavior. Let us say that a chimpanzee is shut away from its food by the bars of the cage. The food is placed at such a distance that the chimpanzee cannot reach it with its arms. There is in the cage, however, a stick which is long enough to reach the food. An untrained chimpanzee is often perplexed by this situation but after a certain amount of more or less irrelevant behavior which some psychologists would call a trial and error solution of the problem the chimpanzee appears suddenly to see the relation between the stick and the getting of food. In any case, the stick is promptly grasped and used as a tool for drawing the food within reach.[11]

We have, then, some basis for supposing that there are four different types of learning. The first type simply describes a way of merging previously acquired skills into a single more complex skill. The other three seem to describe the very origins of some skills, together with the ways in which they may be brought to perfection. We are still not clear, however, as to which of these types of profit from past

[10] Pavlov, I P, *Conditioned Reflexes*, London, Oxford Univ Press, 1927 (trans by G V. Anrep) Watson, J B, "The place of the conditioned reflex in psychology," *Psychol Rev*, 1916, *23*, 89–117 Guthrie, E R, "Conditioning as a principle of learning," *Psychol Rev*, 1930, *37*, 412–428 Humphrey, G, "The conditioned reflex and the laws of learning," *J Educ Psychol*, 1928, *10*, 424–430

[11] Bingham, H C, "Selective transportation by chimpanzees," *Comp Psychol Monog*, 1929, No 5 Kohler, W, *The Mentality of Apes*, N Y, Harcourt Brace, 1925 McDougall, K D, and McDougall, W, "Insight and foresight in various animals monkey, raccoon, rat, and wasp," *J Comp Psychol*, 1931, *11*, 237–273.

experience may be called true learning and which may be of the memory type. That is, we do not know which are to be explained in terms of the body and which are to be explained in terms of the mind The next step in this direction will require that we pass from a mere description of different types of learning to a critical study of them

3 *The Laws of Learning* —It will be easy to get at the critical study of the nature of learning if we begin with what are sometimes called the laws of learning. The reader must distinguish, first, between the laws of learning and those general principles which make the study hour more effective. That is, he must distinguish between laws of learning and most of the principles that were described in Chapter Six. Fortunately, it is not necessary to know the exact nature of any series of events before such events can be used in fairly effective ways.

The first law of learning is often called the law of exercise.[12] This law assumes that between a sense organ and any given set of muscles there are pathways of conduction, the exercise of which will lead to an increase in the strength of the connection or to an increase in readiness for conduction. It is assumed, of course, that the connections between sense organ and muscle are modifiable connections so that, other things being equal, the more frequently they are exercised, the stronger they will become As a corollary of this law of exercise there is the law of recency which says that the more recently a connection has been exercised the stronger will be the connection. Likewise, one may say that the disuse of any series of connections will result in the weakening of that series. In short, the law of disuse describes the forgetting phase of learning, whereas the law of exercise describes the acquiring phase.[13]

The law of exercise reflects, of course, the very common belief that the only way to acquire a skill is to practice it until it becomes automatic. We have, then, in the language of common sense, such phrases as "practice makes perfect." It is clear, however, that a great many types of learning do not require this sort of exercise. As we have already seen, memorizing may be distinguished from learning in the sense that the use of a set of connections only once may be sufficient to establish a memory. At first sight, then, it looks as though the law

[12] Thorndike, E L, *Educational Psychology*, N Y, Columbia Univ Press, 1913, Vol I, *passim*, Symonds, P M, "Laws of learning," *J Educ Psychol*, 1927, *18*, 405–413 Gates, A I, *Psychology for Students of Education*, N Y, Macmillan, 1930, *passim*

[13] Other supplementary laws are the laws of primacy, recency, frequency, and vividness. See Jersild, A, "Primacy, recency, frequency, and vividness," *J Exper Psychol*, 1929, *12*, 58–70

of exercise could apply only to motor learning. A great many of the other psychological functions, however, do not involve repetition. Moreover, it is fairly clear that repetition is most effective when motor skills are very complex in nature. Even among the animals and certainly in human learning, simple motor skills may be acquired almost instantly.[14]

This last fact becomes of more or less importance in any theory of learning when we place it in relation with what has been said on page 98 about the nature of forgetting. The words "retroactive inhibition" and "mutual inhibition" seem to say that forgetting is an event that takes place only because of the continued pressure of learning. It goes almost without saying that any normal person could learn with a single reading two nonsense syllables. When, however, he is asked to learn twenty or thirty, the learning of the first two raises a barrier against the learning of the next two and likewise the learning of the second two would bring about a certain amount of forgetting for the two that have already been learned. The law of exercise seems to say that repetition is necessary in order to increase the strength of connections. The facts just cited seem to suggest, on the contrary, that, as a matter of fact, connections may acquire maximal strength after a single repetition and that improvement in a complex skill is brought about by the quick establishment of new connections rather than through an improvement of older connections. As we have said before, if a learner could make a desired set of connections and then cease living, the last connections made should continue as a permanent acquisition. Living must, however, go on. Consequently any learning process which takes time means that learning has to struggle against the inevitable forces of forgetting.[15]

For certain practical purposes it makes no difference whether we think of learning as the quick establishment of connections between stimulus and response or whether we think of the gradual improvement in the strength of these connections. But for theoretical purposes the difference is quite fundamental. We shall see this to better advantage if we consider a further fact about repetition. In the case of some skills it is known that repetition hinders rather than favors an increase in skill.[16] In order to correct the mistake of writing "hte" on a type-

[14] Cf. Wheeler, R. H., and Perkins, F. T., *Principles of Mental Development*, N. Y., Crowell, 1932, *passim*.

[15] Cf. Lashley, K. S., *op. cit.*, *passim*.

[16] Dunlap, K., "Revision of the fundamental law of habit formation," *Science*, 1928, *67*, 360–362.

writer in the place of "the," Dunlap practiced the former rather than the latter. Constant repetition of the wrong thing thoroughly wiped it out. This same sort of event takes place in learning by conditioning. It has been shown, for example, that if a conditioned reflex is used over and over again without reinforcement from the original stimulus, it will become progressively weaker and finally disappear altogether.[17] Still another type of illustration may be given. If a tuning fork is held near a spider web the spider will run out in search of its prey. When, however, this situation is repeated over and over again, the spider fails to come out of its nest. The law of exercise would make it appear that the repetition of the act ought to strengthen the act rather than weaken it, but as a matter of fact, the behavior of the spider is radically altered rather than simply strengthened.

The reader can now easily see that something must be wrong with the law of exercise.[18] This means that some of the methods of teaching and all of the various types of training in preparation for specific industrial skills may likewise be in error. It happens, however, that both the student in the schoolroom and the worker in the factory do learn. This must mean either that they learn in spite of the law of exercise or that the law of exercise works in some other way than has actually been described up to this point. It will be helpful to look at both of these possibilities and of the two, we shall consider first the various ways in which the law of exercise may be supplemented by other laws.[19]

4. *The Law of Effect.*—Let us suppose that an animal has been placed in a very simple maze situation where the taking of one pathway leads to success and the taking of another leads to failure. It can be shown in any experiment of this type that the subject may select the wrong turning many more times than it takes the right turning Obviously, if it goes into the correct pathway at once the trial will be finished, whereas if it goes into the wrong pathway it may enter this pathway two or three times before achieving success in the other. In spite of the greater amount of exercise with respect to the wrong pathway, however, the right one is finally chosen. We are led to ask, then, how the law of exercise can be modified in a case of this sort.

[17] Pavlov, I P, *op cit*, Chap II and *passim*

[18] Cason, H, "Criticisms of the laws of exercise and effect," *Psychol Rev*, 1924, 31, 397–417

[19] The student must realize that discussions of the *nature* of learning are much less certain than discussions of the facts Cf Dunlap, K, *Habits, Their Making and Unmaking* N Y, Liveright, 1932 This is, perhaps, the best survey now extant of the field of learning

In order to meet this situation the law of exercise has been supplemented by what has sometimes been called the law of effect This law states that, other things being equal, any connection will be strengthened which leads to or is accompanied by a feeling of satisfaction, whereas any connection will be weakened which leads to or is accompanied by a state of annoyance.[20] At first sight, this law clears up the difficulties created when the law of exercise is used alone. In the case of the spider, for example, annoyance has attended the fruitless journeys in search of prey, and consequently that series of connections is weakened Clearly, however, if these connections remain in a weakened condition, the spider will die of starvation. So, too, entering the wrong pathway does not lead immediately to a state of satisfaction even though such a pathway may be exercised more often than some other pathway. Since the right pathway leads immediately to the getting of food, it is the pathway whose strength is increased in spite of insufficient exercise as compared with the wrong pathway

If we were to apply this law of effect to our daily experience, it ought to follow that we remember pleasant experiences more easily and more frequently than we do unpleasant experiences In other words, if feelings of unpleasantness or of annoyance have been continually associated with certain types of action or information, it ought to follow that the connections responsible for these events should grow continually weaker so that, in the long run, we would have no unpleasant memories at all. The experiments that have been made upon the presentation of pleasant and unpleasant memories do not bear out this inference [21] As a matter of fact, there are certain types of unpleasant memories which are even more persistent in memory than pleasant memories are.[22] Then, too, it has been shown that, under experimental conditions, acts which lead directly to an unfavorable outcome may sometimes be learned more rapidly than those which lead to a satisfactory state of affairs. As an example, we may take the following experiment. A group of subjects were trained to punch either one of two holes arranged in an irregular manner on a punchboard maze. There were thirty pairs of these holes. One group of

[20] Thorndike, E L, *op cit*, *passim*, "The law of effect," *Amer J Psychol*, 1927, *39*, 212–222

[21] Cf Koch, H L, "The influence of some affective factors upon recall," *J Gen Psychol*, 1930, *4*, 171–190

[22] The student will recall that this is a supposition which lies behind much of the Freudian psychology

subjects was instructed to avoid those holes which caused a buzzer to sound when the stylus was punched into them. The second group was instructed to punch those holes which would cause the buzzer to sound. Still another group learned the maze when the wiring was so reversed that the buzzers sounded on the opposite hole of each pair from what it did with the other groups. The fourth group worked under the same conditions as did the first group save that, instead of the buzzer, an electric shock was administered through the stylus. A fifth group was given the same instructions as was group two save that it likewise suffered from electric shock. The performances of the several groups varied in such a way as to make clear that the law of effect did not hold true in the experiment. The best performance, for example, was turned in by the fifth group and this is a result which could not have been predicted from the law of effect.[23]

The negative results which have come out of the experimental examination of the laws of exercise and of effect have served two purposes. On the one hand, they have shown that neither of these laws may be particularly pertinent to the way in which learning goes forward.[24] In the second place, a good many of the experiments have suggested other characteristics of the learning process which may play a significant rôle in the maturation of behavior. In the experiment just cited, for example, it was shown that the amount of learning might depend upon the way in which one of the holes was emphasized with respect to the other. That is, if the buzzer or the punishment came in conjunction with the correct response, it was easier to learn the whole series of correct responses than it would have been otherwise. If the electric shock or the buzzer appeared after the wrong response, it was apt to cause a distraction and the result was a slower rate of learning.[25] In still other types of experimentation, it has been shown that learning proceeds most rapidly when the items to be learned have a property which has been described by the word "belongingness" It has long been known, for example, that the learning of nonsense syllables takes place much slower than the learning of meaningful material. The very fact that the word "meaning" can be used with respect to some types of material suggests that the separate parts of this material belong

[23] Trowbridge, M H, and Cason, H, "An experimental study of Thorndike's theory of learning," *J Gen Psychol*, 1932, *7*, 245–258

[24] Cf Tolman, E C, *op cit*, *passim*

[25] Cf Tolman, E C, Hall, C S, and Bretnall, E P, "A disproof of the law of effect and a substitution of the laws of emphasis, motivation, and disruption," *J. Exper. Psychol.*, 1932, *15*, 601–614.

together in a way which is not possible for meaningless material.[26] Obviously, we must look into this situation a little more closely.

5 *Learning by Insight.*—The net result of our discussion up to this point can be formulated as follows. Processes of learning appear to fall into at least two groups, the one group standing at the opposite extreme from the other. That is, there is only one kind of learning, but this one kind may take two extreme forms because of the general character of the learning situation. At the one extreme there are those forms of learning which may be called rote learning or trial and error learning. This form of learning is characterized by much practice. As we have suggested, however, practice is necessary not because pathways of conduction have to be improved by constant use but because most learning situations are so complex that there is a constant process of forgetting throughout the learning period. The acquisition of any single part of the total complex acts not only as a hindrance to other parts of the complex but suffers from the learning of later parts, as well. Trial and error learning, then, is a curious mixture of learning and forgetting, and the curves of skill which commonly come out of experiments in this field can be nothing more nor less than a statistical average struck across this double process. As we have seen, the overlearning of some parts of the material may increase the resistance of that material against the acquisition of other material. One might learn twenty nonsense syllables, then, by overlearning the first two, in which case the other eighteen would still be unlearned. Later on, a second pair might be overlearned leaving only sixteen. Gradually the entire set would be learned, in which case, the learning curve would take the form so commonly described in experiments of this type. The same effect would appear if the entire set were practiced as a unit save that under these circumstances the recall of any single pair would be inhibited by other pairs.

At the other extreme of learning processes, there stands a form of learning which may be described as quick or sudden learning. There are a great many different ways in which this form of learning may be studied. There is, for example, learning by conditioning. As we have seen, the simultaneous presentation of two stimuli, each leading to its own response, will frequently make possible a sort of fusion between the two patterns so that the stimulus which formerly called out only its own response will now be able to call forth the response ordinarily connected with the other stimulus. On a great many occasions, this

[26] Thorndike, E. L., *Human Learning*, N. Y., Century, 1932, Chaps. I and II.

type of learning takes place quickly. There are times, however, when the two stimulus-response patterns have to be presented over and over again before effective short-circuiting between them will take place. There is some evidence to show that such short-circuiting cannot take place until the two initial items have entered into that sort of relation to one another which is expressed by the word "belongingness." If, for example, an attempt is made to condition a dog to a given stimulus and if the experimental situation includes a great many other sources of excitement, the response of the subject will be more nearly a hysterical than a learned response. The subject acts as though it did not know what the experimenter wanted. If, however, the conditions of experiment are so closely controlled that the two stimuli are actually dominant in the whole situation, conditioning may take place very rapidly [27]

Another way of looking at quick learning is furnished by the so-called laws of association. It used to be thought that those objects which appeared together in time or in place or which resembled one another or which contrasted with one another would quickly come to be associated together [28] Let us take a typical case. We will say that a teacher has just written four words upon the blackboard. Since these four words have been associated in time and in place, any one of them ought to recall the others. As a matter of fact, however, they have also stood in association with the piece of chalk and it ought to follow, according to the laws of association, that the presentation of a piece of chalk on some favorable occasion would lead to the recall of the four words. Likewise, the blackboard has stood in a close spatial and temporal relation to the four words. It, too, then on some future occasion, should promptly lead to recall of the words. Associations of this type, however, are not the ones usually established. On the contrary, the four words are more directly related to one another than they are with any other feature of the whole situation They seem to belong to one another more closely than they belong to anything else.[29] Under certain conditions, however, associations in other directions may be established If there is any unusual degree of emphasis placed upon the blackboard, upon the teacher, upon the piece of chalk, or upon any other object in the total situation, quick and immediate

[27] The literature on the various phenomena of conditioning is enormous. See McGeoch, J A, "The psychology of human learning a bibliography," *Psychol Bull*, 1933, 30, 1–62.

[28] Cf Warren, H C, *A History of the Association Psychology*, N Y, Scribner's, 1921, *passim* Robinson, E S, *Association Theory Today*, N Y, Century, 1931, *passim*

[29] Cf Kohler, W, *Gestalt Psychology*, N. Y, Liveright, 1929, Chap II and *passim*.

associations may be established between these emphasized objects and the written words. Contiguity in space and time, therefore, seem to furnish only one of the conditions under which learning by association may take place. The essential condition is furnished by that whole complex of circumstances which makes it possible for hitherto unrelated items to fall into single meaningful pattern or configuration.[30]

This phase of learning has been much studied recently both at the animal level and at the human level. As a typical illustration we may take a chimpanzee which is asked to get a bit of food placed beyond its reach. Its previous training would probably lead to such an act as reaching Somewhere in the perceptual field, however, the experimenter may have placed the branch of a tree. Any previous training would ordinarily locate such objects as a branch in the context furnished by the ground upon which the branch lies or by the wall against which it leans. The solution of the problem requires that the chimpanzee shall discover that the branch of a tree and a piece of food beyond arm's reach may have some significant relation to one another. The problem is solved whenever the chimpanzee sees the branch as an object from which a tool (a stick) can be obtained for the purpose of getting at the food. In other words, two objects which hitherto have remained in their own contexts are now taken, as it were, out of their natural contexts and put into a new relation with one another. Whereas they did not formerly belong to one another, now they do belong.[31]

It is clear, of course, that a great many learning situations are presented in such a way that the nature of the belongingness is suggested by the very organization of the situation. If the words "lernen" and "learn" are presented side by side on a printed page it is obvious that they are to be associated with one another rather than with the temperature of the room, the nature of the type used, or the size of the book. To present a single pair of such words means that they will forthwith belong to one another. As we have said above, if living could stop at this point they would always belong together for this particular person. It happens, however, that living and learning cannot cease. This means that both the word "lernen" and "learn" may enter a great many other configurations besides the one created when they were initially paired together. Moreover, if the subject were asked to learn twenty such pairs in a short period of time instead of

[30] We begin here to touch upon that form of psychology known as configurationism See the references under General Readings at the end of Chapter Thirty-Six

[31] Cf Kohler, W , *The Mentality of Apes*, N. Y., Harcourt Brace, 1925, *passim.*

one, the laws of inhibition, both retroactive and mutual, would create in him the interferences which lead to forgetting.[32]

6. *Learning as Growth.*—It is not possible, of course, to name the point when learning begins. That is, it is not possible to pick up a growing person at a point when there is no previous history to be considered. Even the development of the first nerve cells in the embryo implies that these cells have, as a part of their environment, other cells. The rest of the environment is made up of the chemical agents around the embryo itself. As we have seen in the last chapter, some of these agents cannot be changed by experimental means, but they are not on that account any the less effective in the general growth pattern. Sooner or later in the history of the individual, however, specified changes can be made in the pattern of the stimulus agents surrounding him. These changes imply, of course, a change in the patterning or organization of the individual himself and, in particular, of his nerve tissue It is possible to argue, then, that learning describes one phase of the whole growth process.

Let us say that the reader has just gone out to make his first drive at a golf ball. This first effort will be awkward, uncoordinated, ill-timed, and poorly adapted to the task set. The theory of trial and error learning would say that the individual is making more movements than are actually necessary. It will say also that, during this process of varied attack, success, together with feelings of pleasure, will accompany right actions whereas annoyance will accompany wrong actions The right actions, therefore, will be selected out of the whole complex, whereas the wrong actions will disappear. At length the learner will have gained considerable skill in driving a golf ball.

There is, however, another way to describe these events. The first movements which a person makes in hitting a golf ball may be called a composite of right and wrong movements only because someone else has set a standard of what shall be right. If we attempt to describe the behavior of the learner independently of such a standard of correct performance, we may say that the first movements of the golfer are immature movements rather than wrong movements. If the subject had to learn how to make any single movement in the whole pattern he would probably do so with a single trial. There are, however, hundreds of postures and movements in a complete golf stroke. The learning situation, therefore, is very complex. There is too much

[32] See Hunter's discussion of learning by insight in Murchison, C (ed) *Foundations of Experimental Psychology*, Worcester, Mass, Clark Univ. Press, 1929, pp 575–581.

to be learned at once. The making of the right movement in one place will be interfered with by other parts of the total pattern. Gradually, however, this immature level will be replaced by a more mature or seasoned performance. The fact that the processes must be gradual can be explained as a series of statistical averages which cut across both learning and forgetting, that is, learning and interference. To be sure, no person could learn to drive a golf ball if he did not have, as a part of his native equipment, muscles which could contract, eyes which could be set into function by light waves, nerves which could conduct, and other relevant pieces of apparatus The particular way in which all of these events will happen, however, will be a feature of the growth pattern which develops under the guiding and promoting influence of learning situations.

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CHAPTER THIRTY-NINE

METHODS OF PSYCHOLOGICAL EXPERIMENTATION

1. *Introduction.*—More than one person has observed that human beings display an almost unlimited capacity, both of the active and of the passive sort, to resist the application of scientific facts and methods to the understanding and control of their own conduct and experience. The history of science shows this to be true, for the physical sciences have always taken the lead over the social sciences in laying the foundations for the arts of practical control. To be sure, men have excused themselves for this resistance because they have always held that biological and psychological facts are so much more complex and so much more difficult to handle than are physical facts that no practical use can be made of them. But the essences, both of science and of sound practice, are to be found not so much in the number of facts that can be gained as in the attitude which is taken by men trained in scientific methods.

With respect to these considerations, our study of the field of psychology should have served two purposes. On the one hand, it should have told us what psychology means when it is used in a great variety of practical situations. On the other hand, it should have given us a clear picture of the scientific point of view. In every one of the chapters up to this point, the reader has had the opportunity to compare the methods, the modes of approach to problems, the caution with which conclusions are drawn, and other aspects of the scientific frame of mind with the attitudes that are commonly known as the common sense or the intimately personal attitudes.

It is not necessary, perhaps, to say again what has already been said about the general frame of mind behind the experimental method. This disposition may be variously characterized by the words "objective," "disinterested," "impersonal," and "impartial." First of all, then, experimentation implies a distinctive way of looking at and of thinking about nature. In the second place, it means a method. It is a method whereby the various events and objects in nature can be made to happen over and over again under conditions that are always under control. One of the events which happens most frequently in

nature is motion. The motions that take place around us concern bodies of various sizes and of various masses at all levels of speed. Some motions are straight, some are curved, and others are highly irregular. Since the movements of so many different objects have to be controlled or brought into practical use, the physicist finds it worth while to cause nature to echo itself in a laboratory where the various conditions which prescribe the nature of a given movement can be varied one at a time. At the end of a long series of experiments, the exact relation between rate of movement, on the one hand, and all of the factors which bear upon velocity, on the other, can be stated with sufficient accuracy to admit of prediction where a new motion is about to occur. The same considerations hold true of all natural events.[1]

The development of an experimental psychology means the use of a laboratory for the study of human nature. First of all, there is required of the psychologist an attitude which is very much like the attitude of the physicist, the chemist, and of the biologist. He must be impersonal or objective. There is required of him, in the second place, a way of causing human behavior to repeat itself over and over again under conditions where as many relevant factors as possible can be controlled or even measured.[2] The success which the psychologist has achieved in making experimental studies of his particular subject matter makes possible the writing of books of this kind. The first experimental laboratory for the study of human nature under controlled conditions is not much more than fifty years old. To be sure, there were men before 1877 who had watched human beings as closely as one can without the aid of apparatus and without the aid of other types of laboratory equipment. Then, too, there were men who had used statistics in the study of human nature Rigid experimental methods, however, began within the memory of some of the psychologists who are still actively at work. Now there are hundreds of laboratories and multiplied hundreds of research men devoting just as much energy and care to the study of human nature as is used by those who study other segments of the natural order of things.[3]

There are two features of the use of experimental methods in psychology which seem, at first sight, to make a great difference between psychology, on the one hand, and the physical or biological sciences, on the other. In the first place, the past history of a great many events

[1] Weld, H P, *Psychology of Science*, N. Y, Henry Holt, 1928, *passim*

[2] Rosenzweig, S, "The experimental situation as a psychological problem," *Psychol. Rev*, 1933, *40*, 337–354

[3] Boring, E G, *A History of Experimental Psychology*, N. Y, Century, 1930, *passim*.

in the physical sciences is not particularly relevant to any particular experiment. If the physicist had begun his work when the universe was still passing through that rapid process of change described by the words "genesis" and "evolution" he would face the same sort of situation which the psychologist,—and sometimes, even the biologist,—has to face now. In other words, the physicist could not work, as he does now, with a world that is essentially finished or at least highly stabilized. The water which is analyzed today is the same kind of water that might have been analyzed yesterday. The human being, however, who is studied today is not the same kind of a person he was yesterday. The changes that have gone on in him are not cyclical changes but truly genetic changes. In short, experimental psychology has to deal, from first to last, with events whose history has an important influence upon the way in which they will appear at any given moment.[4]

In the second place, psychology is sometimes said to differ from the other sciences because the objects and events which it describes are so different from physical objects and events. Very few people have ever thought that a mind or a mental process had the same sort of objective reality which a salt, an acid, or a cell are supposed to have. When a question is put to a cell or to some inorganic compound, the answer comes by way of pointer readings in the apparatus that is being used. The same observation holds true, of course, of a human being, but when a human being answers a question his answer is said to be a description of a set of unique and otherwise unobservable (i e, publicly unobserved) events that are going on inside of him. In physics the experimenter is the observer and the object being experimented upon is the subject. In psychology, however, it has been argued that the subject is not only the object being experimented upon but an observer who stands between the experimenter and the facts being studied.[5]

Since we have already examined this situation in Chapter Thirty-Six, we shall say no more about it at the moment. On the contrary, we shall pass on to a study of psychological methods of experimentation and of collecting information, for these methods will, in and of themselves, suggest some of the answers that may be given to the situation just described.

[4] Baldwin, J M, *Mental Development*, N Y, Macmillan, 1906, *passim*

[5] Washburn, M F, "Introspection as an objective method," *Psychol Rev*, 1922, *29*, 89–112 Titchener, E B, "Prolegomena to a study of introspection," *Amer J Psychol*, 1912, *23*, 427–448, "The schema of introspection," *Amer J Psychol*, 1912, *23*, 485–508

2. *The Nature of an Experiment.*—Let us say that we wish to know how fast a human being can react to a given stimulus In order to answer this question it is necessary that some stimulus, say a flash of light, be provided. The psychologist goes to the physicist for pieces of apparatus which will give a light of constant intensity and of constant duration. This source of light is placed before the subject at a given distance. The subject is prepared for the experiment by a series of instructions which have told him that, at a certain interval after the "ready" signal, a light will be flashed before him. He is told, also, that he must press a telegraph key just as quickly as he can upon seeing the flash of light. This telegraph key is connected to an elaborate instrument which will measure, with a very small margin of error, time intervals as short as a thousandth of a second The apparatus is so arranged that the timing device will start when the light is flashed and stop when the key is pressed. Let us say that the total interval between these two events is 180 thousandths of a second Up to this point the psychologist has proceeded as any other experimenter would proceed. The apparatus which he uses is physical apparatus and his subject has made a response to some stimulus in exactly the same way that any other object would respond [6]

At this point, however, it looks as though the psychologist changes his tactics. After having measured the time that it took the subject to respond to the stimulus, he makes a further change in the total experimental situation by saying to the subject, "Now tell me what mental processes appeared in your mind during this period?" In rough terms, the experimenter wishes to know what the subject "thought about" as he saw and reacted to the light. The fact that we can say of the subject that he "saw" and "reacted to" the light already implies something about a human subject which is not implied in the behavior of other kinds of objects

The subject answers this change in the experimental situation by describing what he calls his mental processes. Since, however, even the short interval of 180 thousandths of a second is asserted to contain more mental processes than can be inspected at one and the same moment, the subject is asked to fractionate the whole experience in order to describe those mental processes which run their several courses during the fore-period, the mid-period, and the after-period. As we have already remarked, it is at this point that the subject becomes an

[6] Valentine, W L, *Readings in Experimental Psychology*, N Y, Appleton, 1932, *passim.* Garrett, H E, *Great Experiments in Psychology*, N Y, Century, 1930, *passim*

observer second in importance only to the experimenter himself, for the verbal responses made by him are said to describe his private view of himself. In physics, the subject (or the object) upon which an experiment is made never becomes the observer. In psychology, however, when the subject begins his report of his own mental processes, the experimenter assumes that he himself is viewing these same mental processes. The reader will see easily enough that this is not the case. The data which the experimenter gains come from the experimental situation which is made up of a bright light, the preliminary instructions to the subject, the actual warning signal, and the general context within which the whole experiment is placed. The data also include different kinds of reactions. The primary reaction, of course, is the finger movement which stops the timing device The difference in time between the presentation of the stimulus and the arrival of the response marks the personal equation of the subject. In addition to this information, the experimenter has a series of verbal comments from his subject concerning the mental processes which the subject himself "saw." Obviously, however, the words which the experimenter hears and copies down in his notebook are not the mental processes of his subject, although the experimenter frequently says that they constitute a direct description of mental processes.[1]

There are three aspects of this situation which deserve special attention In the first place, it must be clear that no experimenter in psychology ever places the mental processes of another person under direct inspection His experimental situation is arranged much as a physicist might arrange a parallel situation and the data which he gets are made up of the responses of the subject to these situations. These responses may be either verbal or manual, either localized in some special muscle or generalized in a total posture or attitude The experimenter secures an answer to the questions he asks of his subject because he is able to work out certain relationships between the varieties of stimulus-situations presented and the types of actions or postures which are, so to speak, a consummation of the stimulus-situation. It is for this reason that we have taken most of the facts of psychology listed in the foregoing chapters from what is commonly called the behavioristic point of view. As a plain matter of fact, every psychologist, no matter how he describes the problems of psychology,

[1] Cf Rosenzweig, S., *op cit* Also Boring, E G., "Psychology for eclectics," in *Psychologies of 1930* (ed. C Murchison), Worcester, Mass., Clark Univ. Press, 1930, Chap. VI.

is limited to the experimental situation just described and to the "objective" data which issue from it.

In the second place, it is clear that if one man finds out anything about the mental processes of another man, he does so not after a direct inspection of these processes but through inferences and deductions drawn from his data on behavior.[8] These data, as we have seen, may be either of the verbal or of the manual sort, but in either case, they are about behavior and not about mind. Inferences or deductions about the mind of another person are made possible, first of all, because every experimenter holds that he has what he calls his own private view of himself Moreover, he is inclined to believe that his private view of himself (i.e., his own mental life) sustains direct and very intimate relations with certain kinds of objects and with certain kinds of performances He believes, too, that his body, including sense organs, nerve tracts, muscles, and glands is very much like the body of his subject. Where there is similarity in structure, there must be a reasonable degree of similarity in function or performance If the experimenter, in his private view of his mental life, finds that certain kinds of conscious events are associated with certain kinds of objects or actions, he may infer that, whenever he finds other persons using familiar types of action in the presence of familiar objects, these other persons must have experienced a similar pattern of mental events which constitute their private view of themselves.

This sort of an inference or analogy works very well when both the experimenter and his subject are adults who have been well trained in the introspective method. As we have seen, however, the facts which psychology tries to describe are essentially genetic facts. No person is ever a completed person When, therefore, the experimenter tries to use the principle of inference or analogy (or the method of extrapolation) in approaching the mental life of small children, newborn infants, chimpanzees, white rats, earthworms, or amoebae, the value of his inferences decrease in direct proportion as he moves away from subjects of his own kind. Since the information which is used in the various branches of applied psychology is always information about behavior, the use of inferences or analogies becomes more or less an exercise of the imagination rather than a method of controlling action. In education, for example, one might take the point of view of a novelist who would write out an imaginative account of the mind of a small child; but it has proved much more helpful to leave romance

[8] Washburn, M. F., *Animal Psychology*, N. Y., Macmillan, 1925, *passim*.

and literary creation out of the educative process. This is done simply by finding out how the actions of small children are related to various stimulus-situations. The educator tries to control the environments of small children so that desired results in their actions will become more and more frequent.[9]

In the third place, it is clear that the language responses of a human subject differ in some respects from other types of response. Since we have already had something to say about the origin and development of language and about the way in which verbal responses may become substitutes for other types of action, we need only to refer the reader again to the material in Chapter Twenty-Five. Our human type of life would not be possible if words could not be used as substitutes for objects and events. Moreover, our kind of action would not be possible if the making of one movement could not become an adequate stimulus for the making of another. Verbal action is the one type of action in which substitutional behavior has reached a very high stage of development. In the face of a given situation a human being may delay the consummatory response over a period of time which is filled with tentative verbal and postural responses. These, in turn, give rise to other responses such as have been made possible by the previous training of the subject. It is clear that an experimenter, using the principles of inference or analogy may suppose that the intervals between stimulus and response are filled with what he calls thinking or reasoning. It does not look, however, as though thinking or reasoning could take place independently of action,—at least of verbal action.

3. *The Nature of Explanation*.—Some light will be thrown on all of these matters if we consider for a moment the nature of explanation in psychology. Let us take again the experiment described above which includes the experimenter, a subject who has been prepared to act in a certain way, and a stimulus-situation under absolute control. The observed facts are as follows. There is, first, a stimulus-pattern which can be described. The stimulus-situation includes a light and the sounds which have been made by the experimenter during the course of his instructions to his subjects. Both of these specific stimulus factors must, of necessity, take their place in a general pattern of events called the laboratory situation. As we have seen, the responses of the subject will be of two types. On the one hand, there will be a specific movement of the finger within a background created by his general

[9] Consult the references at the end of Chapter Twenty-Three.

bodily set or attitude. On the other hand, he will make a series of sounds which will be received by the experimenter as a description of mental processes. Now it may be said that all of the events thus described, that is, the effectiveness of the stimulus pattern in exciting the subject to action, and the precise character of the action itself, could not take place without the presence of mental processes. With respect to these mental processes, we may take either of two points of view. On the one hand, we may say that they are natural events which take their proper place among the other events which make up the total experimental situation On the other hand, we may say that they are unpredictable and undetermined events which have a special causal relation to the perception and to the reaction. In this second instance, the possibility of reducing the phenomena of reaction time to a scientific basis would not be possible. No science has ever been able to take account of events that are so variable in their appearance as to fall outside of the general principle of determinism. We are led, therefore, to accept the first interpretation. This choice is supported by the actual result of several thousand measures of reaction time, for it will appear that the more closely the conditions of measurement are defined the more stable the measures. It may be then that such simple events as quickness of reaction at one extreme and complex events like problem-solving at the other are accompanied by or even made possible by the existence of mental processes. Since, however, both reaction time and problem-solving can be controlled—that is, predicted—whenever the stimulus-situation is properly defined and whenever the previous history of the subject has been wholly uncovered, we may say that an appeal to mental processes adds nothing to actual control over human behavior.

To be sure, there are plenty of people who will argue that it is meaningless to try to describe psychological facts without saying something about minds, mental processes, or consciousness. Conjectures about the presence or absence of these events are not necessary, however, in the explanation of behavior if it can be shown that a reaction in all of its parts and in all of its properties is wholly accounted for by a description of the stimulus-situation and of the previous history of the reacting person. Experimental psychologists are now of the opinion that the best results can be gained when this point of view is adopted, that is, they are of the opinion that behavior is explained whenever all of the conditions are named under which a given behavior pattern will appear. If it were not possible to discover a one-to-one relation be-

tween stimulus patterns and behavior patterns,—that is, if it must be assumed that mental processes bring about unpredictability or failures in correlation,—then there can be no hope of a practical science of psychology. As we have said before, the appeal to mental processes, consciousness, or minds may be necessary if one wishes to explain the ultimate nature of the universe or to find support for theological dogmas. In all practical matters, however, the procedures which have been outlined above seem to satisfy the requirements of an applied psychology.

4 *Tests of Performance.*—The continuous use of learning situations is, as we have seen, a way of helping a person to grow older We may desire that he shall grow older in some particular skill or in his acquaintance with a series of facts or in his general attitudes and dispositions or in a more general and diversified use of his different psychological functions As a rule, the main impetus towards maturity in these several respects is furnished by formal learning situations of the schoolroom and playground type Many of them are dependent upon the presence in the learning situation of a teacher or of a director of special activities A fairly large part of maturity, however, is acquired by quite informal means in the sense that, outside of the schoolroom, every child is reacting to that variety of situations which make up his total context One of the preceding chapters has shown us that the processes of informal education work more directly on the development of emotional and personality traits than they do on other phases of human nature In any case, we may say of a person that, at some particular age level, he will have acquired an ability to act more or less skillfully or more or less maturely in a great variety of ways For certain purposes, it may be helpful to know just how mature a person has become It is this fact which gives rise to tests of performance.

As a typical example of such tests we may take measures of skill in athletics Skill in such games as football, baseball, tennis, or golf depends upon a proper use of certain groups of muscles in certain specified ways We may think, for example, of running, twisting, turning, throwing, bending, or holding. Let us say that we wish to measure the maturity of an athlete in the art of throwing a ball. For this purpose, we may set up a target and ask a group of subjects to throw a dart or a ball at the target. After a sufficient number of trials, an experimenter will be able to state in terms of averages or in terms of serial order the amount of difference between each of the subjects in this performance. Almost all tests of performance are of this same

type This means that they differ from the skills which are actually used on the playground or in the factory solely because they are sufficiently simplified to make accurate measurement possible. It must always be shown, of course, that the laboratory form of a performance test is significantly correlated with the levels of performance which actually appear in practical work. This provision becomes still more significant when laboratory studies depart still further from actual field studies. An experimenter may wish to know, for example, how men differ from one another in traits that are common to a great many different performances. Reaction time and coordination are cases in point, for in the laboratory, we study reaction time simply by asking the subjects to press a key in response to a light. A performance of this type differs greatly, of course, from the quickness with which a man may apply the brakes or dodge a tackler. At the present time, experimenters are strenuously at work trying to find a short but representative list of tests which will indicate degree of maturity in the more complex skills that are actually used on the playground and in the factory

It is sometimes asserted that performance tests differ from tests of intelligence. There is no reason to suppose, however, that tests of intelligence are fundamentally different from performance tests. If test samples are chosen which represent the more common elements in the training of all persons of a given socio-economic level and if these test samples relate to range of information, ability to see relationships, name opposites, and follow directions, then the psychologist has devised what is called an intelligence test.[10] In other words, the intelligence test is based upon the assumption that the opportunities for growing or learning are more or less the same for all children. Since, however, some children will make more use of these opportunities than others, they will be able at any given age to turn in a better performance than their fellows. Having made the assumption that the opportunities for growth or for learning are about the same for all persons of a given social group, one may attribute differences in performance to some innate or hereditary factor and it is for this reason that the intelligence test is said more nearly to measure the native ability of a child than the performance test does.

There are times when the psychologist may be interested not so much in typical achievements as he is in a particular achievement.

[10] Consult the books having to do with general statistical method listed under General Readings at the end of this chapter.

Let us say, for example, that a child has been presented with a large number of stimulus-situations having to do with arithmetical processes. The effect which these learning situations have upon him will depend, so it is said, in part, upon the effectiveness of the teacher and, in part, upon the native ability of the learner. In either case, a large number of questions about the facts and processes of arithmetic may be asked of the members of an arithmetic class in order to see who will get the higher scores and who will get the lower scores. Such a test is called an achievement test.[11] There are, of course, a great many varieties of achievement tests; but they resemble, in all fundamental respects, both the performance test and the intelligence test.

One of the most common forms of the achievement test is known as the examination. In any given course, for example, a large number of facts in the form of learning situations may be presented to the members of the class. The learning situations continue for some such period as a semester and at the end of the period a teacher may wish to know how mature, so far as these facts are concerned, his students have become. He cannot ask questions which will cover every one of the learning situations that have been presented to the students. He must, therefore, ask what he calls a sample set of questions. The older or essay form of examination was framed in such a way as to give the student an opportunity to write out a great many facts in response to a question stated in fairly general terms The newer type of examination asks the student merely to indicate by a check mark which of several propositions is correct. This type of examination is said to have the advantage of including a larger number of samples than can be included in the essay form. The former type has the advantage of inviting the student to make judgments, draw comparisons, reorganize his facts, and otherwise comprehend the meaning of the facts he has learned. The latter type, however, is said to recognize only the rote memory achievements of the student.[12]

There are, of course, a great many other types of achievement test in common use in the various branches of applied psychology. Typical samples have been suggested in some of the earlier chapters. In connection with industry, for example, one of the first problems of an employer is to find out just how competent the applicants for a given position are before they are actually tried out in the factory. The employer assumes that every worker has already had some sort of an

[11] Viteles, M S., *Industrial Psychology*, N Y., Norton, 1932, Sect 2
[12] Consult the references on examinations at the end of Chapter Six.

educational history, that is, he assumes that each prospective employee has grown more or less mature with respect to the various traits that he may be called upon to use in any given type of industrial situation. The achievement test which, after all, is a kind of examination, serves this purpose [13]

5. *Attitude Tests.*—It is not possible to describe all of the differences between a mature and an immature person in terms of special skills or in terms of familiarity with special sets of fact. In addition to skills and information, every person is a sum of a great many opinions, judgments, preferences, and attitudes. These elements have come to him in part through informal education, in part through formal education, and in part as a kind of unearned increment on special types of training Among the more common attitudes we may name such items as loyalty, devotion, honesty, selfishness, egotism, introversion, and extroversion. Let us take, for example, the difference between the introvert and the extrovert The former is said to find himself more or less ill at ease in social groups and to be more or less interested in his own private view of himself, while the latter is frequently said to have more initiative, to be interested in external objects and events, and to meet people easily.[14]

In addition to these attitudes, there are such matters as general judgments and opinions. What, for example, is the opinion of any group of people on a candidate for the presidency, on a matter of prohibition, or on a matter of marriage? Moreover, how many opinions of this type change under the influence of "propaganda"? Finally, there are wide differences among individuals in what we may call their dispositions. People may be distinguished from one another in temperaments such as are named by the words lethargy, melancholy, happiness, and eagerness. These dispositions, like attitudes and opinions, are just as much a matter of training as are special skills.

Tests of attitude, opinion, and disposition may be made in the same way as tests of special achievement are. It is only necessary that the experimenter phrase a large number of questions, the answers to which will throw some light upon the relative maturity of his subjects. It must be assumed in asking these questions that they are a real sample of all of the questions that might be asked and that they have been so stated that the subjects will answer them in a reliable way.

[13] Viteles, M S, *op cit*, *passim* See also Monroe, W S, *et al*, *Educational Psychology*, N Y, Doubleday Doran, 1930, Chap IX

[14] Symonds, P M, *Diagnosing Personality and Conduct*, N Y, Century, 1931, Chap. VI and *passim*

It is sometimes said that performance tests and attitude tests are not real measurements of psychological traits. This raises, of course, the whole question of the meaning of a measurement, not only in the physical sciences, but in the psychological sciences as well. Let us say that a physicist wishes to measure the length of a table. He does this by applying a rule to the table a great many hundreds of times where high accuracy is desired. He knows that one measurement will not be enough simply because a measurement made by someone else will vary from his own. Moreover, his own measurements will vary from one another. Let us say that he has made one thousand such measurements. The values he will get will be distributed in what is called the normal probability curve. This curve is of such a form that a larger number of values will fall at one place on the curve than at any other place. This point may be called the mode or the mean of all the measures. It is then taken as the true length of the table. It is a true length, however, only in a statistical sense. There is no way in which the physicist can compare this statistical length with a true length that has been obtained in some other manner.[15]

The reliability of measurements of this type depends upon the spread or the range of all of the measures gained. If, in measuring a table, a physicist found that the range was very great, that is, if he found that some measures were very short while others were very long, he would assume that some factor in the whole situation had not been adequately controlled. Since the conditions which affect the measurement of a table can be controlled, the total range of the measures will be very small and the physicist feels justified in saying that he has found out how long the table actually is. The same considerations hold true of psychological measurement. If the conditions can be controlled, the range of the measurements which the psychologist will get of any given function will be small. When, however, the conditions are not controlled, the range will be very large. Moreover, there will be times when the results do not fall into a normal probability curve at all. When situations of this kind arise, the psychologist does just what the physical scientist does. He realizes that his conditions have not been controlled and that the events under inspection, therefore, are not as yet accurately measurable.

6. *The Questionnaire.*—There is much more to be said about the nature of measurement in psychology, but this can wait until we describe briefly still another method of psychological study, viz., the

[15] Bridgman, P. W., *The Logic of Modern Physics*, N. Y., Macmillan, 1930, *passim*.

questionnaire [16] There is, perhaps, no method in psychology which has done quite so much to put a bad name on the science as has the use of this instrument of research. The questionnaire is based upon the following assumptions. In the first place, every person is the sum of an enormous number of different stimulus-response patterns. It will never be possible, perhaps, to make a list of these even for a single person. It seems to follow that, where so many items are concerned, the patterns into which they may enter will go well beyond calculation. This fact is expressed in our common language by saying that every human being is a unique personality. Each of us has an individuality which distinguishes us from every other individuality. It must follow that certain kinds of measurements on a limited group of subjects could have no general value. Let us suppose, for example, that we wish to find out something about the buying habits of human beings. We might, then, question the first ten persons we meet on the street. Clearly, we could get some information about the buying habits of these ten persons, but we would have no reason at all for supposing that any ten people would be a fair sample where millions are involved. It would take a great deal of time for an investigator to enter into personal consultation with a million people. Some other way must be used, therefore, in order to get knowledge about the buying habits, or any other habit for that matter, of a great many subjects.

This way is offered by the questionnaire. The questionnaire is a kind of an examination which raises queries in a definite and precise way about the matter being studied. That is, an array of questions can be sent to hundreds of thousands of people with the request that they answer the queries as faithfully as they can. It is clear, of course, that queries of this kind may be highly personal in nature. Moreover, unless they are framed so that they will be understood in exactly the way the investigator wished them to be understood, the answers to them will not be significant. A personal interview will often correct this source of error because the nature of an oral answer to a question will often show that the question has been misunderstood.

Given specific questions and given a very large number of them, the investigator who uses the questionnaire feels that he can get a fairly reliable sample of the opinions of a group. Obviously, questions may be asked about almost any matter whatsoever. As a general rule, the larger the number of subjects the more reliable the study. Furthermore, if an arbitrary division of the questionnaires into two groups

[16] Symonds, P M, *op cit*, Chaps IV, V, VI, and VII.

makes no difference in the distributions of the answers given, the investigator may feel fairly certain that there has not been a large amount of confusion in answering the questions. Furthermore, when a questionnaire is directed toward the presence or absence of facts such as the amount of one's income, the possession of a radio, the number of children in the family, and the like, one has to assume only the honesty of the subjects in order to place full reliance upon the questionnaire.

7. *Statistical Methods.*—We may now resume our discussion of the meaning of the word "measurement" in psychology. We have meant to say above that psychological facts are apt to be more variable than physical facts because it is more difficult to control the conditions under which they appear. In all essential respects, then, psychological measurement is like physical measurement except for the matter of variability. It is for this reason, perhaps, that psychology has paid much more attention to what are called statistical methods than have other men of science. Data from all kinds of experiments are known to cluster more or less closely around some mean value. This kind of clustering is called the normal distribution curve. Such a curve drops away symmetrically on either side of the mean or of what may be called the central tendency.[17]

There are several different ways in which one may describe the central tendency of a distribution curve. In the first place, one may take a simple average or an arithmetic mean of all of the measures. This simple average is gained by adding together all of the measures and dividing the sum by the total number of cases. When data are thrown into a distribution curve, it frequently happens that all of the measures within a given range—say from 45 to 50 or from 65 to 70—are treated as though they were of exactly the same kind. In figuring a mean, therefore, it is necessary to take account of the actual number of measures in any given unit of distance on the frequency curve.

The median is the midmost member of a whole set of data. If this total set is an odd number, one may simply count in from one end and then from the other until one reaches the half-way point. If the total number is an even number, the mean will obviously stand somewhere between the two midmost measures. The median is apt to be a more accurate value for certain purposes because it does not vary so greatly with the total range of the data. It is obvious that if, in a given set

[17] Consult the titles under General Readings at the end of this chapter on general statistical methods.

of data, there were some very low values, the mean would be influenced by them. The median, however, is not influenced in this way.

The mode is that measure in a whole series of measures which has appeared most frequently. It is, in other words, the highest point on a normal distribution curve. Sometimes, when the situation is very complex or when it has not been possible adequately to control the events measured, more than one mode will appear. Curves built out of such data may have two or more modes. Some of the other ways of describing the central tendency are suggested by the fact that, in a given set of measures, it might be wise to weight some measures more than others. In examinations, for example, teachers often give more weight to some questions than they do to others.

The description of the central tendencies in a set of data is just the beginning, however, of statistical method. After some sort of central tendency has been described, the investigator must find out how great the range or the spread of his data is. For example, the average of a set of data running from zero to 100 might be the same as the average of a set running from 50 to 70; but it is clear that the second average would be much more significant than the first. The simplest way of describing the dispersion of a set of data is simply to name the lowest and the highest values. A still better way, however, is described by what is called the mean deviation or average deviation. This value can be determined by finding out how much each separate measure in the whole set of data varies from the mean of the whole set. If all of these deviations are added without regard to the question as to whether they are plus or minus, and then divided by the total number of measures, the result will show how great the dispersion is. The most reliable measure of deviation, however, is called the standard deviation. This value is obtained by taking the square root of the mean of all of the squares of the deviations from the mean.

Up to this point, we have named some of the ways in which single sets of data may be studied. It often happens, however, that one set of data must be compared with another. Relationships of this sort are expressed along a scale varying from minus one through zero to plus one. These values are called measures of correlation. The fact which degrees of correlation describes may be stated as follows. Suppose that it is desired to compare the relative position of a single measure in one set of data with its relative position in another set of data. If, for example, the tallest man were also the heaviest man, the correlation between height and weight would be plus one. On the

contrary, if the tallest man were the lightest man, the correlation would be minus one. We know that neither of these correlations holds true. There is still the possibility, however, that there is a tendency for taller men to be heavier than shorter men. If, by comparing the set of data concerning height with the set of data concerning weight it were found that the degree of correlation could be stated by the number 0.80, this value would mean that there are 80 chances out of 100 over and above a 50–50 chance that weight is correlated with height.

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CHAPTER FORTY

GENERAL PROBLEMS OF HUMAN FELLOWSHIP

1. *Introduction.*—We have come, now, almost to the end of our introduction to the study of applied psychology. Any one of the eight parts into which the book has been divided could win,—indeed, it has won,—at least a volume for itself. As a matter of fact, a whole monograph could be written about almost any one of the sub-topics included in each of the chapters. The student may wish, therefore, to enrich the meager data that have come to him through this particular channel by making free use of the references placed at the end of the several chapters, but as he does so or as he leaves, at this point, his study of the applications of psychology to his daily life, he should carry with him a more general perspective on the significance of the facts he has been reading about than will have come, perhaps, from closer attention to details. It is the purpose of this final chapter to point out some of the places where a greater perspective on the problems of human fellowship may be gained.

If the reader has been able to think of himself as the main character in this book, he will have found himself in a great many different situations. He will have discovered that so common an act as driving an automobile or playing a game of tennis is full of events of psychological import. His familiarity with the facts and principles of applied psychology will depend upon the extent to which he has used the suggestions about the art of study that were discussed in Chapter Six. The motives he possesses, both as to their character and strength, for continuing the study of this field or any other field, for that matter, have been placed under examination (cf. Part One).

In Part Two, the reader found himself regarded, not as an individual wrapped up in his own personal concerns, but as a member of a group, owing some of his attitudes and dispositions to the group but inhibited in the free expression of many of his desires because of the social agencies and institutions around him. He then saw, in Part Three, a particular social agent, viz., the law, at work in the actual task of converting the customs and traditions of mankind into useful instruments for the protection of the larger number. Moreover, he saw some of

the psychological principles upon which jurisprudence rests in its effort to enforce the law, get evidence about unlawful actions, and punish, in a suitable manner, the offender. In Part Four, an attempt was made to show how the term "illness" may be used in psychology. If the student has ever been subject to any one of the various disturbances that make conduct unsuitable, he will now know that there are certain psychological principles that can be used much as a physician would use medicaments in the treatment of his bodily disorders. There is even a way in which some of the facts of psychology can be used to promote his aesthetic impulses and lend greater enjoyment to the artistic efforts of others (cf. Part Seven).

Most important, perhaps, is the way in which the very growth of the reader has been promoted and guided by teachers and parents who have been able to learn some of the essential facts about him (cf. Part Five). If the time shall come when he chooses to enter into industry or into any one of the professions, he will know that his entrance will depend, in part, upon the way in which he has been guided by a human engineer. He will know, too, that his success in his calling and his safety from accident may depend upon the use of proper information about himself and his immediate environment (cf. Part Six). And finally, he has been brought face to face with some of the more general problems of human nature, problems that touch him in almost everything that he does (cf. Part Eight).

Altogether, then, the facts of applied psychology do have a value that is immediate and direct. Almost everything that has been said in the preceding pages refers to some activity or enterprise that may be met with on the street or in the home at any moment. What, however, shall we say from the longer or time-wise view of man and his doings? What part may we expect the science of psychology to play in the long-time history of human fellowship? Human beings who were in possession of our own form and talent have been on the earth for upwards of a hundred thousand years. There is every reason to believe, unless they themselves bring their own existences to an end, that they will be here for some time to come. There will be local disasters, of course; but there is no sign either in the heavens or upon the earth that any doom is impending over man. The only chance lies in some great cataclysm in nature; but neither the discerning eye of the telescope nor the still more acute eye of the microscope yields any disturbing information on the point.[1]

[1] Cf. Jeans, J. H., *The Universe around Us*, N. Y., Macmillan, 1929, Chap. VI.

So far as the physical stability of the earth is concerned, our kind of life seems more or less permanent. But how about human nature? What reason is there to believe that men can save themselves from ruin and what reasons are there to show that they may not be their own worst enemies? For there are those who would say that if the temporal order in which we now live does come to an end, it will be man's own doing and not the doing of a vindictive nature.[2] Prophets who describe the nature of the next war are free to say that whole populations may be wiped out by the use of poison gas, incendiary bombs, and virulent bacillae. It has been asserted that our increased control over nature may have lessened the chances of minor disasters such as flood and fire, but that the chances of a major disaster of man's own making have been greatly increased. If the wireless phone serves warning of a coming typhoon, it will also give notice of the whereabouts of an army or a fleet, of a sleeping town or of a water supply that may be poisoned.

It looks as though escape from disasters of man's own making must depend, in large measure, upon the ways in which man can train himself. The ways in which he can train himself depend upon his knowledge of human nature. Psychology is said to be the science of human nature and we may reasonably inquire, then, what may be expected of this science in the more ultimate problems of human welfare. What can knowledge of human nature do to change the persons who gain such knowledge? Can social groups do anything toward lifting themselves by their own boot-straps?[3] Is it possible progressively to make society over, and what part shall the science of human nature play in this task?

2. *The Psychologist's Point of View.*—In answering the questions that have just been asked and in saying anything at all about the general problems of human fellowship, it is necessary to remember that we are now what we are because of the use that has already been made of information about human nature. Psychology is a new science but it is not, on that account, a wholly new realm of information. So long as we have had any kind of dealings with one another we have used the person-techniques that were suggested by direct observation of one another's behavior. As we have seen, especially in Chapter Thirty-Six, these observations have not been very accurate. Among other

[2] Cf Spengler, O., *The Hour of Decision*, N. Y., Knopf, 1934.

[3] Cf Cowdry, E. V. (ed.), *Human Biology and Racial Welfare*, N. Y., Hoeber, 1930, especially Chaps. XX, XXIV, and XXV.

things, they early led to the notion that human behavior is a product of the workings of a special kind of substance called the *Mind*. The mind was thought of as a free agent in the world and as having certain traits which were intrinsic to it no matter how the persons who possessed minds might have been trained. It goes almost without saying that a psychology of this kind would put a definite bias on what men thought of one another and upon the ways in which they would go about it to control one another. As we shall see in a moment, one of the chief means of control lay in the use of religion which gave divine sanction to certain types of tradition.[4]

Now all of this is changed. In the place of inferences about human nature drawn from casual inspection, theology, and philosophy, the laboratory has made possible a vast amount of accurate information. There is every reason to suppose that this information will continue to accumulate so that the practical man of the future will have much more of a foundation upon which to build his arts of control. Although we do not have all of these facts now, we are able, nevertheless, to say something about the events that may come to pass whenever any considerable number of people see what the psychologist's point of view is and how he goes about it to get his facts.[5]

As a first description of the attitude of the psychologist toward the general problems of human fellowship we may say again something that was said almost at the beginning of our study. The science of psychology, like all the other sciences, is definitely committed to the point of view of determinism.[6] That is, the events of which the psychologist speaks do not happen willy-nilly. On the contrary, they happen according to certain laws and principles. There is order in the domain of the psychologist just as there is order in the heavens or in the events that go on in a test tube. To be sure, not all of these laws and principles are known, and some of them may be far different from the types which are discovered by the physicist and the chemist.[7] It seems to be clear, however, that a scientific inspection of human nature must come to an end if nothing can be counted upon.

There is one phase of the general doctrine of determinism which causes a great amount of difficulty. It is commonly assumed that if

[4] Cf Randall, J H, *The Making of the Modern Mind*, Boston, Houghton Mifflin, 1926

[5] Many books are now being published describing the new world of science See Russel, B., *The Scientific Outlook*, N Y, Norton, 1931,

[6] Boring, E G, *The Physical Dimensions of Consciousness*, N Y, Century, 1933, *passim*.

[7] Wheeler, R H, *The Laws of Human Nature*, N. Y, Appleton, 1932. Robinson, E. S, *Association Theory Today*, N. Y., Century, 1932.

events are determined they must, therefore, be mechanical. The point of view of the psychologist is often dismissed, then, with the derisive remark that it tries to make a machine out of the human mind.[8] It is now clear that not even the body can be thought of as a machine in the older sense of the word. On the contrary, the events that may take place in such a process as respiration are dynamic in character and imply all sorts of equilibria between the forces that are at work.[9] The word machine seems to apply to wheels, cogs, pistons, friction, work to be done, and other matters of similar character. Physiological processes, on the contrary, represent one of the highest expressions of the sort of event which is now being described in the atom, the molecule, and in the relation between fields of force. Behavior events are more like physiological events than like a crude machine. In what respects they may differ from both of these still remains to be seen. In any case, they cannot be without determination or else there could be no science of human nature.

It is also assumed by some of those who accept determinism that unpredictable events cannot happen in such a world. There is no reason, however, why an event cannot be determined and yet be wholly unpredictable. In the physical sciences, most of the objects that are dealt with have already reached a sort of equilibrium. The changes that go on in the laboratory of the chemist are predictable because they are repetitions of previous changes and because the conditions which surround them can be controlled. Were we to have been present when this earth was assuming its present degree of stability and to have seen the formation of water for the first time, the chances are that some of the properties of water, while being strictly determined, would have been unpredictable. It happens that human behavior is never finished.[10] It is constantly going through that kind of change which is truly a genetic change.[11] Take the solution of a problem as an example. Given the history of a certain nervous system, it would be possible to say that the conclusion which that nervous system might reach would be determined; but there is rarely anything about the history of such a system that would enable one to predict the character of a solution or the significance it might have for the creation of other problems.[12]

[8] Cf Herrick, C J, *The Thinking Machine*, Chicago, Univ. of Chicago Press, 1929.
[9] Cf. Haldane, J. S, *The Sciences and Philosophy*, N. Y., Doubleday Doran, 1929. Also Cannon, W. B, *The Wisdom of the Body*, N. Y, Norton, 1933.
[10] Cf Morgan, C L, *Emergent Evolution*, N. Y, Henry Holt, 1923.
[11] Cf Goodenough, F. L, *Developmental Psychology*, N Y, Century, 1934.
[12] Cf Kohler, W, *Gestalt Psychology*, N. Y, Liveright, 1929, *passim*.

When we look at human affairs from the time-wise point of view, therefore, we may be fairly sure that these affairs will be more or less orderly and a determined outcome of a previous set of affairs. They will not necessarily be predictable, however. On the other hand, some of them will be predictable and it should be the task of the psychologist so to arrange his experiments that the number of predictable events will be on the increase rather than on the decrease. In other words, predictability probably stands in some direct relation to the amount of knowledge that is already available. In such a major piece of experimentation as the U.S.S.R. is now carrying out, predictability is not possible because too many unknown factors have a bearing on the result. In a minor piece of experimentation where a single learning situation and the search for a single skill are involved, a high degree of prediction is almost certain.[13]

These facts lead us to a second characteristic of the attitude of the psychologist toward the general problems of human fellowship. No matter what the nature of the problem nor how complex and difficult it appears at the start, the psychologist is thoroughly committed to the experimental point of view. In this respect he is opposed to an older way of getting knowledge which assumed that the mind could discover truth simply by searching for it with the aid of strict logic during a period of armchair speculation. It may be that, in two or three centuries, when we are able to get the same kind of perspective over science that we now have over pre-scientific climates of opinion, we shall discount the experimental method as a means to knowledge; but for the present,—as a matter of fact, for some time to come,—the experimental laboratory reveals itself as the one safe place for securing reliable information.[14]

This devotion to experimental methods naturally raises the question as to whether the whole domain of human nature, both in its individual form and in its social aspects, is actually open to laboratory inspection. Will there not always be some parts of psychology that cannot be penetrated with the aid of apparatus and of controlled situations? It is not easy to answer this question and yet the indications are that more successes have been enjoyed than defeats. Obviously,

[13] Valentine, W L. (ed), *Readings in Experimental Psychology*, N. Y , Harper, 1931, *passim* See also Murchison, C. (ed), *Foundations of Experimental Psychology*, Worcester, Mass , Clark Univ Press, 1930.

[14] Consult Montague, W P , *The Ways of Knowing*, N Y , Macmillan, 1928 Also Cohen, M , *Reason and Nature*, N Y , Harcourt Brace, 1931. Also Dewey, J , *The Quest for Certainty*, N. Y , Minton Balch, 1929.

the most difficult part of the whole problem comes in connection with the behavior of groups and with the hopelessness of trying to control all of the conditions which determine the actions of any given individual or which issue in a social event.[15] As a single case, we may take the judgment of a given individual on the matter of socialism versus capitalism. In order to predict this judgment, it would be necessary to know all of the circumstances which have led up to it. Now it happens that human beings react to a present situation partly in terms of the situation itself, and partly in terms of the entire previous history of the reacting person An experimenter would have to know, then, what this person had read, what he had seen, with whom he had talked, and how often and in what manner he had talked with himself (i.e , carried on active reflection). Furthermore, it would be necessary to know what parts of all of these events had actually become functionally active in the reacting person's particular case. This is almost a hopeless task and such hopelessness might be taken to mean the abandonment of scientific inquiry No science has ever made any progress, however, by giving up a problem So long as men keep active in their laboratories, no one can set a limit to the questions that may be asked of nature and neither can they call a halt to the piling up of information.

A third aspect of the attitude of the psychologist toward the general problems of human fellowship is almost directly stated in the description of the first two. If there is determinism in human nature and if there must be ceaseless experimentation, it seems to follow that no experience or event of the psychological kind can be too sacred for inspection. It used to be thought that the mystic in his ecstacy, the saint in his prayers, or the child in its innocence were not the proper subjects of experimentation [16] Even today it is sometimes said that certain aspects of social psychology such as economic and political systems are not proper subjects of experimentation,—to say nothing of free criticism and discussion. In these cases and in all others that might be named, the psychologist has taken the attitude which may be described by the word secular. Any man of science must be impersonal in his attitude toward nature in all of its parts.[17] As we have

[15] It will be suggestive to compare one of the older social psychologies with a newer one. Compare, for example, McDougall, W , *Social Psychology*, Boston, John W Luce, 1916, and Murphy, G , and Murphy, L B , *Experimental Social Psychology*, N Y , Harper, 1931

[16] For an epochal work that changed this disposition, see James, W , *The Varieties of Religious Experience*, N Y , Longmans Green, 1912

[17] For the social sciences, see Rice, S A (ed), *Scientific Method in the Social Sciences*, Chicago, Univ of Chicago Press, 1931

said before, the psychologist is engaged in the delicate task of writing an impersonal account of persons.

This is not to say that psychologists are brutal or thoughtless or indifferent to values. They have been led to believe, however, that if they search first for the truth about human nature, these other things will be added in due time. Moreover, they will be added with an abundance that must stand in direct proportion to the amount of dependable knowledge that is at hand. If he wishes, a physicist may calculate the surface tension on his soup before he eats it, but this knowledge does not interfere with his enjoyment of the dish. So, too, a psychologist may find out certain things about the mind even of a mystic and yet have as much or more respect for its esoteric quality than he did before.

3. *The Charlatan's Point of View*—Around the edges of a science and of its practical applications, there will always stand a group of imaginative speculators who cannot sense the naturalness of the events that are being studied and who will search for and proclaim discoveries of a bizarre and occult nature. From one point of view, these persons are always in search of short-cuts to the inner secrets of nature, as though the more painstaking methods of laboratory men were too slow and too much beside the point. Then, too, men of this type appear to be more interested in the mystery and obscurity of nature than they are in the areas where a more brilliant light shines.[18]

Naturally enough, psychology has its share of this kind of science. As a matter of fact, it has more than its share, for such men prosper in direct relation to the youthfulness of a science and the tentativeness of its conclusions. They prosper, also, because events that are called mysterious or occult or supernatural take place more frequently in human behavior than they do in the behavior of other objects. Moreover, the sciences of human nature have had to issue from the belief of primitive peoples about the soul and about the agents which give direction to human destiny.[19] It has come about, therefore, that large numbers of persons seek answers to questions about human fellowship through other channels than those that have been worked out so patiently by the experimental psychologist. Since the use of these channels is prompted by an attitude toward human nature which

[18] Cf Carrington, H, *Psychical Phenomena and the War*, N Y, Dodd Mead, 1918; also Jastrow, J, *Fact and Fable in Psychology*, Boston, Houghton Mifflin, 1901.

[19] Cf. Williams, J J., *Voodoos and Obeahs*, N Y, Dial Press, 1932

departs widely from the attitude of the psychologist, it is necessary that we give some attention to them.

The methods of which we speak are commonly known as spiritualism, psychic research, telepathy, crystal gazing, mind reading, the use of the divining rod, astrology, and the like. Spiritualism is that point of view about human nature which says that the human mind is made up of a kind of stuff which is finer than bodily stuff but which can, nevertheless, be photographed or seen with the naked eye, or actually caught in small amounts in a suitable container.[20] Psychic research is a branch of anecdotal science which studies unusual coincidences in human affairs such as prophetic dreams, premonitions, the modes of revelation peculiar to spirits or souls, and similar events.[21] Telepathy describes the fact that, granted the existence of souls or spirits and granted their survival after death, there should be some path of communication with them through other channels than the ordinary channels of sense. As a rule, these other channels are made of direct impressions upon one mind by another or of signals such as rapping, the movement of furniture, or of a special kind of spirit-guidance in speaking and in writing.[22] Crystal gazing and mind reading belong to the same category save that they are said to depend upon the vision gained by a medium of the subconscious mind of another person through the aid of a crystal sphere.[23] To be sure, certain inferences about the private life of a person may be gleaned from his behavior, but mind reading means more than this. It means a direct penetration to the mental life of another person. The divining rod is only one of a number of devices which are said to betray the presence of water, of gold and other precious metals, or of oil when there is nothing about the geological nature of the ground that would suggest their presence.[24] Astrology is the doctrine that the planets and other heavenly bodies must have some direct influence upon human nature and its destinies.[25]

When we compare these various occult sciences with the methods and facts that have stood out most prominently throughout this book, it is clear that they all belong together in a group by themselves. Had we the time to discuss them in more detail we should find that they all

[20] Cf. Doyle, A. C., *The History of Spiritualism* (2 vols.), N. Y., Doran, 1926. Carrington, H., *The Physical Phenomena of Spiritualism*, Boston, Small Maynard, 1908.

[21] Richet, C., *Thirty Years of Psychical Research*, N. Y., Macmillan, 1923.

[22] Yost, C. S., *Patience Worth*, N. Y., Henry Holt, 1916.

[23] Thomas, N. W., *Crystal Gazing*, N. Y., Dodge, 1905.

[24] Foster, W. J., "Experiments on rod-diving," *J. Appl. Psychol.*, 1923, 7, 303–312.

[25] Cf. Podmore, F., *Modern Spiritualism*, N. Y., Scribner's, 1902, *passim*.

depend upon the credulity of human beings and upon the chance relationships which must always appear when very large numbers of events are concerned. If the man on the street enjoys an unusual experience,—say, a dream that coincides with an event elsewhere,—he is going to remember this experience and make capital use of it. His first impulse is not to learn what the actual facts are but only to believe and to wonder.

There is another and still more important feature of the occult attitude, however. It goes without saying that the reports of such persons have been studied with as much care as the circumstances will allow.[26] It sometimes happens, as in a spiritualistic séance, that the conditions for the appearance of the phenomena in question are not subject to control. No one can say, however, that the believer in the occult has not been given a fair hearing. Everything has been done to bring him into fellowship with the normal and accepted run of events, but his results have not been able to stand the light of rigid examination. More often than not, the various occult practices named above have been found to depend upon trickery This trickery may be of two sorts. On the one hand, the trickster may be fully conscious that he is simply befuddling his audience. In this case he resorts to occult practices simply for the sake of the money which an appeal to credulity will almost always bring forth. On the other hand, it is quite clear that some men are wholly honest in their practices. In these cases, however, it can be shown that advantage is taken of a group of facts which are not the common property either of the occultist himself or of the people with whom he works.[27]

As an example of this fact we may take the following situation. It is well known that many of the sectors of a normal environment may affect the behavior of a person without his knowledge. Sometimes, one aspect of a total stimulus-situation may be so weak in intensity or so far removed from direct attention as to appear to have played no part in the development of a judgment.[28] By varying the presence or absence of such factors, however, their influence on the nature of judgment can be determined. It must be clear that a clever person might, either witfully or witlessly, use circumstances of this kind significantly to alter the behavior of another person or even to predict his behavior. It would be one thing, however, to call such an outcome

[26] Coover, J E, *Experiments in Psychical Research*, Palo Alto, Stanford Univ Press, 1917.
[27] Cf Houdini, H, *A Magician among the Spirits*, N Y, Harper, 1924 Abbott, D. P., *Behind the Scenes with the Mediums*, Chicago, Open Court Pub. Co, 1907.
[28] Cf Coover, J. E., *op. cit., passim.*

occult and quite another to take it as a part of the normal factual material of a science

This is only one of the many factors about human behavior that can be used in an occult manner We have already seen that too little is known about such sources of stimulus to action as are described by the word "suggestion" and it is only recently that hypnosis has been brought into the experimental laboratory.[29] It is no wonder, then, that persons of a certain type lean toward the mysterious side of such phenomena. Of one thing, however, they should take notice. As soon as events of the kind described by these borderland sciences are brought into a reputable laboratory, they are either disproved or they fit easily into the general scheme of things known as sound science. To adhere to them, then, is simply to perpetuate an attitude that runs counter to the best interests of an applied psychology. It would be delightful, perhaps, if magic formulae could bring us to short-cuts in our control of human nature, but the sober truth is that no such short-cuts have ever proved successful save where the victim is ignorant and willing to lend himself to exploitation.

4. *Science and Value Again*—Very early in this section we had something to say about science and value. We return to the same topic now because we are better prepared, perhaps, to look more deeply into the significance of the contrast between these terms. It is the function of a science to view everything from a secular point of view. That is, a science is more or less impersonal. It deals with objects and events.[30] This must mean that the science of psychology deals with human beings as though they were a natural part of a very natural world. As a result, a science ought to be able to say where the quickest and most efficient path to any goal may lie If, for example, it is desirable to know how the most persons could be put to death most quickly, science ought to be able to give an answer If it is desirable to know how a given theft could be carried out to the best advantage, science would be a very great help.

But it happens that not all actions are of equal value or of equal importance. In western Europe several hundred thousand persons were once burned to death. It was said of them that they were witches. It now looks as though many of them were suffering from some of the more common types of psychological ailment. To burn them, then, meant a certain amount of purification of the race. The same thing

[29] Cf Hull, C L, *Hypnosis and Suggestibility*, N Y, Century, 1933
[30] Weld, H P, *Psychology as Science*, N. Y., Henry Holt, 1928, *passim*.

could be done at the present time. All mental defectives, all elderly people, and all of the viciously criminal could be disposed of easily enough by a scientifically minded dictator. Once again, however, we face a question of value. Would it be a good thing to use the fruits of science in practical ways of this type?

We may make these several considerations still more personal. Let us suppose that the cold objective results of a science have decreed death upon a member of our own family because that person is a handicap to the other members of the family and to the social group as well. Or, let us suppose that the needs of the group demand that a certain number of persons shall be hewers of wood and drawers of water. Within limits, the influence of pure and applied psychology, working through the processes of education, could become effective in producing such persons. It might be, however, that the reader himself would be chosen as one of the hewers of wood. It could very well happen, also, that he had some other sense of value for himself; but obviously, the value he placed upon himself or upon a member of his own family would have nothing to do with an experimental study of his situation.

When, therefore, the man of science has finished his work someone must take up the task of evaluating this work. Technical experts could build a tower a mile high, but would it be worth while to have such a tower? Technical experts can build automobiles that will travel over three hundred miles an hour, but would it be desirable to have any number of these cars on the public highway? Science can say something about birth control, but is it wise to limit the normal growth of a population? Faithful teachers might create a million artists like Paderewski, but would this make a wise contribution to the rest of the social group? A teacher can easily make a conservative or a radical, a thief or a murderer, but how many of each type ought a social group to have?

Clearly, someone must express the wishes of the group about these matters. What, then, are these wishes and how can we be sure that wishes will be wise? There are several ways in which this question can be answered. The most venerable way is to say that values have an absolute and eternal status.[31] From the foundations of the earth, standards of good and bad, of right and wrong, of truth and error, of beauty and of ugliness, have been set. It is the simple function of man

[31] Cf Broad, C P, *Five Types of Ethical Theory*, N Y, Harcourt Brace, 1930 Mencken, H. L, *Treatise on Right and Wrong*, N. Y, Knopf, 1934.

to open his ear to the divine word about these standards and order his conduct accordingly. From a great many points of view, this answer has been the most satisfactory that has ever been offered. It assumes that there is Someone whose infinite wisdom is sufficient to name the good and the evil. Unfortunately, the whole history of social institutions and of inventions makes this answer no longer tenable. Every value that we possess has had a history.[32] As men have lived together, they have invented new concepts of value and with every invention there has been a long period of correction, modification, and change.[33]

This fact leads naturally to the second answer to the question asked above. It may be said that, in view of the long history through which such concepts have passed, every value has been precipitated, so to speak, out of trial and error learning. In the long run, certain rules of conduct, certain standards of right and wrong, certain concepts of beauty and ugliness, represent the best judgment of the most persons. No sooner is this answer made, however, than a great difficulty arises. The values to which any group may subscribe quickly enter into the educative process of that group. Thus it may happen that adherence to values is a product of group choice, not because a free choice has been made by each generation, but because of a predisposing education.[34]

In the face of this situation, it has been possible to argue that the total run of human experience will reveal general principles just as the daily run of nature reveals the laws of nature. One may say, therefore, that any action is right whenever the best interests of all concerned will be served if all resort to the same act.[35] In this way, social groups have come by the so-called laws of morality, the laws of aesthetics, etc. It still remains true, however, that such laws are a precipitate out of much trial and error learning. It is at this point that the study of experimental psychology may serve the interests of society. Should predictability in psychology ever reach the level that is possible in the physical sciences, the outcome of any individual or social experiment might go a long way toward defining the experiment and relating its possible results to the individual and to the group. Let us suppose, for example, that it were possible to wipe out the institution of marriage in a social group. We might then ask whether

[32] Cf Kellar, A G, *Man's Rough Road*, New Haven, Yale Univ Press, 1932

[33] This fact has been discussed sufficiently, perhaps, in Chapter Eleven

[34] The student has only to review his own educational history in order to realize the truth of this proposition

[35] Cf Dewey, J, and Tufts, J H., *Ethics*, N. Y., Henry Holt, 1908.

the psychologist has enough information about human nature which would predict what the results would be. He already knows how his educational program should be formulated to achieve this result; but the desirability of entering into such a program would rest upon his prediction as to results. So long as his information about human nature has not reached the stage where prediction is possible, it would seem to be wiser to adhere to the social mores in such a matter. This is not to argue, however, that one should not take an enlightened experimental attitude toward social problems.

In the last analysis, then, science and value can remain divorced from one another so long as one limits one's self to the study of physical events. When, however, the results either of the physical, the biological, or the psychological sciences begin to touch human interests and social values, the line between them will be drawn more and more thinly It is this fact which makes the application of psychology to the various activities of men a hazardous undertaking. As we have remarked before, experimental psychology is in the curious position of trying to write out an impersonal account of persons. If one were to take this impersonal account as one would use any other kind of thing-technique, one can greatly increase the efficiency of the human cog in the whole industrial machine But thing-techniques applied to persons have never been successful for any long period of time. They have been no more successful than the attempted application of person-techniques to things.

5. *Psychology and Religion.*—There is no system of actions or of beliefs that has cut more deeply into the life of the individual and of the social group than that known the world over as religion. It would be neither possible nor desirable, therefore, to conclude a study of the field of applied psychology without saying more than we have up to this point about the relation between religion and psychology. Heretofore, it has been thought that psychology was a servant of religion or even a very intimate handmaiden, but now that psychology has become one of the sciences, most persons are inclined to say that the conflict between the two is more venomous toward and destructive of true religion than the perennial conflict between physical science and religion has been.[36]

In order to strike immediately into the heart of the problem, we may take the two most widely divergent views of the nature of religion. There is, on the one hand, the doctrine that religion is the result of a

[36] Cf Barnes, H E , *The Twilight of Christianity*, N Y , Vanguard Press, 1929

progressive series of revelations made by a Divine Spirit to human beings who are essentially the sons of God [37] No matter how one may think of the origins of religion in magic and in animism, the attitudes and feelings named by this word have a supernatural reference and a supernatural origin. The system of thinking behind religious feeling argues that the psychological functions of an individual are the overt manifestations of his mind or his soul. The mind or the soul, in turn, is not of this earth. It has a heavenly origin and its true home is the celestial city in which citizenship papers are held. According to this theory, then, both the nature of religion and the facts which psychology ought to study are divine rather than secular.[38]

In contrast to this set of beliefs,—a set which has been expressed in the most beautiful literature the world possesses and in its most profound philosophical systems,—there are two other types of belief. On the one hand, that kind of psychology which studies the behavior of human beings and of the lower animals would seem to say that psychology is strictly a secular science. If one were to go the full limit with certain types of behaviorism, it would appear that minds or souls, in the classical sense of the words, could not exist. If they do not exist, human behavior could have no supernatural meaning for it is difficult to see how behavior patterns could survive beyond the disintegration of the muscles and nerves which make them possible. But even if we think of behavior as somehow the overt expression of states of consciousness or of awareness, there is no reason, so far as the science of psychology is concerned, to suppose that states of consciousness or of awareness have more than a biological importance [39]

On the other hand, that kind of psychology often known as Freudianism takes a still more extreme position. It is said that the new-born infant has been thrust into a world of reality without his choice and without any preparation. The world he has just left, the mother's womb, is a world of perfect comfort where all his needs are supplied. It is not strange, then, that the act of birth should mark a major crisis in his career. Neither is it strange that he should use all kinds of devices in order to escape from reality. Freud would argue that religion is one of these devices. It is a highly fanciful and imaginative picture of how one may go about it to gain release from the pressure of living.

[37] Read Santayana's delightful account of the Christian Epic in *Reason in Religion*, N. Y., Scribner's, 1928, Chap V

[38] Cf Fairbairn, A M, *Philosophy of the Christian Religion*, N Y, Hodder and Stoughton, 1902

[39] Cf. Mencken, H L., *Treatise on the Gods*, N. Y, Knopf, 1930.

Schemes of heavenly bliss and of eternal joy are compensations for earthly misery and labor. Such schemes cannot possibly have an objective reality but only a sublimational value for the individual. They make him able to put up with reality until such a time as he can escape from it. Given more knowledge about human personality and better control over his education, it will sometimes be possible to sublimate him in more effective ways, in which case religions will naturally disappear.[40]

In view of these great extremes of belief about the nature of religion, what attitude shall the experimental psychologist take who is interested in the larger problems of human fellowship? This is certainly not an easy question to answer. Men have been looking at it for a long time and they have searched in all manner of places for light on the problem. Of one thing we may be certain. The experimental study of human nature is not a philosphical or theological appreciation of the values that may be achieved by using human nature in one way rather than another Neither is such a study the equivalent to a study of the ultimate nature of things. Theologies of various kinds are just this. They are made up, in part, of empirical knowledge of the objects and events that are now studied by the sciences, and in part, of reflections upon the ultimate meaning of it all. It happens, at the present time, that some of the information gained by the experimental psychologist suggests that older types of information used by theology are wrong. But this has happened before. When the sciences of mechanics and of physics were first born, some doubt was cast upon the knowledge that theologies then used [41] No one now thinks that theology was any the worse for this experience. As a matter of fact, it profited greatly by it. We may suppose, then, that experimental psychology will also change some of the data with which theology works, and we may suppose, too, the theology will still be able to strive after some satisfying concept of ultimate things.[42]

In other words, both theology and religion are ways of interpreting the facts that have come from the various sciences. Psychology is now one of these sciences. If the experimenter does not choose to make these interpretations while he is actually at work in his laboratory, he is not, on that account, either for or against religion. If he chooses when he comes out of his laboratory to think of his data only in terms

[40] Freud, S., *The Future of an Illusion*, N. Y., Liveright, 1928

[41] White, A. D., *A History of the Warfare of Science with Theology*, N. Y., Appleton, 1929.

[42] Attempts are now being made to adapt theology to newer knowledge See Horton, W. M., *A Psychological Approach to Theology*, N. Y., Harper, 1931.

of their significance for the getting of more data, that is his business. If, however, he chooses to draw out some of the ultimate meanings of his data, he is free to do so. As a matter of fact, the whole history of human affairs seems to suggest that he is more or less obligated to do so, for no man has been able to live by bread alone. The very fact that even a psychologist is always a member of some social group means that his personal integrity is dependent, in part, upon what the group thinks and feels. Religion and theology have sought to interpret human life so that the best interests of each person might be conserved. They have, moreover, sought to motivate a mode of living which would promote and safeguard these interests. As with every other type of individual and social action, terrible mistakes have been made. Both religion and theology have led to needless shedding of blood and to much stifling of free search for the truth; but at the same time they have served as a steady repository for types of action and of belief that may make the difference between life and death. It is possible to say, of course, that death is more to be desired than living; but so long as living continues it seems worth while to do the best job that can be done.

The share of psychology in this task is fairly straightforward. Whether any single experimenter goes from his laboratory to philosophy and theology or not, information about human nature, about the way in which its growth can be controlled and promoted, about the way in which values can be made more or less effective, about adjustments between person and person, about the solving of problems and the application of scientific method to social organizations and actions, cannot help but put the search for the ultimate nature of man and the universe upon a more stable foundation. Experimental facts about human nature may be either for or against some single theory of ultimate reality but they cannot be for or against all such theories.

6 *Psychology and Social Decline*.—In order to make an argument, we shall assume that a long life of maximal enjoyment and of productivity is a desirable thing for each individual person. We shall also assume that a long life and an increasing level of whatever one may mean by the word culture is a desirable thing for any social group. Without asking why we are here we may simply take the fact for granted and assume that we shall remain here to the best of our abilities. When, however, we make these assumptions, we meet with the inevitable fact that the life of a single individual must end, and it looks, too, as though the life of any single social group must end.

There is, apparently, nothing that can be done about forestalling the approach of individual death. At one time in its long history, vital processes faced, so we may say, a sort of choice. They had to choose between the immortal continuance of the individual, on the one hand, and the destruction of the individual so that the group might live, on the other. The choice appears to have been made in terms of the expenditure of energy.[43] It would have taken large amounts of energy to perpetuate the individual but the species could be perpetuated much less expensively. However that may be, the individual dies and the group goes on.

But it looks as though, in some respects, the group also dies. As a common phrase has it, the glory that was Greece is no more. Cultures have been born in various parts of the earth and at various times; but all have lived their day and are now remembered only in the books on history.[44] But, we may ask, must cultures die? Must a social group come to a high level of advancement only to make way for another? Or is there anything that an existing group can find out about itself that will delay the advent of senescence and of death? If there is such a way, what part may the science of psychology expect to play in discovering it?

A vast number of theories have been invented in order to account for social death. For purposes of comparison, we may mention only a few of these. It has been said, for example, that the continuous cultivation of a given area of land must inevitably lead to a decline in the productivity of the land. It is possible, of course, to resort to artificial fertilization, but those social groups which did not have such information as is now available could not hope to handle this problem effectively. If an adverse change in climate should accompany increasing poverty of the land, the dwellers thereon would have to migrate to some other territory or submit to the power of a more vital and aggressive group.

Another theory has it that increasing levels of culture usually bring a declining birth rate. It may be argued, too, that the declining birth rate will be selective in the sense that the best stock will tend to disappear while the poorer stock will increase. Moreover, the development of a culture has usually been made possible by increasing wealth. Where there is wealth, there can be leisure; and where there is leisure, there may be devotion to the arts and the sciences. But in the mean-

[43] Haldane, J. B. S., *Possible Worlds*, N. Y., Harper, 1928, *passim*.
[44] Cf. Wells, H. G., *Outline of History*, N. Y., Macmillan, 1921.

time, wealth brings with it unproductive leisure and also the enslavement of the less wealthy. This situation, coupled with a decline in the birth rate among the cultured class, is said to have only one result, viz., the gradual decline of the group concerned.

Another possible cause of social decay is said to lie in the fact that any single group of persons cannot live together in a common habitat for very many centuries without a considerable amount of inbreeding. Close inbreeding, as of brother with sister, has never played a very significant rôle in human mating; but matings between first, second, and third cousins have been more frequent. In a small state the opportunity for such matings would be enormously increased. The experiments that have been made in this field have led to doubtful conclusions, but there is some reason to believe that intense inbreeding may lead to a serious weakening of a given strain. On the other hand, free crossing has been known to result in a strain much superior to either of the parent strains.[45]

It is not our purpose, however, to complete the list of possible causes of social decline and neither do we wish to place a proper value upon them. Our main task is to ask whether the development of experimental psychology can be expected to play any part in the search for causes and in the search for ways of delaying social death. This search is prompted by the following facts. Any new social group may have to spend the first part of its history in the active conquest of the territory that has been won This conquest may play a very large part in developing the initiative, the inventive genius, and the general morale of the group. As time goes on, the organization of the group becomes more complex and the learning task that is placed upon the new members of the group grows almost beyond their capacity. Where much is still to be discovered and where a premium is placed upon the problem functions of a person, education naturally leads to the development of these functions. When discoveries and inventions have piled high, education seems to turn more devotedly to the learning functions. Each new member has to learn more and more material before he can reach the informational or cultural level of the group into which he will be launched when his education is complete. Since it has always been much easier and much more economical to teach simply by laying out before the student a vast amount of material to be learned by constant repetition, the student becomes a repository of knowledge but in no sense a judge of his information or a problem-

[45] Cf Jennings, H S, *The Biological Basis of Human Nature*, N Y, Norton, 1929.

solver with respect to it. A precise character will already have been given to his preferences for types of learning.

One of the results of this type of training would be the gradual stifling of that kind of flexibility in problem-solving which would be most needful in the study of society and its movements. If this is a fair inference, it would seem to follow that one of the causes of social decline is to be found in the character of the educational process during the mature years of a social group. That is, new members of the group would become so used to imitating the great men of the tribe and learning what they had said as to have nothing to say for themselves. In such a case, the functions of psychology and education would be clear enough. The psychologist can well be expected to continue his search after the nature of human nature. This search ought to bring fruit through the labors of the educator who directs the educative process. If it can be shown that there are certain kinds of instruction which will promote the problem-solving functions,—that is, keep them flexible and alert,—then each new generation can take the masters of an older generation en route to their own achievement.

In any case, it will be granted that the next great step in communal living is much more dependent upon the progress which the psychologist can make than upon any other single factor. The human element is so pervasive an element in all that goes on that any further information one can get about it brings that much nearer the day of intelligent action in social as well as in physical matters.

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