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THE ORIGIN AND NATURE OF MAN

THE ORIGIN AND NATURE OF MAN

AN ENQUIRY INTO FUNDAMENTALS

RECONCILING
MAN'S PROUD ACHIEVEMENTS
WITH MAN'S HUMBLE DESCENT

BY

G. SPILLER

Author of

"The Mind of Man," "A New System of Scientific Procedure," etc.

SECOND EDITION

LONDON

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1935

"Man, oh, not men! a chain of linkèd thought."
Percy Bysshe Shelley.

"Toute la suite des hommes . . . doit être considérée comme un même homme." *Blaise Pascal.*

"Die ganze Menschheit ist wie *ein* Polypenstock."
Ernst Mach.

DEDICATED TO THE

MEMORY OF

CHARLES DARWIN

PRINCE OF NATURALISTS

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PREFACE.

THIS work has a twofold object—by means of an exhaustive enquiry to ascertain *man's place among living beings* and *men's place among their fellows*. The result may be epitomised in the following three statements, statements which purport to offer a convincing and intrinsically reasonable answer to the three most searching questions that can be asked on this subject of supremest concern to man.

First, the author seeks to establish, what is forcibly suggested by a comprehensive survey of the facts, that the members of all animal species are virtually unable to learn anything from their kind and that, on the contrary, human beings are able to do that to an almost unlimited extent. This will account for the well-nigh infinite potential superiority of human beings over animals, since in favourable circumstances individual men can multiply their powers almost endlessly through assimilating the substance of the consolidated thoughts and experiences of practically their whole race past and present, whilst individual animals, for the reason adduced, cannot virtually multiply their powers at all.

Secondly, in explanation of the above crucial difference between man and animals, the author seeks to establish that the higher apes are not only the most intelligent animals, but that they are so advanced mentally that a further moderate mental advance, about equal to that of apedom beyond monkeydom, inevitably gives rise to an intelligence—that of man—just sufficiently developed to be able to learn freely from all intelligent beings. It seems thus possible to explain man's unique and dominating place in nature without assuming any yawning mental gulf between him and his nearest animal relations.

Lastly, in seeking to establish the precise magnitude of the innate mental capacity reached by man as a consequence of this advance in inborn intelligence, the author finds, on examination, that if we discount the mass of information as to facts and as to modes of procedure which any given individual may have acquired from his myriad knowledge-producing and knowledge-pooling fellows, he would only be more or less able to improve modestly the equivalent of a paleolithic tool or idea during a life-time.

Hence man's close affiliation to the higher apes, together with his almost infinite potential superiority to them, are demonstrated. Hence, also, any stateable or immense differences in the mental status of human beings and human groups are to be explained by the relative assimilation or non-assimilation on their part of the ever-growing and ever-developing cultural heritage. If the contrary point of view, that of

vast innate differences between animals and man and between men and men, is almost universally prevalent to-day although fundamentally opposed to all biological experience, it is because in the absence of a coherent scientific theory, thinkers have mistaken acquired for native ability. The substitution of meticulous for passing observation and study will correct this erroneous inference. It will demonstrate that the current biological teaching as to man's place among living beings and men's place among their fellows is not a whit less in monstrous conflict with fact than was the pre-Copernican teaching regarding the earth's place in nature. It will, moreover, produce as revolutionary a change in men's conceptions of Man as the Copernican theory produced in men's conceptions of the Universe, providing incidentally a firm basis for a lofty moral and social idealism.

Our three statements, which we hope to justify in the following pages, furnish broadly a sound and simple foundation for a science of man. This foundation ought to appeal profoundly to the biologist, the sociologist, and the thinking public generally, since for the first time an explanation is offered which reconciles (*a*) man's almost infinite mental remoteness from the animal world with his close proximity to it biologically and (*b*) the presence among men of measurelessly great differences in *observable* mental status with the absence among them of any noteworthy differences in *innate* mental status, as imperatively demanded by biologic science.

Further prefatory remarks will be found in the brief Introduction which follows the Table of Contents. It may be also stated that Chapters I. to III. prepare the ground, Chapters IV. to VII. contain the essential matter, Chapters VIII. to XI. develop certain leading conclusions, Chapter XII. gives a reasoned summary of the work, and that Section 4 of Chapter V. and Section 3 of Chapter VI. discuss respectively and at length the compatibility of our view and the incompatibility of the current biological view with the general facts of human experience.

G. SPILLER.

London, March 1931.

. . . . .

This Second Edition is virtually a reprint of the First Edition. The only change made of any consequence has been the introduction here and there of the term "inter-learning," to replace the clumsy expression "learning from others."

London, August 1935. G. S.

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INTRODUCTION.

In his *Origin of Species,* first published in 1859, Charles Darwin all but ignored the problem of the origin of man. In a brief sentence, at the end of his classic work, he merely stated in passing that "light will be thrown by the doctrine of organic evolution on the origin of man and his history."

His disciple, Thomas Henry Huxley, accepted this significant hint and shortly afterwards, in 1863, published his challenging *Man's Place in Nature.* In this masterly and memorable study he demonstrated, beyond any reasonable doubt, that man's physical constitution departed no more from that of the higher apes than the general physical constitution of the higher apes departed from that of the monkeys. Man had, accordingly, assigned to him an unostentatious place in the animal series.

In 1871 Darwin published his *Descent of Man.* Taking tacitly for granted Huxley's demonstration, he concentrated his attention more particularly on the complementary problem of man's mental outfit and reached the conclusion that there was only a question of degree between the human and the ape mind. Man was thus definitely assimilated to the Primates.

The great mass of thinkers were singularly unimpressed by the coordinate demonstrations. They had, of course, to accept as decisive the conclusion that man was descended from some lower form; but they could not reconcile themselves to the suggestion that the human world—which seemed to them farther removed from the animal world than the animal world is from the plant world—occupied no outstanding place in the hierarchy of living beings. And yet, profoundly struck by humanity's achievements, Darwin had spoken of man as "the wonder and glory of the Universe" and Huxley had dilated on "the immeasurable and practically infinite divergence of the Human from the Simian Stirps."

The present work represents consequently an attempt to ascertain whether, in complete accord with the general theory of evolution and without invoking occult or obscure causes, the insistent demand for a conception of man's evolution sharply separating him from his animal ancestors in the matter of mentality, cannot be satisfied. Conceivably, Darwin and Huxley had been so absorbed in the search for similarities that they overlooked some crucial and far-reaching divergence.

The author does not believe that there is a rift in nature. He considers that man's animal origin may well comport with his presenting a radical departure and even forming a separate kingdom. Man's immediate ancestor, he holds, represented the culminating point in the enormously long mental development of sub-human kinds, a point

beyond which a new world with almost infinitely higher potentialities naturally opened. That is, developing intelligence had at last reached the stage where individuals could freely profit by the experiences of their fellows near and far in space and time and in this way could multiply their powers almost infinitely. Thus, up to man, we meet invariably with the method of instinctive, individual action varied by that of instinctive cooperation between the members of individual living groups of a given species, *a method which leads in the course of the ages and apart from biological change to* IN NO DEGREE DIVERSIFIED *and* IN NO DEGREE PROGRESSING *modes of life,* whilst in man this method is superseded by that of intimate cultural interrelations between the thousands of millions of individuals in all the human groups of all the ages, *a method which leads in the course of the ages and apart from biological change to for all intents* ENDLESSLY DIVERSIFIED *and* ENDLESSLY PROGRESSING *modes of life.*

Hence men's cousins, the apes, use now, *exactly* as hundreds of centuries ago, unfashioned sticks and stones, whilst with man the crude eolithic flint tool has very gradually developed into various almost inconceivably more complex and more finished instruments, such as the observatory telescope, the railway locomotive, and the rotary press. Likewise, monkeys chatter now *precisely* as they presumably did half-a-million years ago, whilst in man virtually meaningless chatter has very gradually developed into imposing languages capable of clearly conveying our inmost thoughts and sentiments and of being fixed in writing and printing. In a word, the historically altogether non-progressive method of individuals guided by instinct and individual intelligence, a method absolutely universal in the animal kingdom, is replaced in man by the historically infinitely progressive method of individuals able to profit by the thoughts of their myriad fellows near and far in space and time and capable of infinitesimally improving on those thoughts. These two methods may be respectively distinguished as the individuo-psychic and the specio-psychic, the non-cumulative and the cumulative, the non-progressive and the progressive, the auto-learning and the inter-learning methods.

The view propounded here should commend itself particularly to men of science. As against Huxley, it involves only a " measurable " innate divergence biologically of the human from the simian stirps, and as against Darwin, we are not bound to assume an " immense " difference in native capacity between man and ape. Nor need we subscribe to the monstrously unscientific assumption that individuals, peoples, and ages differ enormously in congenital intelligence, in defiance of all we know of the trivial differences obtaining between the members and generations of individual animal species. On the contrary, we only suppose that man is about as superior to the higher apes as these

are to the higher monkeys ; that, but for inter-learning, he is infinitely nearer to the ape than to a great scholar ; that the innate mental differences between men, peoples, and ages are no greater than we find among animal species ; and that, for all intents, cultural causes account both for cultural differences and for cultural progress through the ages. For the first time thus the science of man is invested with a scientific character, is stripped of all extravagance and caprice, and has for its basis a unit which is calculable because individuals are recognised as differing only infinitesimally in native capacity and as contributing, of themselves, only ultra-microscopically to the cultural heritage. Such a rigorously scientific conception is bound to clash at a score of points with the babel of haphazard present-day explanations. No reader will therefore expect to find in this volume a mere reflection of his own opinions. Rather should he hope for a new, but consistent and helpful, theory of man's place among living beings and men's relations to their fellows near and far in space and time.

Nor should the practical aspect be lightly dismissed. The aberrations of "fundamentalism" and the strange conservatism of modern religious communities are to no small extent due to the dubious position assigned to man by biologists. It is also worthy of note that the cultured generally find it impossible, despite desperate efforts, to harmonise human experience, human history, and human hopes with current biological appreciations of man's place in animate nature. All these classes would be inexpressibly relieved if the dignity and uniqueness of man could be shown to be compatible with his evolutionary origin. Moreover, the longer the deadlock continues, the more manifest it becomes that the prevalent view of man's descent has to be discounted because it leaves human progress and human achievements unexplained and affords no guidance either to the student of human nature or to the perplexed reformer. The only way out of the *impasse* is for biologists to aim at explaining man as he is and not, for the sake of a plausible but wholly inadequate hypothesis, to insist that man is what he palpably is not.

Some seventy years ago the establishment of the general evolution theory created an epochal revolution in the biological sciences and in man's outlook on living nature. It remains for this age to offer a scientific account of the origin and nature of man that shall have a no less profound and far-reaching influence in the sphere of the social and moral sciences and on the leading practical issues of our time. To bring sensibly nearer this eminently desirable consummation is the object of this work.

BOOK I.

THE DISTINCTIVE NATURE OF MAN.

Chapter I.

CHARACTERS COMMON TO PLANTS AND ANIMALS.

In order that we may be able to discuss profitably the place to be assigned to man in the scale of living beings, it is indispensable for us to be clear regarding the characters common to, or separating, plants and animals. Otherwise we should hazard arriving at conclusions which are nebulous and therefore unsatisfactory. On the contrary, as soon as we have definitely established wherein plants and animals agree and differ and studied the divisions to be found in them, we shall be in a position to place man, always provided that he does not possess fundamental characters which compel us to class him apart.

Accordingly, we have decided on an objective review of the leading facts of animate existence. In this Chapter we shall, in consequence, ignore the direct problem of the origin and nature of man and confine ourselves to an enumeration and description of the chief characters common to plants and animals. In the second Chapter we shall then examine, more particularly, what is the distinctive nature of animals. With the ground thus cleared, we may, in the third Chapter, approach with some confidence the problem of the characters which man has in common with plants and, especially, with animals. Having completed this examination, we shall feel at liberty to ask whether anything of importance in man remains to be explained. The answer to this question will occupy the remainder of the volume.

Thus the reader will not be at the mercy of biased suggestions by the author, nor have to enter on a laborious examination of the general facts of life himself. With the material laid before him in the first instance, he can readily compare the author's conclusions with the data whereon they are based and satisfy himself as to their soundness or unsoundness.

We shall now proceed to our statement regarding the salient features which plants and animals have in common.

1. *The Nature of Life.*

Of recent years the problem of the nature of living substance has exercised the thoughts of numerous scholars. Close comparisons have been made of different states of matter in order to grasp the origin of life itself. The general fact of the existence of a series of growingly more complex chemical compounds outside life activities has been established. Attention has been also concentrated on the sister fact to life, crystals. These exhibit the most diversified, complex, and

beautiful regular forms, as well as the phenomenon of growth in certain circumstances. However different they may be from life forms, crystals represent such a remarkable departure from ordinary amorphous minerals that they call for a special explanation and tentatively suggest that proteins are also nature's product created by certain exceptional conditions. Indeed, the prevalent unemotional and purely scientific attitude evinced towards the nature of crystals would be readily extended towards the nature of plants (which are easily conceived as superior types of crystals), were it not that some distance ahead are the higher animals (whom, however, the Descartians regarded as automata and many men still consider as "soul"-less) and a little beyond these, self-conscious man. Furthermore, interest has been growing in the colloids which appear to be the chemical substances having in them the promise of life.[1] The exploration of these diverse lines of approach has, in fact, recently led to the rapid development of biochemistry and biophysics.

However, whilst the transition from non-living to living matter is still imperfectly understood, there is unanimity that life is only to be found connected with cells and that the protoplasm of the cell is the living matter. We shall therefore turn to an examination of the cell.

The following recent works deal more or less exhaustively with the subject of the above Section: H. C. Bastian, *The Nature and Origin of Living Matter,* London, 1905; Jacques Loeb, *The Dynamics of Living Matter,* New York, 1906; D. F. Harris, *The Functional Inertia of Living Matter,* London, 1908; Stéphane Leduc, *Théorie physico-chimique de la vie,* Paris, 1910; H. C. Bastian, *The Origin of Life,* London, 1911; Jacques Loeb, *The Mechanistic Conception of Life,* Chicago, 1912; Stéphane Leduc, *La biologie synthétique,* Paris, 1912; E. A. Schäfer, *Life:* Its Nature, Origin and Maintenance, London, 1912; J. B. S. Haldane, *Mechanism, Life, and Personality,* London, 1913; Félix Le Dantec, *La "méchanique" de la Vie,* Paris, 1913; H. F. Osborn, *The Origin and Evolution of Life,* London, 1918; Emil Hatschek, *Introduction to the Physics and Chemistry of Colloids,* London, 1919; G. Bohn and A. Drzewina, *La chimie et la vie,* Paris, 1920; Georges Bohn, *La forme et le mouvement:* Essai de dynamique de la vie, Paris, 1921; David Burns, *An Introduction to Biophysics,* London, 1921; James Johnstone, *The Mechanism of Life in relation to Modern Physical Theory,* London, 1921; Stéphane Leduc, *L'énergétique de la vie,* Paris, 1921; Benjamin Moore, *Biochemistry:* A Study of the Origin, Reactions and Equilibria of Living Matter, London, 1921; Auguste Lumière, *Théorie colloidale de la biologie et de la pathologie,* Paris, 1922; E. S. Goodrich, *Living Organisms:* An Account of their Origin and Evolution, Oxford, 1924; D. Noël Paton, *The Physiology of the Continuity of Life,* London, 1926; and G. P. Bidder, "The Ancient History of Sponges and Animals," in *British Association Report for 1928.* An older and erudite work on the subject is F. A. Pouchet, *Hétérogénie,* Paris, 1859.

As regards crystals, Bragg's recent works may be consulted: *X Rays and Crystal Structure,* London, 1924, and *Concerning the Nature of Things,* London, 1925; and as regards both crystals and living matter John B. Leathes, "Function and Design," in *British Association Report for 1926.*

2. *The Nucleated Cell.*

Only about half a century has passed since Professor Huxley eloquently dilated on "the physical basis of life" (1868), and approximately a century has elapsed since, through the labours of Schleiden,

[1] See, for example, the chapter on "The Evolution of the Colloids," in Benjamin Moore's *The Origin and Nature of Life,* London, 1913.

Schwann, and their immediate predecessors and successors, the general theory of the cellular nature of life was established. For our forefathers life was synonymous with "animal spirits" or a principle of vitality. They scarcely suspected that life had a physical basis, and as for determining its precise properties, that lay entirely beyond their speculative horizon. For us to-day the purport of life centres in and around the cell.

Life and the complex and unstable, as well as viscid and semi-transparent, substance Protoplasm may be said to be identical. Stated thus baldly, our description of the nature of living matter might suggest an amorphous agglomeration of materials indefinite in spatial extent. To avoid such a misconception it is advisable to concentrate attention on the closely circumscribed and normally almost microscopic cell which contains the protoplasm and its products. This cell has been defined as the unit mass of life. Such a definition, however, should not exclude our recognition of the fine protoplasmic strands or filaments which often traverse the cell walls more especially of plants, connect the cells, and weld the multitudinous cell units into a co-ordinated whole.[1]

Moreover, it may be questioned whether theoretically the cell possesses the simplicity which we normally associate with a basic concept. For instance, when we learn that one of the protozoa, a single-celled bell animalcule, possesses a ciliated disk, a gullet, a pulsating chamber, a food reservoir, and a sheath containing a spirally attached muscle,[2] we feel that it verges on extravagance to speak of the cell as the unit mass of life. No wonder that a specialist protests: "For my part I would as soon postulate the special creation of man as believe that the Metazoan cell, with its elaborate organisation and its extraordinarily perfected method of nuclear division by karyokinesis, represents the starting-point of the evolution of life." (E. A. Minchin, "The Evolution of the Cell," in *British Association Report for 1915*, p. 438.)

A further objection may be urged against the place commonly assigned to the cell in biological treatises. Within it, somewhere near its centre usually, is situated a kernel or nucleus—much smaller, almost always microscopic, more compact, less transparent, and probably reticulated or knotted. "As seen in the living cell the nucleus most commonly appears as a clear, rounded, sac-like body bounded by a delicate membrane and often showing no visible structure save for the presence within it of one or more smaller rounded bodies, the *nucleoli*." (E. B. Wilson, *op. cit.*, p. 78.) This nucleus appears to control the principal activities of the cell and seems indispensable

[1] See Edmund B. Wilson, *The Cell*, New York, 1925, p. 22.

[2] See the illustration in E. Ray Lankester's *Science from an Easy Chair*, London, 1922, p. 196.

for growth and reproduction. Thus it has been authoritatively stated that "a fragment of a cell deprived of its nucleus . . . has lost the power of assimilation, growth and repair, and sooner or later dies." (*Ibid.*, p. 25.)

The part played by the nucleus in reproduction is especially noteworthy. Division begins first within its labyrinth, and only after the nucleus has undergone certain observable and well-defined changes in its chromatin, does it divide into two, each part receiving invariably an equal number of chromosomes. Between these daughter nuclei, which gradually move away from each other, a cell wall forms, after which complete separation ensues, leaving eventually two cells where there had been only one. More significant still is the place occupied by the nucleus in the normal reproductive process of multi-cellular beings—that is, in ordinary propagation by sex. Here the male element or spermatozoön consists chiefly of a nucleus with a propelling cilium attached, whilst its objective is the nucleus of the ovum, with which, after discarding its cilium, it unites to form a single germ or embryo nucleus. Reproduction, therefore, represents in the main a nuclear act, and all hereditary factors must consequently be contained in or about the nucleus.[1] How far, however, the nucleus itself may be composed of simpler vital elements, bearing a relation to the nucleus such as this bears to the cell, remains a problem for future research to resolve.[2]

These reflections suggest that whilst the protoplasm-containing nucleated cell is the invariable unit of which plant and animal organisms are composed, the veritable element of upbuilding and developing life has yet escaped the diligent search of our men of science. The nucleated cell may be, for aught we know, the last of a series of primeval transformations. L. Doncaster (*An Introduction to the Study of Cytology*, 1924, p. 263) touches on this problem: "Chromatin particles are the only constituents of the cell that are not only universally present, but also seem to have a continuous existence and individuality through all cell-generations. These facts suggest that the most primitive living organism was composed . . . of chromatin or something nearly allied to it." In this view Doncaster follows Minchin who had stated: "The earliest living beings were minute, possibly ultra-microscopic particles which were of the nature of chromatin." (*Op. cit.*, p. 454.)

[1] More precisely, the spermatozoön "consists of (1) a head, (2) a middle-piece or body and (3) a tail." "The head contains the nucleus, while the body contains the centrosome. It is these parts of the spermatozoön which are essential to fertilisation." (F. R. Bailey and A. M. Miller, *Text-Book of Embryology*, London, 1912, pp. 13, 15.)

[2] We cannot naturally enter here into the problem of the nucleolus or the existence of several or (as alleged) of no nuclei in certain cells. On the latter point Benjamin Moore writes: "All cells either possess a nucleus or did possess one at an earlier period in their history." (In J. R. A. Davis' *Science in Modern Life*, London, vol. 5, 1910, p. 85.)

3. *Nutrition.*

So much for the fundamental structure of life and the component elements of living forms. However, our interest lies primarily in life's dynamic aspects, and these we must more particularly examine in this Chapter. The instability of nitrogenous compounds is a well-established fact and we know that crystals possess complex geometrical forms and are capable of extensive growth when immersed in their mother liquor. In protoplasmic matter there is a prodigious extension of these two properties. The living cell is essentially unstable or metabolic in character, so much so that life might be defined as self-equilibration—a perpetual oscillation between losing and regaining (rather than reaching, as in the crystal) equilibrium, a ceaseless "adjustment of internal to external relations" (Spencer). Fresh streams of energy being thus continually required, there must be provision for fuel or food to be intermittently or unintermittently secured. Hence nutrition in the broadest sense is an attribute of life. It involves the absorption of oxygen gas and of water and the assimilation of certain other substances. The top of life cannot continue spinning unless it is whipped at more or less regular and brief intervals.

4. *Sensibility and Impressibility.*

The process of alimentation, as we see, is not an indiscriminate one. Since the essential and transforming matter in the cell is protoplasm and since this consists of oxygen, carbon, nitrogen, hydrogen, and a small percentage of other elements, nutrition involves the procuring of these substances. Moreover, the organism is so constituted that it can only assimilate these when united, partly or wholly, in given compounds. Thus, for example, the plant secures its carbon, whereof it largely consists, through its chlorophyll which, under the influence of sunlight, breaks up the carbonic acid of the atmosphere into carbon and oxygen, uniting the former with water to produce starch and liberating the latter. Pure carbon the plant cannot utilise. Similarly the animal depends for nourishment on consuming carbohydrates and proteids, either in the shape of plants and fellow-animals or their products. More exactly, "Animals are unable to assimilate, that is, to utilise as food, the simpler chemical compounds of carbon or of nitrogen. They can only take their nitrogen from food which is in the elaborate form of combination which is called a proteid ; they can only take their carbon either from a proteid or from a carbohydrate or a hydrocarbon. These elaborate compounds only occur in the bodies of other animals or of plants. Hence animals absolutely depend for their food on other living things. Plants, on the contrary, are (with certain exceptions) able to take up as food the compounds of carbon and of nitrogen which may be called the stable or resting condition of those elements—namely, the simple

oxide of carbon—carbonic acid gas and the simple compound of nitrogen with hydrogen which is called ammonia, or the oxide of nitrogen which forms nitrates." (E. Ray Lankester, *A Treatise on Zoology*, London, 1909, vol. 1, pp. x-xi.) In conformity with this basic need of being differentially affected by the environment, we must postulate the property of irritability or sensibility in all animate beings.

This sensibility is also to be found in connection with other leading functions of life. For instance, as every living creature must respond positively to appropriate sustenance in its environment, so must it be repelled by whatever is detrimental to its life. Thus naturalists assure us that many uni-cellular organisms are exceedingly apt at countering dangers,[1] which process, of course, like that of searching for food or for mates, involves sensibility.

Not only, however, is a living being more or less irritated or affected by its environment, but the irritation leaves behind it certain traces. Accordingly, everything that happens to an organism, generally modifies it to a certain extent in a given direction. In this way the organism's structure and reactions frequently undergo measured changes in the course of time through the superposition of one impression on another. The result is a double one : on the structural side adaptations ensue and on the functional side habitual responses.[2]

The maintenance, protection, and propagation of life thus demand sensibility and impressibility.

5. *Adaptability and Regeneration.*

Nutrition and other needs presuppose a selective process. Yet not infrequently circumstances are either particularly favourable or unfavourable, as when one tree is sheltered by groups of neighbouring trees and another stands in an exposed position by the wind-swept seashore. There must be therefore adaptability if there is to be survival in numbers. The food supply may be scanty, when existence

[1]Here is a remarkable example : " There is a trumpet-shaped ciliated Infusorian called Stentor which abounds in marshy pools, attaching itself by the narrow end to water-weed, and surrounding the lower half of its body with a mucus-like sheath, the so-called tube. If a cloud of carmine particles be introduced into the water-currents passing to the ciliated mouth of the Stentor, it bends to the aboral side, twisting on its stalk two or three times as it bends, and thus it often succeeds in avoiding the falling particles. This is answer one. But when the supply of carmine particles is kept up, the ciliary movement is suddenly reversed and the water is driven away from the mouth. This is sometimes repeated two or three times, and is answer two. But if the Stentor does not get rid of the obnoxious stimulation in either of these two ways, it contracts into its tube and suspends activity. After half a minute or so it re-expands, and if the carmine particles still reach it, it contracts again. It will do this many times and after each contraction it stays a little longer in its tube than it did at first. This is answer three. Finally, if no improvement in circumstances rewards the Stentor's trials, it breaks from its attachment and swims forwards or backwards away from its tube. This is answer four." (J. Arthur Thomson, *The Study of Animal Life*, London, 1917, pp. 161-162.)

[2]Geddes and Thomson (*Biology*, 1925) speak of " enregistration " where we speak of " impressibility."

will be impoverished but continue, or it may abound, when growth and development will be accelerated. Exercise may visibly develop the muscles and deficiency of exercise reduce their dimensions. Hence, because of uncontrollable contingencies, a broad margin of fluctuations is the rule in living beings and it is only when perils exceed a certain magnitude that vigour and life are gravely jeopardised.

As regards regeneration, extreme instances of this phenomenon are to be met in some organisms (such as the Stentor) which, bisected or even multisected, grow into as many normal individuals, or in the lower forms of life generally where regeneration of important organs or other parts is not uncommon. Contrariwise, in the highest sentient beings the power of regeneration falls to the lowest limits.

A certain degree of adaptability is a universal property of living beings, including adaptation to the quantity and quality of food obtainable, to fluctuating meteorological conditions, and the like. And so is recovery from more or less severe internal or external injuries and loss of parts.

On regeneration, see T. H. Morgan, *Regeneration,* New York, 1901, and Jacques Loeb, *Regeneration,* from a Physico-Chemical Viewpoint, New York, 1924.

6. *Growth and Development.*

In the earlier phases of the life of an organism the tendency is towards a moving equilibrium and an accelerated spin. That is, more energy is at that period assimilated than is requisite for the bare maintenance of equilibrium. This has for its object to allow growth to adulthood when growth is for all intents arrested.[1] Again, whilst growth, or increase in bulk through intussusception, is an invariable vital phenomenon, it is in the higher forms of life largely subordinated to the more complex process of somatic development, as illustrated by the radical transformation of the single, almost amorphous germ into the multi-featured fœtal stage and that into the mature and far more advanced individual. Indeed, the two main functions of individual life may be regarded as consisting of growth and development, these culminating normally in reproduction. All energy production or repair of waste, all increase of dimensions due to the generous nourishment of the body or to growth from birth to nubility, would be thus broadly covered by the term growth. The remainder, including regeneration, would fall partly or entirely within the category of development. This, consequently, does not consist primarily of growth in the size, or of mere increase in the number, of cells, but of the transmutation of a cell into cells of markedly different character or of a novel disposition of cells. Roughly, growth appears thus a quantitative, and development a qualitative, vital process.

See, among others, with regard to growth, C. S. Minot, *The Problem of Age, Growth, and Death,* London, 1908 ; D'Arcy W. Thompson, *On Growth and Form,* Cambridge, 1917 ; and G. R. De Beer, *Growth,* London, 1924.

[1]Growth has a double end in plants.

7. *Decline and Death.*

Still, a pivotal distinction exists between uni-cellular and multi-cellular organisms. Uni-cellular beings, it is widely held, are theoretically immortal. They only succumb to a violent death or one of privation. Their energies persist unabated and their functions do not become impaired with the passage of time. Assuming a uniformly favourable environment and death would never overtake uni-cellular organisms, except in the sense that each life would automatically divide into two after the lapse of a stated period. With multi-cellular beings deterioration enters on the scene. The diminutive and feeble infant grows in stature and strength and capacities for a given time, to the stage called adulthood. Subsequently he remains perhaps for a term stationary or develops some functions more particularly, his mentality, for instance. Then gradual decline follows, which is all too soon converted into senility, until equilibration has become so precarious that any trivial disturbance or affliction compasses the death of the once vigorous and lusty creature.

In a remarkable passage Halliburton sums up thus the decline and passing of individuals: "As the prime of life is past, signs of old age begin to appear, the eyes become feeble, the hair becomes grey, the cartilages calcify, the muscles become weaker, digestion gets feebler, and metabolism in every way more and more imperfect. If this continues, life is ultimately terminated by natural death, in which the functions get weaker and weaker and finally cease. Death from old age, however, is comparatively rare; the common cause of death is accident, in which term we include disease. In the activity of youth many a disease is vanquished, but as the powers of resistance diminish with increasing years, some ailment usually upsetting more particularly some important organ will ultimately find the body unable to repel its attack." (W. D. Halliburton, *Handbook of Physiology,* London, 1928, p. 874.)

What constitutes death? In propitious circumstances the uni-cellular organism is, as we have seen, exempt from this fatality. Why, then, does the multi-cellular organism so radically depart from its uni-cellular parent form in this respect? Conceivably, the inter-dependence of its cells renders continued cell activity impossible when some part of the vital structure is destroyed. Possibly nature's indifference to the organism after it has provided adequately for sufficient offspring capable of independent existence, has left the ripe organism at the mercy of chance and therefore a prey to decay. However, if the endeavours of the late Metchnikoff and his school to detect and exterminate the germs of decline should prove successful, science may restore the physical balance neglected by natural selection and scotch, if not slay, decline and fabulously postpone death.

On the subject of the combating of decline and the prolongation of life, see E. Ray Lankester, *On Comparative Longevity in Man and the Lower Animals,* London, 1870 ; Elias Metchnikoff, *The Prolongation of Life,* London, 1910, and *Etudes sur la nature humaine,* Paris, 1917 ; Hermann Weber, *On Longevity and Means for the Prolongation of Life,* London, 1919 ; Octave Laurent, *La Science de la vie et la longévité,* Paris, 1921 ; G. Stanley Hall, *Senescence,* the Last Half of Life, New York, 1922 ; Raymond Pearl, *The Biology of Death,* Philadelphia, 1922 ; T. B. Robertson, *The Chemical Basis of Growth and Senescence,* London, 1923 ; and Paul Kammerer, *Rejuvenation and the Prolongation of Human Efficiency,* London, 1924.

We ought to distinguish between molecular and molar death. In the former case we are contemplating that death whereby we live, the destruction of cells which is the normal accompaniment of vital activity, *e.g.,* the epithelial and muscular tissues are periodically worn out and replaced. In molar or integral death the power of repair ceases. Even here, however, it behoves us to recognise that death is not constantaneous. The nails and the hair continue to grow for many hours after the heart has ceased beating, and with proper care portions of an animal which has just died may be removed and kept alive for several days or weeks. There can be therefore no question of " life " departing after " death " supervenes, seeing that at a certain point of time some parts of the plant or animal are alive whilst others are dead.

In justice to the cell it should be stated that the dead multi-cellular organism does not, strictly speaking, spontaneously disintegrate. That is, if through intense heat or intense cold, or by other appropriate means, certain bacteria are destroyed or rendered inactive, the corpse remains indefinitely unaltered. In other words, there is no principle or inclination in the dead body to decompose. Putrefaction appears to be solely the effect of attacks by putrefactive organisms.[1]

8. *Reproduction and Over-reproduction.*

Growth appears to have its well-defined limits, traceable in utmost purity in uni-cellular organisms. Here growth normally proceeds until, we might say, equilibration is disturbed and the nucleus, and with it the cell in its entirety, divides into two. Where there was one cell, two now exist. And each of these cells is, barring accident, destined to pass through the same cycle as the parent cell, duplicating itself in due course.

In the Metazoa or many-celled animals reproduction involves as a rule two beings of different sex. These cooperate for reproductive

[1]There is another aspect to the problem of the disintegration of dead organisms : " The occurrence of saprophytes is essential to the conservation of life. If the saprophytic, coprophagous, and necrophagous organisms disappeared, dead bodies and excreta would accumulate on the earth's surface, all the material utilisable by animals or by plants would be locked up in the remains, and if there were no power to restore the dead material to an inorganic state, the earth would soon become nothing but a gigantic charnel-house." (Jean Massart and Emile Vandervelde, *Parasitism, Organic and Social,* London, 1895, pp. 6-7.) For this reason, " the final destiny of all living substance is, sooner or later, directly or indirectly, to become food for bacteria." (John Murray, *The Ocean,* London, 1913, p. 153.)

purposes, the male sperm fusing with the nucleus of the female ovum to form the germ or zygote out of which the new generation develops. In this instance reproduction is not inevitable as in the simpler forms above alluded to and even neuters, as among bees, are to be found.

We have affirmed that growth is normally followed by reproduction. On looking more closely, we shall find that reproduction has for its normal complement over-reproduction. From the viewpoint of ensuring the perpetuation of plant and animal species such over-reproduction is indispensable, for if each animate being gave only birth to one other, or each couple to only two others, unpropitious circumstances would soon reduce and ultimately exterminate all species. For this reason also over-reproduction varies : the redoubtable elephant reproduces its kind sparingly, whereas numerous fishes produce myriads of eggs in order to counteract the ravages of a supinely indifferent environment. In this connection G. R. De Beer (*op. cit.*, p. 110) speaks of " the power of increase of a bacterium from unity to a number of thirty figures in a day," *i.e.*, from 1 to 1,000,000,000,000,000,000,000,000,000,000 in a day, and H. P. Fairchild, in his *Elements of Social Science,* of " one minute organism whose rate of reproduction is so great that, if it were not checked, in thirty days it would form a mass a million times larger than the sun."

9. *Heredity.*

The factor of heredity was until recent times regarded as of pre-eminent importance in biology. This was because characters acquired during the life-time of an individual and due to increased or diminished functional exercise were supposed to be inherited. Diverse diseases were also assumed to be acquired and subsequently transmitted to the succeeding generation through the medium of the sex elements in reproduction.

In respect of the inheritance of acquired characters we shall learn in the Section following this one, that it has been, to state the matter temperately, enormously over-estimated, such characters being as a virtually invariable rule either re-acquired (as when parent and offspring pursue a similar mode of life under analogous conditions) or initially due to germinal variations in the parent.[1] Likewise, touching certain diseases wrongly presumed to be inherited, it has been demonstrated that the offending microbes are transferred to the progeny through the close association of the female parent with the embryo and fœtus and, beyond, during birth and infancy. To these

[1] " It is fair to recognise that the biological question is by no means finally closed ; and that experiment may yet furnish evidence against an absolute acceptance of Weismann's principles. But if inheritance of acquired modifications remains a theoretical possibility, nevertheless, to have evaded demonstration hitherto, its effects must be infinitesimal and for practical purposes negligible. This, I think, is now non-controversial." (C. Burt, " The Inheritance of Mental Characters," in *The Eugenics Review,* July 1912, p. 184.)

influences should be also referred much else that is ascribed by some to heredity.

Science having dispelled these specious illusions of common sense, the problem of heredity requires a new formulation. We shall see that individuals slightly deviate innately from their parents in numerous directions. Accordingly, in bi-sexual propagation the sex elements of the two parents cannot be said to possess identical characters. Whence follows that the offspring of the two parents must either exhibit in combination the particularities of both parents (*e.g.*, the complexion of the child being a blend) or that only certain of the parental characters are transmitted. The latter is ordinarily the case, and then we speak of the young having inherited this or that trait from the one or the other parent. The problem is even more complicated, however, in that reversion to grandparents[1] and, indeed, to remote ancestors (as in the well-known atavistic characters in pigeons and horses) has to be accepted as an incontrovertible fact. That is, just as the human embryo, in its successive phases, recapitulates in part the general outlines of organic evolution, so characters of ancestors may reappear in the individual, demonstrating that what is expressed in post-natal existence is far from reflecting the sum and substance of germinal potentialities. In all such instances we may legitimately speak of the inheritance of certain traits. In one respect, then, heredity deals primarily with those germinal characters which have become dominant in any one individual. Secondarily, it also comprises any somatic modifications or acquired characters that may have been transmitted to offspring through the sex elements being affected by the same influence as the body as a whole, *e.g.*, by the action of some toxin. Naturally, the great mass of characters which constitute the individual a member of a species, of a genus, etc., are inherited, heredity being the genetic relation between successive generations.

10. Germinal Variation.

If each life culminated in a new and identical life, we should needs have to imagine as many beginnings of life forms as there are species or varieties. A supplementary factor requires therefore to be invoked if we are to explain the existence of the multitude of living forms. This will be found in the circumstance that however closely an offspring resembles its parents or ancestors, it nevertheless diverges slightly from them in sundry respects by virtue of its innate constitution. Germinal variations represent, accordingly, a further basic fact in life and one entailing far-reaching consequences, as we shall see in the next Section.

[1]This tendency to reversion was recognised long ago. We read, for instance, in Lucretius (*On the Nature of Things*, bk. IV.): "Sometimes the children may spring up like their grandfathers and often resemble the forms of their grandfathers' fathers."

The causes of innate variation have proved a subject of fascinating interest and interminable discussion. We have seen that during the life-time of the individual a certain degree of adaptability exists. Proceeding inferentially, Lamarck and Herbert Spencer—and Charles Darwin following them occasionally—reasoned that characters acquired in the individual's life-time through use or disuse are, or tend to be, transmitted to offspring. Lamarck, the illustrious founder of this theory, contended therefore that since, for example, adverse environmental conditions exact of giraffes a continual stretching of their necks, the cumulative effect of these exertions through many hundreds of generations is summed in the extraordinarily elongated neck of the giraffe of the present day. By the aid of this hypothesis of the inheritance of acquired characters much appeared explicable in the process of evolution, and Darwin frequently had recourse to it, more especially in connection with the tracing of the ascent of man.[1] Unfortunately, uncompromising experience offers such equivocal or hostile testimony to this attractive theory, that it may be regarded as at best of negligible importance in explaining inborn variations.[2]

Nor can we take refuge in the colourable but self-contradictory doctrine that the mingling of the different characters of the two parents accounts for congenital diversity in the offspring, for, on the one side, it is precisely the development of these diverging characters which demands explanation and, on the other, there are elements in the offspring which cannot be reasonably traced to the parents. All that we can assert is that given congenital differences in the parents, the combination of these in the germ may possibly increase the potentialities of variation. Moreover, in the inheritance of parental characters we have first and foremost an illustration of inherited qualities and not of variation proper.

We are confronted, then, with the theory which most widely obtains in our day, namely Weismann's theory of the mutability and continuity of the germ plasm. This theory implies that the vicissitudes of post-germinal existence leave the gametes and the zygote wholly unaffected, save in the case of certain substances which penetrate the

[1]Natural selection appears to involve the evolution of virtually stable and virtually uniform types corresponding to a broadly stable and uniform environment, whereas the use and disuse theory seems to imply indefinite individual and group adaptation to passing individual and group circumstances. The latter theory probably confuses what is advantageous to a given individual or group with what is likely to be advantageous to a given species.

[2]See, however, Félix Le Dantec, *La science de la vie,* Paris, 1912, and E. W. MacBride, *An Introduction to the Study of Heredity,* London, 1924. F. A. E. Crew, *Animal Genetics,* Edinburgh, 1925, has an interesting section on "Transmission of Acquired Characters," pp. 339-352.

Note that we speak our language all the days of our life and that perhaps many scores of generations have spoken it and nothing else. Yet no evidence exists that this extraordinarily intensive and long-continued use leaves any marks on the successive generations. Is it, then, probable that other practices should affect the life germ ?

whole organism including the sex elements. All heritable variations, conformably to this theory which is held to be most nearly concordant with recent research, must therefore be variations in the germ plasm. The discussion of the complicated and hypothetical mechanism of heredity postulated by Weismann and Mendelians, the determinants and factors in heredity, is beyond the scope of this work.

Darwin declares that when the environment is profoundly altered or materially altering, the reproductive system tends to lose its equipoise and variations are consequently more abundant. To this he ascribed the generally admitted fact, which is now however being questioned, that cultivated plants and domesticated animals vary more conspicuously than their wild congeners. He also suggested that certain variations induce secondary morphological changes of a more or less far-reaching order, as in the case of white male cats with blue eyes which are alleged to be invariably deaf. Temperature and food are also said by experimentalists like Loeb[1] to influence the germ critically.

Darwin held that germinal variations are almost without exception imperceptibly small, and substantial variations are therefore, in his opinion, the massed result of slight variations through thousands and tens of thousands of generations. On the other hand, Mendelians claim that variations are not continuous but discontinuous and that they are frequently of a decidedly palpable character. "Sports," that is, such as the Angora sheep referred to by Darwin, instead of being rare and irrelevant to the evolutionary process, are alleged by Mendelians to be fairly common and to represent the ordinary method of evolutionary progression. However, the theories of both Darwinians and Mendelians concur in this that variations in a species give rise to varieties or to very nearly related species. Mendelians do not expect to pluck bananas from rose trees or to find tigers giving birth to ducks. This involves that effective variations are narrowly circumscribed and that genera, families, orders, and classes are the outcome of æons of evolution.

How innate variations are produced is as yet a moot point, but numerous experiments are being conducted to elucidate the issue.

11. *Evolution.*

It is, then, a fundamental attribute of organisms to vary germinally. Yet this of itself might be of little concern to us in this work. If these

[1] A recent work of the Loebean school is L. T. Hogben and F. R. Winton, *An Introduction to Recent Advances in Comparative Physiology,* London, 1924. See also on the same subject F. W. Gamble, "Construction and Control in Animal Life," in *British Association Report for 1924.*

[2] Arthur Fairbanks (*Introduction to Sociology,* London, 1922, p. 253), quotes Wallace to the effect that "the experience of all cultivators of plants and breeders of animals shows that when a sufficient number of individuals are examined, variations of any required kind can always be met with." The triumphs of horticulturists generally and of Luther Burbank in particular are difficult to comprehend on any other theory.

variations represented fluctuations, coming and going like the tides and the waves of the seashore and exhibiting no tendency to perpetuate and accentuate themselves, the genesis of species would be uninfluenced by them. They would correspond to the ephemeral adaptations induced by the environment within the life-time of individual animals and plants.

Such a conclusion would not harmonise with the data. Whatever the correct explanation may prove to be, certain variations at least are perpetuated and accentuated and it is these which account for the lavish profusion of animal and plant forms geographically and geologically. The reason for this perpetuation and accentuation is stated by Darwinians to be natural selection, or the struggle for life consequent mainly on marked unfavourable changes in animate or inanimate environmental conditions. This selective process is said to issue in the survival of the relatively fittest for a given environment and therefore includes, strictly speaking, both progressive and retrogressive evolution. In other words, since the members of any species encounter at all seasons and most especially at certain geological junctures formidable obstacles in maintaining themselves, those of them, it is argued, will command superior prospects of surviving and rearing offspring which have varied in a manner favourable to themselves. On the other hand, unfavourable variations will be eliminated by this identical process of unconscious and pitiless selection.

We are not concerned with the minutiæ of the subject and need not therefore cruise in controversial waters. The struggle may be not only for necessaries but for comfort. It may also relate to closer cooperation among members of a family or group, or to success through manifesting kindlier feelings towards offspring, mate, and the race generally. It may assume the form of sexual selection or of variation along organically predetermined lines. Or it may express adaptation to other animate forms, as in the adaptation of insects to flowers and *vice versa,* or in the mimicking of living or non-living objects by colour, shape, or voice.

Darwin never tired of reiterating that the minutest favourable variation would benefit an animal or a plant in the struggle for existence and would therefore tend to be perpetuated. But this view has its difficulties. Success in life hinges on numerous physiological and environmental conditions, and factors and capacities are scarcely ever so delicately—and, one may add, so unwholesomely—balanced that the most trifling gain of a certain category should terminate in survival or extermination. Otherwise stated, if microscopic advantages and disadvantages were able to determine preferential survival in ordinary circumstances, then the violent alternations so common in nature would annihilate living beings altogether. In reality, the substantial

adaptations produced in individuals by their surroundings heavily discount such an interpretation. Only where there is a new trend in an environment and where variations in harmony with that trend are accordingly fostered in the species as a whole or in an isolated portion thereof, does there appear to be a likelihood of variations surviving and being accentuated from generation to generation. Save on some such assumption, the relative and conspicuous constancy and uniformity of species becomes unintelligible. On grounds of logic Darwin's conception of every favourable variation being perpetuated and accentuated implies that every species and every genus is a weltering chaos of varieties in every state of development, which it certainly is not. On the contrary, we may lay it down for our guidance in the succeeding Chapters that where the environment is relatively stable the native outfits of all the members of a species remain confusingly alike for protracted periods.

Given therefore an environment changing from one type to another widely different, and granted that in such a condition perhaps the reproductive system or some other factor intensifies the tendency to vary, one can comprehend how during the geological epochs which have passed, the multifarious and marvellous forms of animate existence have successively emerged.[1]

12. Conclusion.

Such appear to be the principal characters common to plants and animals. We may sum these up by stating that the unit mass of life is the protoplasm-containing nucleated cell and that all plants and animals exhibit the phenomena of Nutrition, Sensibility and Impressibility, Adaptability and Regeneration, Growth and Development, Decline and Death, Reproduction and Over-Reproduction, Heredity and Germinal Variation, and Evolution.

For scientific purposes a comprehensive survey such as ours has been was imperative inasmuch as without it we could not be sure of man's precise relationship to other living forms. Our object, in fact, would have been defeated if we had started with certain assumptions however plausible. Our only hope for obtaining a satisfactory answer to Huxley's "question of questions" is to allow nothing to stand between us and the facts. We may direct our attention now to the distinctive characters of animals.

[1]Leaving aside selection by human agency, ordinary observation, reinforced by historical and archeological records, seems to reveal remarkable uniformity, spatial and chronological, in the members of given species.

"The voice I hear this passing night was heard
In ancient days by emperor and clown."—KEATS.

We may assume hence that in our epoch the natural forces operate chiefly in maintaining the type. As we have already intimated, in a relatively stable environment favourable germinal modifications have no opportunity of accentuating and universalising themselves.

Chapter II.

THE DISTINCTIVE NATURE OF ANIMALS.

1. *Locomotion.*

We have reached a higher platform. The plant, it is true, is able to extract its nutriment directly from lifeless nature through the agency of its chlorophyll and its absorbent rootlets. The individual animal, however, whilst dependent for its sustenance, whether proximately or remotely, on vegetal food, is not confined to one narrowly and inexorably determined locality. The one is rooted, the other locomotive.

As we might expect, the sharp distinction between plant and animal—the one rooted and the other locomotive—is virtually non-existent on the first rungs of the ladder of life.[1] Accordingly, we shall ignore here the lowest orders of animate beings. It is, of course, also obvious that the widely observable movements, or rather mostly outgrowths, of certain parts of rooted plants belong to a fundamentally different category. Moreover, the parasitic, saprophytic, and insectivorous habits of numerous plants, some even of a comparatively high order, suggest that nutritional dependence on plants or animals cannot be regarded as the distinctive animal attributes, for otherwise certain parasitic plants would have to be classed as animals; rather is this nutritional dependence in animals due, it seems, to the locomotive factor, to free or integral movement from place to place.

We may further observe that not only are we ignorant of any stationary animal of high intelligence, but that stationary animals, without exception, whether low in the scale (such as sponges) or degraded at a certain stage of their life-cycle (such as certain insects), scarcely rise above plants in mentality. Thus intelligence and high organic development appear to be indissolubly wedded to locomobility. In this connection it is interesting to learn that of the whole immense phylum Vertebrata only about half-a-dozen species of fishes

[1] However, "the great majority of animals can and do move from place to place; and even when they are fixed, as it is termed sessile, their larvæ are capable of very active movement." (A. E. Shipley, *Life*, Cambridge, 1923, p. 2.) See also the same work on plant and animal movements, as well as Jagadis C. Bose, *Life-Movements in Plants*, Calcutta, 1918, 1919, 1923. According to Huxley (*Discourses: Biological and Geological*, London, 1894, p. 163), Cuvier regarded the alimentary cavity as "the primary and the most important distinction between animals and plants." Isidore Geoffroy Saint-Hilaire's long chapter on the subject of animal movements in his *Histoire naturelle* may be also mentioned here. The various movements *in loco* of plants may be distantly compared to the secondary movements of animals—movements of head, mouth, eyes, grasping, &c.

are parasitic and that no instance of parasitism is known among amphibia, reptiles, birds, and mammals.[1]

2. *The Animal Organism.*

This seemingly unimportant property of integral locomotion opens the door to a fairy-like world rich in varied possibilities. The greater energy required for moving from place to place, the multifarious demands of an incessantly changing environment, hunting and being hunted, tend to produce an almost infinitely more complex organism than that of a plant. A vertical medium section through the trunk of an oak tree and a horizontal medium section through the trunk and head of a lion would reveal a startling difference. The oak tree, by comparison, can scarcely be deemed an organ-ism, for its structure is simplicity itself. It possesses, speaking broadly, roots, stem, branches, bark, leaves, flowers, seed, a few primitive tissues, the power of absorbing water and certain mineral substances in solution and of decomposing the carbonic acid in the air, and is, of course, cellular in structure. The lion, on the other hand, *solely because he belongs to the order of locomobile beings,* has an elaborate vascular system, respiratory system, digestive system, assimilative system, excretive system, epithelial system, glandular system, nervous system, sensory system, muscular system, skeletal system, prehensile and locomotive system, reproductive system, and possesses other salient characteristics. In fact, "*plants in their structural relations remain about the level of Cœlentera among animals*" (Patrick Geddes and J. Arthur Thomson, *Evolution,* London, 1911, p. 96, italics ours), *the Cœlentera constituting the second lowest group of multi-cellular animals.* E. Ray Lankester (*A Treatise on Zoology,* London, 1909, vol. 1, p. xv) speaks of "the arborescent, filamentous, foliaceous, fixed series of living things called plants."

Moreover, the evolution of integral locomotion has permitted the peopling of the air by animals adapted for flight and the inhabiting of the waters by animals adapted for swimming. Thus life, through the development of the motor faculty, conquered fresh realms inaccessible previously except to miscroscopic vegetation. Even where plants, in their flowers and fruits, display riotous colouring and superb gracefulness in form, this seems to be owing to their dependence for fertilisation on locomotive organisms. Suppress the indirect effect which insects have exercised in vegetal propagation and evolution, and almost naught but grey and green plant hues remain (if we omit some spring foliage and the gorgeous autumnal tints of decay), whilst fragrant odours have presumably vanished.

[1]According to Aristotle "to be an animal means to have the power of sensation." (*Aristotle's Psychology,* tr. by W. A. Hammond, London, 1902, p. 280.) For Socrates' distinction between man and animals, see Xenophon's *Memorabilia,* bk. 1, ch. 4.

3. *The Senses.*[1]

Furthermore, the emergence of locomotion—of integral movement of the organism as a whole—brought in its train an even profounder revolution than that implied in animal structure as such. We have seen that the lowest order of life consists of uni-cellular beings and manifests sensibility. The indeterminate circumstances of the locomotive condition, however, necessitate a prodigious development of the property of sensibility. One sense after another is for this reason evolved—sense of touch, of temperature, of pain, of taste, of smell, of hearing, of sight, among others. In this way a host of sentinels are brought into being who guard and inform the locomotive organism.

Naturally the senses only gradually and circuitously attain to the elevated levels exemplified in the higher vertebrates.

The *tactile sense,* which informs us of the configuration, dimensions, and surface irregularities of objects with which we come into direct contact, was naturally the first sense to be evolved. Owing unquestionably to its requiring immediate contiguity, the sensory apparatus did not develop beyond simple terminal nerves differentially distributed over the body according to practical needs. The table below indicates roughly "the relative power of distinguishing two points in the more important regions of the surface of the skin" in man :—

Tip of tongue	1.1 mm.
Palm of terminal phalanx of finger	2.2 „
Palm of second	4.4 „
Tip of nose	6.6 „
White parts of lips	8.8 „
Back of second phalanx of finger	11.1 „
Skin over malar bone	15.4 „
Back of hand	29.8 „
Forearm	39.6 „
Sternum	44.0 „
Back	66.0 „

(Michael Foster, *A Text Book of Physiology,* London, vol. 4, 1900, p. 1532.)

According to what could be anticipated, "as a general rule it may be said that the more mobile parts, or those which execute the widest movements, or execute movements most easily and frequently, such as the hands and lips, are those by which we can thus discriminate [tactile] sensations most readily." (*Ibid.,* p. 1533.) Of signal importance as the tactile sense proves to be in life, primitive structures suffice for its purposes.[2]

[1] A masterly experimental enquiry into the nature of sensitivity in general will be found in Jagadis C. Bose's *Response in the Living and Non-Living,* London, 1902. A comprehensive work on the sensations is Johannes v. Kries, *Allgemeine Sinnesphysiologie,* Leipzig, 1923. An ample treatment of the subject is available in the leading works on physiology.

[2] "In the case of the other senses, man is inferior to many animals, but in discriminations of touch he is far superior to the others. For this reason man is the most intelligent animal." (*Aristotle's Psychology,* p. 82.)

The *temperature sense,* conveying the sensations of heat and cold, is glossed over in the traditional fivefold classification of the senses. The warning and counsel, however, which it furnishes, shows that it is of moment in life. Physiologically, we meet here with a mechanism of a similar character to that involved in the sense of touch, save that there are separate "heat" and "cold" nerve terminals, alternating with "touch" terminals, at irregular intervals of space. Accordingly, some points on the skin yield the sensation of touch, others that of heat, and still others that of cold—an efficient and yet curious arrangement unsuspected until recent times.

We may class with the foregoing the obscurest and yet most real of the senses—the *sense of pain.* In this instance also distinct pain spots have been traced on the skin. However, one of the effects of painful contact is undoubtedly that of more or less violently disturbing the equilibrium of the central nervous system. Still, when we reflect that we speak of gnawing, burning, throbbing, cutting, and other pains, and that by firmly fixing our attention on these pains the pain sensations persist whilst the pain passes (G. Spiller, *The Mind of Man,* ch. 6), we shall recognise the inadvisability of pursuing the subject in these pages.

The above-mentioned three senses possess a common character, that of being more or less extensively and intensively distributed over the cutaneous surface as a whole or, as with the sense of pain, over both the external and internal parts of the body.[1]

The lowest of the senses with a restricted localisation may be said to be the *gustatory sense.* Here we are still concerned with separate nerve terminals ; but these are located irregularly in the mouth—about the tongue, more especially the back of the tongue, the soft palate, the pharynx, and parts of the epiglottis. In this case there is a measurable augmentation of distinctive qualities, although far from being as great as common sense surmises. Sweet and bitter, salty and acid, seem to comprise the whole compass of the gustatory sense. If this appears to contradict daily experience, it is due to the fact of the proximity of the olfactory apparatus, owing to which odours are mistaken for flavours. Thus it is said that an apple and a potato give rise to practically identical sensations when being eaten, provided that the nostrils are closed or the olfactory sense is in abeyance, as through the effects of a severe cold in the head.

[1] "It has been ascertained that there exist [in man] in the skin of the trunk and limbs 30,000 *warm spots* which always react to stimulation with a sensation of warmth, 25,000 *cold spots,* 500,000 *touch spots* ; while *pain spots* seem to be present everywhere." (H. L. Wieman, *General Zoology,* New York, 1927, pp. 131-132.)

Robert S. Woodworth (*Psychology,* London, 1922, p. 197), dealing comprehensively with the sense of "touch," states that "rough and smooth, hard and soft, moist and dry, hot and cold, itching, tickling, pricking, stinging, aching are skin sensations."

This brings us to the humblest of the three highest senses—the *sense of smell.* These three senses are distinguished by three general characteristics. They each possess a special nerve leading to the brain—olfactory, auditory, and optic. They have a duplicated apparatus—two nostrils, two ears, and two eyes. They furnish information in regard to objects at a distance. And, besides, the sensations in this series possess numerous qualitative distinctions.

We need say little about the olfactory sense. Odours are profusely varied in character: they have been recently classified as spicy, flowery, fruity, resinous, foul, and scorched, and also as aromatic, fragrant, ambrosial, alliaceous, goaty, repulsive, and nauseating. Infinitesimal particles separate themselves in a yet inexplicable manner from certain substances mostly of a vital nature and are wafted by air currents in every direction, sometimes for many miles. When these odoriferous particles travel past the upper part of the nasal mucous membrane, certain sensations are experienced which we call those of smell. Odours, however, like tastes, are essentially individualistic in character. They each bring their own message and do not combine with other odours to form a higher synthesis such as is presented in a musical composition or in a landscape painting. Moreover, appreciation of an odour rapidly fades when the odour persists and scarcely develops when it very gradually grows in intensity, thus further minimising the intellectual, and even practical, value of olfactory sensations. Still, when we observe how dogs indefatigably sniff when out in the open, we may realise the immense benefit accruing to creatures endowed with a good sense of smell.[1]

The olfactory sense brings us into contact with near and fairly distant objects by means of infinitesimal particles detached from those objects and aimlessly drifting in the atmosphere. In the *auditory sense* the element of uncertainty is substantially reduced through the vibrant atmosphere mechanically carrying more or less loud sounds for considerable distances in every direction. However, these sounds are to some extent at the mercy of strong air currents.

The sounds emanating from inanimate objects are of comparatively infrequent occurrence and unimportant, strong winds, waterfalls, thunder, and falling rain and hail, being among the few exceptions. In addition, since each object, as a piece of metal or wood, emits commonly what appears to be a single and individual sound, the intellectual value of inanimate sounds is significantly limited. The sound furnishes an indication of an otherwise known object, but of itself supplies exceedingly meager information. Besides, since sound implies an object thrown into appreciable vibration, and since most objects are rarely in such a condition, the generality of objects in our

[1]On the sense of smell, see more particularly Hans Henning, *Der Geruch,* Leipzig, 1916.

environment do not exist for us at any given time so far as sound-derived knowledge is in question. When, however, we draw within our circle animal life, the value of auditory sensations is greatly enhanced. The movements of animals produce sounds which convey priceless information to friend and foe alike, and the cries and calls and songs which fill the forest show that animal life prodigiously profits by the auditory sense. Indeed, allowing for a somewhat limited radius, recognition by sound represents a simpler, more rapid, and more certain process than a search contingent on the employment of the visual sense which is impotent in the dark and cannot detect anything not directly exposed to the eyes. The auditory sense is also the most intimate, the most appealing, of the senses, since among land vertebrates the communication of wants and emotions is mostly effected by the voice.

Telephony depends on a "receiver" which gathers the æther waves created by the voice in the electric "transmitter" and re-transforms them into sound. An instrument of a similar character is the auditory apparatus. Hence its complexity, especially when compared to the almost featureless apparati discussed in the preceding paragraphs. When we study, for example, the visible ears or auricles, particularly in animals like the horse where they freely move, the concha, the external auditory meatus, the tympanum, the remarkable tympanic cavity with its malleus, incus, and stapes, the osseous labyrinth comprising the vestibule, the three semi-circular canals, and the cochlea, and the organ of Corti which mediates between the foregoing and the auditory nerve leading to the brain, we feel that in order of complexity a vast tract divides the auditory sense from the senses below it.

What, then, shall be said of the *sense of sight* as presented in the higher order of animals? Nothing less than that it is as superior to the sense of hearing as that is to the sense of smell, taste, pain, temperature, and touch. The four primitive senses yield no information in regard to the world above, below, and around. Only that which immediately and directly touches the skin and mouth appeals to them. The existence of the wide expanse beyond, with its illimitable treasures and meanings, they do not even hint at. With odours we receive an intimation of the macrocosm, but only an intimation. Sound renders animals aware of objects in more or less violent agitation or collision; it is an ever watchful guard conveying suggestions of perils by day and night; and it serves as a channel for communicating wants and feelings between members of the same family and the same species. Only the visual sense, the king of the senses, sees reality steadily and sees it whole. True, it is powerless in the absence of light; but granted its presence, it offers the sole instrument for becoming closely acquainted with the Universe wherein we live.

Wherever the eyes are turned, knowledge streams into the mind. In a few moments numerous particulars of an animal, a building, or a mountain, are revealed. The slow gropings of those stricken with blindness supply, by contrast, an admirable illustration of the superiority of the visual sense. What meaning can a being lacking the sense of sight attach to the idea of a tree, a wood, a seascape, a sunset, a starry night? That which would occupy days and weeks and months to apprehend tactually we comprehend in a few seconds. The tactile sense would also suggest a drab world, shades of sober and sombre grey, sensations of a qualitatively indefinite and comparatively homogeneous character. It does not even remotely hint at the charm of the gay, varied, and yet well-defined hues of red, yellow, green, blue, with their many shades, intermediates, and combinations. Moreover, the delight of viewing phenomena as totalities instead of having tediously to discover a detail here and there falls in a measurable degree solely to the being armed with vision. Only song and music, in their limited sphere, are meet rivals of the constructive and artistic visual sense.

The sun's rays travel at the rate of some 200,000 miles a second and proceed nearly a million times faster than air waves by which sound is commonly transmitted. No wonder, then, that the sense of sight is incalculably swifter in its grasp than the other senses, and is thus able to perceive and to fuse into unities countless characters of objects. For this very reason the mechanism of the eye immensely exceeds in complexity the mechanism of the ear. No human instrument refined by generations bent on perfecting it, approaches the eye in scope and achievement. Anatomists and physiologists never weary in minute descriptions of the structure and the functions of this the most complex of vital organs. And yet, traced back to primeval times, simple pigmented spots absorbing light are at the fountainhead of vision. Beginning with these, by seizing on useful variations, natural selection has evolved nature's masterpiece whose primary design it is to bring animals into many-sided contact with the world at large.

From diffuse and faint sensibility we thus advance to a number of localised senses and a host of definite sensations. In this way animals are provided with much necessary information which the plant neither needs nor commands.

4. Self-regarding Instincts.

However, knowledge of the external world would be vain if it could not affect action. Mere acquaintance with its surroundings would leave the animal impotent. To survive and to flourish, it must be able intelligently to react and must possess, moreover, the organs necessary thereto. As we shall now learn, nature has made generous provision for this eventuality. Here we rise to the second rung of

the evolved mental life. Nature produces in animals intelligent reactions through the agency of a still imperfectly apprehended process called instinct—a process whereby the animal knows, without having learnt it, how to react in typical situations. The evolution of such congenital knowledge through the instrumentality of natural selection is yet ill understood; but we may regard it as established that the acquisition of such inborn knowledge illustrates a cardinal phase of the evolutionary process.

To the mechanism and the theory of instinct we shall turn our attention in the sequel. At this juncture we shall only offer a representative example of self-regarding instincts in action, culled from the work of a well-known psychologist:—

"The necessity of believing in the transmission from generation to generation of such innate tendencies to the development of mental structure is most obviously forced upon us by the behaviour of some of the insects; for in the insect world the innately determined structure of the mind is commonly very complex, and constitutes a larger proportion of the total structure than in any other of the higher branches of the tree of life. Of all the insects, the solitary wasps, perhaps, illustrate our present thesis in the most striking manner. There are many species which prey upon insects and other small creatures; these creatures are generally killed or paralysed by stinging and then are packed away and sealed up in a nest or burrow together with one or more eggs of the wasp, there to serve as food to the grub which after a time will emerge from the egg. Now the features of this process, of especial interest from our present point of view, are two:—First, the wasps of each species (with few exceptions) prey on animals of one kind only, although in all probability the grubs of each species might flourish on animal food of almost any kind; one species of wasp preys on caterpillars only, another on grasshoppers, a third on spiders, and so on; and a wasp may spend many hours searching for her proper prey amidst an abundance of other small creatures which seem equally well adapted to serve as food for her grubs. This choice of her proper prey is not the result of imitation of other wasps of the same species, nor of any other process of learning; for the wasp hatches out from the isolated chrysalis as a fully adult insect, and shortly proceeds to seek her prey. The wasp, then, has innate power of recognising her proper prey, or, in the sense in which we have defined the word knowledge, she must be said to have innate knowledge of her prey; that is to say, she inherits a cognitive disposition which renders her capable of knowing her prey, when it comes within the range of her sense-organs. The second point of interest in the present connection is that the wasp of each species handles her prey in a manner peculiar to her species; one always stings her caterpillar in a peculiarly effective manner: another walks backwards as she drags her prey to her nest; this mode of progression gives her more power in dragging large specimens of the kind she preys upon, but she behaves in the same way when the specimen is so small that she could easily run forward with it raised in her jaws; it is as though a man should stagger home with bent back and bowed legs, under the weight of a pound of tea slung on his shoulders: a third always straddles across the body of her victim as she carries it off: one species always holds her prey with her third pair of legs, another with the second pair; others hold it in the jaws. And, when the wasp arrives at her nest with her prey, her behaviour again runs on stereotyped lines; one species invariably lays down her prey and runs into the hole she has prepared, turns about, and drags in her prey after her; another suspends it on the crotch of some low branching plant, while she explores her nest; a third carries hers directly into the nest without preliminary exploration. This constancy of mode of behaviour of each species in the normal course of their activities might seem at first sight to favour the view of those who regard animals as mere machines (and that such insects as wasps are unconscious mechanisms has been seriously maintained by some modern observers); yet these same wasps are capable of intelligently adapting their behaviour to unusual circumstances, and they display in certain respects very striking idiosyncrasies.

"Such exhibition of complex modes of nicely adapted behaviour without previous experience of the situation, and the constancy of such modes throughout a species, are the two most generally accepted marks of instinctive action. For the word instinctive survives as a general descriptive term for activities of this kind;

though modern science is no longer content to use it as a cloak for ignorance, and to regard such actions as explained by attributing them to a faculty of instinct: it uses the word rather to mark the need for a theory. The foregoing examples of instinctive behaviour . . . indicate clearly what our theory of instinct must be. The recognition of her specific prey by the wasp of each species, without any guidance from her previous experience, implies the possession of a corresponding cognitive disposition, which is provided in the innate constitution and becomes functionally perfect in each individual without being exercised. The handling of her prey by each individual in the manner characteristic of her species on her first encounter with it, similarly implies the possession of a corresponding innate conative disposition. And the fact that each wasp reacts in this specific fashion to her specific prey, and to that alone, implies that this conative disposition is innately linked with the cognitive disposition that enables her to recognise her prey. This, then, is the nature of an instinct, the mental structure which is the condition of an instinctive action: it consists in a more or less highly specialised conative disposition linked with a specialised cognitive disposition; the whole cognitive-conative system being innate or inherited, that is to say, developing spontaneously in each individual to a state in which it is capable of determining appropriate reaction to its object.

"This is the formula by which we may in a sense explain a large part of the behaviour of all animals; namely, all those purposive reactions which imply perceptual discrimination of the object without previous experience of it. Well-nigh the whole of the behaviour of some animals conforms strictly to this type. The best examples of lives governed wholly by instinct are provided by some of the insects, which, emerging from the chrysalis with all their organs and capacities fully developed, straightaway perform a single cycle of highly complex purposive actions, and die. The structure of the mind of such an animal must be conceived as consisting of a limited number of innate cognitive dispositions, each linked with a conative disposition; and the maintenance of the single cycle of activities, which compose the life history of the adult creature, depends on the fact that the exercise of each conative disposition produces a situation which excites another cognitive disposition, which in turn sets to work another conative disposition, and so on, until the cycle is completed. Such, for example, is the behaviour of an insect which, after hatching out, flies about until it encounters a certain flower, settles upon it, and, by a series of precise manipulations of its parts, deposits its eggs among the ovules of the flower, that is, in the one situation in all the world in which the eggs can develop."[1] (W. McDougall, *Psychology,* London, 1912, pp. 156-161.)

We are not confronted here with anything intrinsically novel, for the amœba and the protozoa generally react in an innately determined manner. Only, precisely as diffuse and faint sensibility has been metamorphosed into localised senses and definite sensations, so alphabetically simple native procedures have been transformed into astonishingly complicated instincts.

The psychologist whom we have quoted above further states that among the great majority of professed psychologists the term Instinct is used only to denote "certain innate specific tendencies of the mind that are common to all members of any one species, racial characters that have been slowly evolved in the process of adaptation of species to their environment and that can be neither eradicated from the mental constitution of which they are innate elements nor acquired by individuals in the course of their lifetime." (*An Introduction to Social Psychology,* 1928, p. 20.) This author regards a purely instinctive action as "unmodified by intelligence and by habits acquired under the guidance of intelligence or by imitation." (*Ibid.*, p. 21.) And instinctive behaviour he describes thus: "In the typical case some sense impression, or combination of sense-impressions, excites

[1]On the same subject see the vivid sketches in George W. and Elizabeth G. Peckham's *Wasps, Social and Solitary,* London, 1905.

some perfectly definite behaviour, some movement or train of movements which is the same in all individuals of the species and on all similar occasions." (p. 22.) More definitely, "Instinctive action implies some enduring nervous basis whose organisation is inherited, an innate or inherited psycho-physical disposition, which, anatomically regarded, probably has the form of a compound system of sensory-motor arcs." (p. 25.) With these expressions of opinion there is broad agreement among psychologists. However, W. McDougall presents us with a more personal definition: "We may define an instinct as an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action." (p. 25.)

Innately determined motor discharges require, however, appropriate organs wherewith they are to attain their ends. This aspect has been too frequently overlooked, the accent being commonly placed on connate knowledge and on conative dispositions. We shall illustrate the complementary truth by a description of the mole whose organism is externally an admirable index of its predestined life-activities. The mole

" possesses a plump, nearly cylindrical body, covered with a velvet-like coat of short soft fur of a black or blackish-brown colour inserted perpendicularly to the skin, very short stout limbs with naked flesh-coloured feet, a short scaly tail furnished with long stiff hairs, and a pointed muzzle. The total length is about six inches, of which the tail measures about half an inch. It has no external ears, and its eyes are so minute as to be easily overlooked. *By its bodily structure it is so eminently fitted for underground progression that it might almost be said to swim through the soft earth.* [Italics ours.] Its whole skull is like a wedge, and its nose is a borer fastened to the sharp end of the wedge. The nostrils are elastic and flexible tubes of cartilage, strengthened by a little bone, and moved by special muscles. The fore-limb is enclosed in the skin of the body up to the wrist. The fore-feet are extremely broad and strong, the palm is turned outwards and backwards; the last phalanges are much longer than the others, are bifurcated, and have strong claws firmly attached to them. The wrist is composed of strong and compact bones, and from its inner side there springs a long sickle-shaped bone which runs forward towards the first digit, strengthening the hand and increasing its breadth. The elbow process is long, thus giving greater leverage to the arm than usual. The bone of the upper arm is broad, short, flattened at both extremities, and contracted in the middle, and has upon it very prominent ridges for the attachment of the muscles moving the shoulder joint. These ridges give it a most peculiar appearance, different from anything found among mammals. The shoulder-blade has the form of a long stout triangular rod. The breast-bone has its fore-part longer than the body and keeled below and expanded. The collar-bone is short, almost cuboid, and is placed at some considerable distance in front of the ribs, thus allowing the fore-limb to be brought very close to the head in burrowing. The hind-limbs are more slender, and are used only for purposes of progression. The incisor teeth are small and sharp, the upper canine is long and possesses a double fang. There are three nearly equal conical pre-molars and a fourth much larger; the true molars are broad, with many sharp conical projections. . . . The senses of hearing, taste, and smell are very strongly developed. The eye is extremely small, with a nearly globular lens and a minute optic nerve, and is at least sensitive to light." (W. Ramsay Smith, in *Chambers's Encyclopædia*, 1908, article "Mole.")

Throughout the discussion of the problem of the evolution of mind we should therefore remember that instincts and organs are

correlated and interdependent and evolve simultaneously and that bare innate knowledge is commonly meaningless in and of itself. Instincts and organs belong together and evolve together.

In fact, we may proceed a step further and recognise that whilst innate intelligence requires as a rule innate organs, innate organs may be self-sufficing. Thus instead of taking special measures against the winter's cold, such as is involved in the migration of birds with the instincts connected therewith, animals may grow a warm winter coat, and instead of modes of active self-defence demanding elaborate instincts, an effective armour or carapace, such as that possessed by the tortoise, may come to be evolved.

5. *Gregarious Instincts.*

A stage above that of instincts subserving individual ends, are gregarious instincts. Here the innate knowledge of the individuals satisfies collective needs and promotes concerted action and here therefore we find an advanced form of organisation inconceivable among plants. The most highly developed type in this respect is perhaps to be found in the bee and its hive. In this instance the individuals of the same species are actually divided into three orders of beings—the worker bee in whom the sex instinct is sacrificed to the common weal, the queen bee in whom the egg-laying propensity modifies and dominates the bodily structure, and the idle drone whose single function in life, left unexercised in most drones, is to fertilise a queen bee and, in the act, suffer a tragic death. Each of these three orders has numerous distinctive features. In addition, there is much division of labour—the queen bee must be waited on day and night while she unceasingly deposits her eggs in specially prepared brood dwellings, the almost mathematically exact sexahedral cells have to be built, the young require to be tended, the nectar and pollen collected and the latter stored, the honey and the wax produced in the organism, and the beehive cleaned, ventilated, and protected. This wealth of activity, which among human beings would involve arduous planning and strenuous endeavour, is all executed not only "as if by clockwork" but veritably by unreasoned and unreasoning instincts and by appropriate organs. Hence, too, within limits, the astonishing superiority of instinct over acquired intelligence which timidly proceeds by trial and error and requires the stern or cajoling schoolmaster at every turn. Natural selection, that is, has fostered in the more important directions unerring modes of procedure, thus ensuring among gregarious animals unquestioning cooperation and among all animals ideal perfection almost.[1]

[1] W. Trotter, in his *Instincts of the Herd in Peace and War* (London, 1919), holds that man is, in the strict sense, a gregarious animal; but the gregariousness, according to him, consists in a specific instinct and not, as among animals, in a series of instincts.

6. *Individual Intelligence.*

We have reached the penultimate phase in the evolution of the mentality of animals. If integral locomotion entailed the development of diverse senses, and if these required to be supplemented by self-regarding and other-regarding instincts, these instincts, in their turn, necessitated a liberal increase in individual intelligence. Thus, just as physical adaptation to environmental exigencies is demanded in even the humblest protozoon, so mental pliability becomes increasingly indispensable to survival as animal forms rise in the scale of being and face an ever more complex environment. In reality, as we ascend the scale in the higher vertebrates, reliance on intelligence becomes more and more pronounced, although it remains first and foremost a servant of instinct. This is patent when we compare, from such a viewpoint, the life of a bee to that of a fox. It is not surprising, therefore, to discover that in man's nearest living relatives, the monkeys and the apes, there is a manifestation of intelligence which conspicuously eclipses that of lower animal organisms. The following extract, summarising an experimental study of monkeys, well illustrates what we have just stated :—

" The monkeys represent progress in mental development from the generalised mammalian type towards man :—

" 1. In their sensory equipment : in the presence of focalised vision.

" 2. In their motor equipment : in the coordinated movements of the hand and the eye.

" 3. In their instincts or inherited nervous connections : in their general physical and mental activity.

" 4. In their method of learning or associative processes : in—

a. Quicker formation of associations,

b. Greater number of associations,

c. Greater delicacy of associations,

d. Greater complexity of associations,

e. Greater permanence of associations." (E. L. Thorndike, *Animal Intelligence,* New York, 1911, p. 237.)

Or, more concretely and graphically :—

" Watch the [dog or cat] and he does but few things, does them in response to obvious sense presentations, does them with practical consequences of food, sex indulgence, preparation for adult battles, &c. If nothing that appeals to his special organisation comes up, he does nothing. Watch a monkey and you cannot enumerate the things he does, cannot discover the stimuli to which he reacts, cannot conceive the *raison d'être* of his pursuits. Everything appeals to him. He likes to be active for the sake of activity." (*Op. cit.,* p. 238.)

The following works relating to animal intelligence, and mostly referred to in other parts of this volume, may be cited here : Jean C. Houzeau, *Etudes sur les facultés mentales des animaux,* 2 vols., Brussels, 1872 ; Alfred Espinas, *Des sociétés animales,* Paris, 1878 ; Ludwig Büchner, *Mind in Animals,* London, 1880 ; Robert Hartmann, *Anthropoid Apes,* London, 1885 ; Lord Avebury, *Ants, Bees, and Wasps,* London, 1893 ; Frédéric Houssay, *The Industries of Animals,* London, 1893 ; C. Lloyd Morgan, *Animal Behaviour,* London, 1900 ; Leonard T. Hobhouse, *Mind in Evolution,* London, 1901 ; George W. and Elizabeth G. Peckham, *Wasps, Social and Solitary,* London, 1905 ; Maurice Maeterlinck, *La vie des abeilles,* Paris, 1907 ; Margaret F. Washburn, *The Animal Mind,* New York, 1908 ; Carl C. Schneider, *Vorlesungen über Tierpsychologie,* Leipzig, 1909 ; Georges Bohn, *La naissance de l'intelligence,* Paris, 1910 ; Georges Bohn, *La nouvelle psychologie animale,* Paris,

1911 ; Samuel J. Holmes, *The Evolution of Animal Intelligence,* New York, 1911 ; Edward L. Thorndike, *Animal Intelligence,* New York, 1911 ; William M. Wheeler, *Ants :* Their Structure, Development and Behaviour, New York, 1913 ; Jacques Loeb, *Forced Movements, Tropisms, and Animal Conduct,* Philadelphia, 1918 ; Eugène L. Bouvier, *The Psychic Life of Insects,* New York, 1922 ; Auguste Forel, *Mensch und Ameise,* Vienna, 1922 ; Gustav Kafka, *Tierpsychologie,* Munich, 1922 ; Friedrich Dahl, *Vergleichende Psychologie,* Jena, 1922 ; Bastian Schmid, *Die Sprache und andere Ausdrucksformen der Tiere,* Munich, 1923 ; Emily M. Smith, *The Investigation of Mind in Animals,* Cambridge, 1923 ; George H. Carpenter, *Insects :* Their Structure and Life, London, 1924 ; Wolfgang Köhler, *The Mentality of Apes,* London, 1925 ; Friedrich Hempelmann, *Tierpsychologie,* Leipzig, 1926 ; and J. Arthur Thomson, *The Minds of Animals,* London, 1927.

7. *Habit.*

We have not exhausted the principal determinants entering into the behaviour of an animal. One of these remains, *viz.*, habit. Habit is, indeed, for individual animals, especially those of the higher genera, what instinct is for the species. Instinct implies innately determined reactions to certain recurring species situations, of which the complement here is the habit-determined reactions to certain recurring individual situations.

The importance of this factor, whilst it leaves unaffected fundamentals, cannot be easily exaggerated. It rules the later life of an animal in almost every particular. Take, for example, the cat. What and whom she knows,—and her range of knowledge is considerable,—is determined by her accumulated experience. What she does is more or less a repetition of what she has done before. Habit guides her mental operations and her play. Her mealtimes, her favourite haunts and places of rest, her love or scorn of comforts, her sociability or unsociability, all are mainly the outcome of the building up of habits. From morning till evening, and from evening till morning, she is guided by habits, her welfare being not infrequently prejudiced by them.

These habits arise in a similar manner to instincts : inborn conative and cognitive tendencies favourable to the well-being of the species are developed by natural selection, whilst, generally speaking, experiences appealing to the individual lead to their repetition and gradually to the development of firmly settled modes of activity. Naturally, habits are, as a rule, neither so fixed, nor so circumscribed, nor so certain to conduce to the animal's well-being as are instincts, but their general form is the same. Habits may be conceived as secondary instincts.

8. *The Adaptive Outfit.*

The science of animal psychology is yet to be developed. What is required in the first instance is the scrupulous and exhaustive study of individual animals and pairs of animals removed from birth to a locality where they cannot sense other members of the same species. Later, in order to test the durability and modifiability of instincts, some individual animals might be reared by members of other species

of animals or be brought up with them. Such caution is imperative if we are to pass beyond hearsay and vague surmises. For instance, Bernard Perez's well-known study of two kittens from birth onward for about forty days is of practically no value for the purpose of determining native capacities and tendencies, seeing that the kittens were with their mother and elder sister the whole of the time. ("Feline Instinct," in *The Cat,* by P. M. Rule, 1887.)

What is more, a number of individuals of the same species should be successively studied by each group of observers in order to prevent overlooking details and so as to avoid recording idiosyncrasies as instincts. For this purpose observatories and stations are needed in connection with universities and zoological gardens and a minuteness of observation and accuracy of description should be aimed at such as we find in the physical, chemical, and biological sciences. Finally, the primary object should not be to decide by some experiment or other how far animals resemble man, but to determine the specific needs, instincts, intelligence, and habits which these exhibit in their normal life, solitary or gregarious.

Even this, however, is not sufficient. We ought to be exact in defining what we mean by a particular instinct and also assure ourselves that we do not consider a group of instincts as one instinct, a single instinct as a group of instincts, or mistake instinct for non-instinct, and *vice versa.*[1] In fact, not until we have traced the anatomical and physiological equivalents of needs and instincts can we be said to have done full justice to the subject.

The definitions given of the term Instinct are frequently apt to be unsatisfactory. Darwin (*Origin of Species,* 1888, ch. 8) says: "I will not attempt any definition of instinct. It would be easy to show that several distinct mental actions are commonly embraced by this term; but every one [?] understands what is meant, when it is said that instinct impels [?] the cuckoo to migrate and to lay her eggs in other birds' nests." (p. 319.) Yet after this deprecatory remark follows immediately what we may accept as a tentative definition (one, however, which defines instinct as inherited *mode of procedure* and not as inherited *impulse,* as we should be led to believe by the foregoing citation): "An action, which we ourselves require experience to enable us to perform, when performed by an animal, more especially by a very young one, without experience, and when performed by many individuals in the same way without their knowing for what purpose it is performed, is usually said to be instinctive." (pp. 319-320.)

Many volumes have been written concerning the instincts of animals,[2] and recently a literature has begun to spring up relating to

[1] Luther L. Bernard, *Instinct:* A Study in Social Psychology, New York, 1924.

[2] See *Dictionary of Philosophy and Psychology,* article "Instinct," and Ludwig Büchner (*Mind in Animals,* London, 1880, pp. 1-10) who furnishes a kind of historical survey of the subject.

man's instincts. To focus our discussion, however, we shall quote from a symposium and debate on Instinct and Intelligence which took place in the pages of the *British Journal of Psychology*. Dr. C. S. Myers, in introducing the subject, denies that there is a stateable difference between instinct and intelligence. There is, according to him, no instinct unaccompanied by intelligence, unpreceded by relevant experience, without consciousness, or complete, and, on the other hand, there is no intelligence which is not based in native capacity. For this reason he concludes that "instinct regarded from within becomes intelligence; intelligence regarded from without becomes instinct." (*Br. J. of Ps.*, 1909-1910, p. 218.) Yet in his reply at the conclusion of the discussion, he practically admits the current position in asserting: "In what is ordinarily called instinctive behaviour, the innate mechanism is relatively fixed and given; in what is ordinarily called intelligent behaviour, the mechanism is relatively plastic and acquired." (p. 270.) Dr. H. W. Carr regards the difference between instinct and intelligence as unbridgeable. Prof. G. F. Stout dwells on the intimate relation which obtains between instinct and intelligence: "The marks by which we recognise an action as instinctive rather than reflex are precisely the same marks which show the presence of intelligent consciousness,—conative impulse, unity and continuity of attention, perseverance with adaptive variation of behaviour corresponding to felt success or failure, and, in many cases, the evidence of having learned by experience." (p. 244.) As to the existence of specific inborn tendencies, he entertains no doubt: "Almost every special phase of the life history of ant or bee," he declares, "is provided for by instincts of a highly specialised kind relatively incapable of modification by experience." (p. 249.) Dr. McDougall concurred on the whole with Prof. Stout's exposition, except that he considered that the existence of instincts in man needs more deliberate and more generous recognition. The definition he proposes appears somewhat tautological: "We ought rather to use the term instinct to denote that feature of the innate constitution of any organism, that inherited disposition, in virtue of the possession of which the organism acts instinctively." (p. 253.) All, save Dr. Carr, but including Prof. Lloyd Morgan, may be said to agree that instincts are variable, imperfect, accompanied by consciousness, affected by experience, dependent on intelligence, and fundamentally indistinguishable from the latter because serving the same purpose.

In later issues of the *British Journal of Psychology* other scholars expressed their views on the same topic. Prof. Carveth Read emphasised that "instinct is always concerned with external relations" (1911, p. 5), and that it represents a "complex reaction of the whole organism to external conditions" (p. 9). These two points may be also looked upon as commonly admitted. Prof. H. R. Marshall,

however, goes further and asserts that to him "reflexes appear to be merely instinct actions of thoroughly coordinated minor systems within the whole system; minor systems which have gained a large measure of independence." (1912-1913, p. 265.)

The most comprehensive modern definitions of instinct carry us far beyond the hazy surmises of the past. Prof. Lloyd Morgan, for instance, after a lengthy and valuable discussion of the subject, states: "We are now in a position to define instinctive behaviour as comprising those complex groups of coordinated acts which are, on their first occurrence, independent of experience; which tend to the well-being of the individual and the preservation of the race; which are due to the cooperation of external and internal stimuli; which are similarly performed by all the members of the same more or less restricted group of animals; but which are subject to variation, and to subsequent modification under the guidance of experience." (*Animal Behaviour,* 1900, p. 71.) Everything is a matter of the nervous system: "Instinct depends on how the nervous system is built through heredity; while intelligence depends upon how the nervous system is developed through use." (*Ibid.,* p. 120.) In a later work, *Instinct and Experience,* 1912, Prof. Lloyd Morgan further develops his theories and definitions of instinct.

We learn in this way that instinctive action and intelligent action are respectively determined by being primarily independent of or dependent on individual experience and that reflex action, according to most authors, widely differs from both by being rigidly fixed and unrelated to consciousness. The next step to take should be the demonstration of the unity of the life process by coordinating instincts with reflexes and automatic acts, in order that a comprehensive explanation may be forthcoming.

However ably and profitably men have enlarged on the problem of instinct, the discussion has nevertheless tended to remain somewhat vague and general, for the excellent reason that there has been no thorough objective study of the facts.[1] Particular examples have been cited and elucidated, without this being accompanied by a corresponding analysis of the precise factors in the hereditary actional outfit *as a whole.* Instinct has been regarded as a *mode of behaviour or procedure,* as in our second quotation from Darwin on page 29. Again, instinct has been conceived, by the same author, as an *impulse* "impelling the cuckoo to migrate and to lay her eggs in other birds'

[1]Lloyd Morgan ("Instinctive Behaviour and Enjoyment," in *Br. J. of Ps.,* June 1921, p. 1) expresses himself caustically on this point: "The word 'instinctive' is one which an author feels free to use in such wise as shall best serve his purpose in hand. There is no established convention in accordance with which its connotation is definitely settled. There is not even agreement as to that to which the word is to be taken as adjectival. Some speak of instinctive impulse; others of instinctive dispositions; yet others of instinctive knowledge, instinctive appreciation, instinctive belief, and so on."

nests." Yet it is all-important to decide whether instinct *impels* or *guides,* since the two represent essentially different orders of fact. Instinct, too, has been well-nigh without exception thought of independently of special external organs which alone clarify its fuller meaning. We shall let Prof. Kirkpatrick speak on this last point: "The relation of instinct to intelligence or reason has long attracted wondering attention, but until recently little notice was taken of the relation of physical structure to instinct. When the matter is once suggested, however, no extended observation is needed to show that the instincts of any animal correspond to its structure. Cats do not try to fly or dive when chased by dogs, nor ducks to climb trees or fight with their claws. Turtles do not attempt to run from danger, or rabbits to curl up in their skins for protection. The peculiar structure of teeth and stomach in cows goes with a strong instinct [impulse ?] to eat grass, and in the lion with an equally strong instinct [impulse ?] to eat meat. Even in the life of the same animal new instincts develop as new structures are formed or perfected. Birds do not show the flying instinct until their wings develop, nor the nesting instinct until they are ready to produce young. Before their teeth and claws are developed, young lions run from large animals instead of attacking them." (E. A. Kirkpatrick, *Fundamentals of Child Study,* New York, 1903, pp. 34-35.)

The relation of instinct to structure is conceived in this manner by Lloyd Morgan: "Not only is there inherited a given structure of leg or wing, but a nervous system through which there is an automatic distribution of outgoing currents to the several muscles concerned; so that, without learning or experience, they are called into play with nicely graded intensity, and exhibit complex contractions and relaxations in serial order, thus giving rise to instinctive behaviour of an eminently adaptive nature." (*Habit and Instinct,* 1896, p. 80.) In one passage more particularly Lloyd Morgan offers a definite statement of the relation between structure and process: "There is the closest possible connection," he writes, "between the structure and organisation of any given animal and its instinctive activities." (*Ibid.,* p. 5.) It is greatly to be regretted that this supplementary line of enquiry is not receiving closer attention, for with animals special structures play, as we have seen, and as we shall see, no less decisive a part than inherited modes of procedure.

Indeed, even Prof. Kirkpatrick is not sufficiently revolutionary. Examining the general structure of the cat, are we justified in affirming that its almost infinitely varied movements are each due to a separate instinct? Is it not rather that many of its movements are conditioned by its peculiarly supple organism? If so, we may find that a certain part of an animal's activity is owing to what may be called learning by experience determined by structural potentiality. To postulate

separate instincts when it may be in certain cases only a question of plastic structure, might be therefore misleading.

However, it does not suffice to correlate instinct with structure, or even behaviour with structure. The tortoise's armour, the summer and winter furs and colours of certain animals, the form and specific gravity of swan and duck, the mimetic colours of certain insects or the adaptive colouring of lions and tigers, and innumerable other structural arrangements, bear witness to the fact that structure as such may usurp the place of appropriate action. In a discussion on behaviour or on adaptive differences between species, suitable structure should be therefore invariably taken into consideration, even if it has no direct reference to cognition, feeling, or volition, just as special external structure may be absent in connection with a particular instinct, as probably with the migratory instinct in birds.

Moreover, we should endeavour to distinguish clearly between inborn need or impulse and instinct or innate mode of realisation. The two are related to each other as structure is to function. Once a need arises, that of hunger for instance, the need seeks to satisfy itself, and if there is an innate arrangement for this purpose, the need succeeds in this with the greatest ease in favourable circumstances. This inborn method of gratifying a particular need, we may therefore call instinct or innate mode of procedure, especially when it refers more or less overtly to environmental activity and characterises a whole variety or species. The impulse or physical stimulus conditioning the instinct, we may appropriately call an impulse or need. Need and mode of procedure, or impulse and instinct, should be moreover correlated with the appropriate structure or organ employed by the instinct for the purpose of satisfying the need.

We are faced thus with a chain: (a) need or *impulse,* issuing in (b) *instinct* or effective but untaught manipulation of certain (c) means or external *organs.* (Possibly four, and not three, factors should be assumed: need, impulse, instinct, and organ.) Beyond this, however, we should keep in view (d) *special structures and states* that render activity superfluous in certain directions, such as the winter coat which occupies the place, say, of migration or special states such as hibernation. Since these structures and states serve the same end as certain instincts or intelligent actions in certain species of animals, we cannot properly compare species without alluding to them. Furthermore, (e) *general adaptive structure,* as the suppleness of the cat, needs to be allowed for. In addition, if our statement is to be truly comprehensive, we should also include in the general scheme (f) *reflexes,* (g) *automatic acts,* (h) *native* and (i) *acquired intelligence,* and (j) *habits.* Nor should (k) *the fundamental internal organs, stimuli, and functions* be excluded from our general description.

This analysis deprives us unfortunately of a collective term, without which it is difficult to reason intelligently. Perhaps the expression Adaptive Outfit may provisionally suffice to comprehend the articulated chain of the several facts and factors, with the emphasis laid on the actual adaptation of a whole species to its environment. This outfit may also normally comprise, as above, acquired needs, means, and modes of procedure so far as individuals are concerned, but exclude habit or adaptation to individual situations.

A detailed analysis of the adaptive outfit given by heredity, such as we have outlined above, is indispensable for the comprehension of the problem of culture, because to speak of reason and instinct alone is inadequate for our purpose. It is only when we recognise that there are innate and acquired needs, means, and modes of procedure ; that there are protective structures ; that even the deeper-lying portions of the organism have an intimate relation to the environment ; that reflexes and automatic activities should not be ignored, nor the influence of the general structure on the nature of activity,—that we can properly gauge the existing divergences between different species, and most especially between animals and man. It is to this obscuration of meaning that the long but relatively sterile discussions on instinct and intelligence are due and to this same incompleteness of analysis is to be traced the newest instinct psychology, with its ingenious attempts at interpreting the ducal richness, matchless variety, stupendous progress, and almost complete unity of human culture, by the supposition of an interminable caravan of so-called instincts. Ruskin's "economic man" was not as plastic as is the strange medley of "instincts" which is brought to our notice by the new sociology and psychology. The sooner therefore the conjectural instinct philosophy is displaced by an objective and detailed study of the adaptive outfit in animals and man, the sooner we shall be able to comprehend adequately the adaptive differences distinguishing animals and man. And this should initially involve, as we have already stated, an exhaustive *observational* study of a number of higher animals (male and female together preferably, although not the progeny of the same parents) from birth to a natural death in an environment appropriate to the species but where no other members of the identical or closely affiliated species can be seen or otherwise sensed by the animals. With respect to set psychological *experiments* on animals, it may be said, without laying down an absolute rule, that the time for them will only have arrived when we have learnt, through patient and painstaking observations, the distinctive mental nature of the subject we intend experimenting on.

Our general analysis has proceeded sufficiently far to permit us to describe the adaptive outfit as a whole :—

(a) *Congenital needs* or impulses, such as need or desire for special food ;

(b) *Congenital means* or organs wherewith the needs may be satisfied—*e.g.*, (1) modified digestive system, senses, limbs, poison fangs, spinning apparatus ; (2) certain protective structures, as hair or a pachydermatous hide ; and (3) general adaptive structure, as illustrated by feline animals ;

(c) *Congenitally determined modes of procedure,* including (1) automatic or uncontrollable acts, as the circulation of the blood ; (2) reflex or controllable automatic acts, as blinking and breathing ; and (3) self-regarding and other-regarding instinctive acts ;

(d) *Congenital intelligence,* such as the animal requires in order to meet particular or somewhat unusual situations ;

(e) Corresponding to (a), (b), (c), and (d), and excluding the interdependence of minds, (1) *acquired needs* or impulses, such as acquired desire for a special form of food ; (2) *acquired means* or organs, such as extra-organismal tools and other acquired instrumentalities ; (3) *acquired modes of procedure* or habits, resulting from repetitive experience ; and (4) *acquired intelligence,* such as follows from practice in the use of the native intelligence.

And presupposing these—

(f) *The fundamental animal structure* and the corresponding *fundamental needs, means, and functions—i.e.,* general organic system of securing, maintaining, and utilising energy.

Nothing less than a comprehensive statement such as the preceding one which allows for a liberal diversity of factors, corresponds to the complete adaptive outfit presented by the animal world.

The following recent contributions partly or wholly relating to the nature of instinct may be consulted with advantage: Georges Bohn, *La nouvelle psychologie animale,* Paris, 1911 ; C. Lloyd Morgan, *Instinct and Experience,* London, 1912 ; Etienne Rabaud, "Etude expérimentale de l'instinct," in *Journal de Psychologie,* Paris, 1914 ; H. E. Ziegler, *Der Begriff des Instinktes einst und jetzt,* Jena, 1920 ; James Drever, *Instinct in Man,* Cambridge, 1921 ; G. C. Field, "Faculty Psychology and Instinct Psychology," in *Mind,* July 1921 ; Morris Ginsberg, *The Psychology of Society,* London, 1921 ; G. C. Field, "The Psychological Accompaniments of Instinctive Action," in *Mind,* April 1922 ; Charles C. Josey, *The Social Philosophy of Instinct,* New York, 1922 ; James L. Mursell, "The Ontogenetic Significance of Instinct . . .", in *The Psychological Review,* May 1922 ; Robert S. Woodworth, *Psychology,* London, 1922 ; William E. Hocking, *Human Nature and its Remaking,* New Haven, 1923 ; William McDougall, *An Outline of Psychology,* London, 1923 ; W. B. Pillsbury, *The Fundamentals of Psychology,* New York, 1923 ; Louis A. Reid, "Instinct, Emotion, and the Higher Life," in *British Journal of Psychology,* July 1923 ; E. M. Smith, *The Investigation of Mind in Animals,* Cambridge, 1923 ; Edward C. Tolman, "The Nature of Instinct," in *The Psychological Bulletin,* April 1923 ; L. L. Bernard, *Instinct: A Study in Social Psychology,* London, 1924 ; and Gardner Murphy, *An Historical Introduction to Modern Psychology,* London, 1929.

An interesting discussion of imperfect instincts will be found in James M. Baldwin's *The Story of the Mind* (London, 1902) and in Arthur J. Thomson's *The Study of Animal Life* (London, 1917).

9. *Conclusion.*

We may now recapitulate our conclusion in regard to the distinctive nature of plants and animals. Both plants and animals consist of nucleated protoplasm-containing cells, require nutriment, exhibit sensibility and impressibility, are capable of some adaptation and regeneration, grow and develop, decline and die, reproduce and over-reproduce themselves, inherit their species character and certain innate parental and preparental characters, deviate slightly from their parents as the result of germinal variations, and, as species, evolve in the course of the ages from one form to another, primarily on account of the pressure of the environment acting selectively on the given innate variations.

With the emergence of locomotive, or animal, life, however, there ensues vastly greater structural and functional complexity than is discernible among plants and, beyond this and controlling it, a gigantic enhancement in mental stature and status, including more particularly the evolutionary creation of sundry sensory apparati, of self-regarding and other-regarding instincts and corresponding impulses, organs, and substitutes for instincts, of individual habits, and, finally, of native and acquired individual intelligence of a more and more penetrating category. We rise thus from protozoon to ape, from diffuse sensibility to alert intelligence, the colossal advance being throughout conditioned by the factor of integral locomobility.

Such is the distinctive nature of animals. Let us now turn to the human species and inquire what characters it has in common with plants and animals, more particularly with the latter.

Chapter III.

CHARACTERS COMMON TO ANIMALS AND MAN.

True to our methodological principles, we shall in this Chapter, as in the two preceding ones, take nothing simply for granted. This, however, will not mean that we shall labour the obvious.

(A) Bodily Filiations.

1. *Man a Multi-cellular Being.*

Man is a uni-multi-cellular being. That is, he originates in a single germ cell created by the fusion of an ovum and a sperm and owing to this germ cell rapidly dividing and sub-dividing, he swiftly develops into a multi-cellular being. The component elements of his body, like those of the bodies of animals and plants generally, consist of cells, and these cells possess the same physical, chemical, structural, and functional properties as those of living cells universally. Examining, accordingly, the fertilised ovum of man, which is about 1/250th of an inch in diameter, we shall discover that it is, roughly, a somewhat colourless, semi-transparent, semi-viscous, spheroidal object, with a centre or nucleus measurably more solid and less transparent, the whole composed of proteins in diverse metabolic stages of chemical integration and disintegration. Further chemical analysis would also prove that the living matter in man is constituted of complex aminoidal chains of carbon, oxygen, hydrogen, nitrogen, and a few less conspicuous elements.

It is therefore true beyond question that, in the ordinary biological acceptation of the expression, man is definitely a living being. He is this, neither more nor less. No chemist would place him in the category of minerals, nor would any histologist admit that the cells of the human body are in any shape or form singular or unique. Microscope and test-tube disclose nothing suggestive of a non-animate or super-animate nature.

2. *Man and the Chief Dynamic Characters common to Plants and Animals.*

(a) Nutrition.—Man is an energising being and therefore requires fuel or nutriment. And since protein forms the substratum of life, the constituents of this protein must be in some way secured by man.

Oxygen, water, carbon-yielding and nitrogen-containing compounds, a certain minute quantity of mineral salts, and the like, have to be obtained. Food of the basic character consumed by other living beings, must be assimilated by man or he perishes.

(b) SENSIBILITY AND IMPRESSIBILITY.—To secure sustenance and to satisfy certain other positive needs, every living being must be to some extent sensitive to its surroundings. The quality of sensibility, or negative and positive tropism, is also required for avoiding and meeting perils. This universal attribute of living beings man possesses. In addition, he is impressible—that is, multiple afferent, efferent, and intra-organic experiences give rise in him, as in all living beings, to what we may call memories and habits.

(c) ADAPTATION AND REGENERATION.—Nor is man destitute of the power of adapting himself to moderate changes in his environment, which distinguishes all living beings. Only in respect of the regeneration of bodily parts are his potentialities relatively limited, betokening that he probably belongs to the most highly developed types of life.

(d) GROWTH AND DEVELOPMENT.—Growth is, of course, present in man, as is implied in his embryonic and fœtal stages and in post-natal existence extending to early adulthood. So is development, a fact demonstrated by the gradual conversion of the single-celled germ into the complex fœtus and that into the mature man or woman.

(e) DECLINE AND DEATH.—Since man is a multi-cellular being, he not only develops to maturity, but slowly, after maturity is attained, declines into senility when virtually all his powers have lost their resilience and their pristine vigour. Nor is the decline indefinitely prolonged, for a time arrives when his organism is so precariously balanced that almost any untoward accident precipitates it into the never-relaxing arms of death.

(f) REPRODUCTION AND OVER-REPRODUCTION.—Living nature parries the irretrievable thrusts of death by providing for the reproduction of individuals. Thus, before death overtakes members of a species, many have perpetuated their kind by leaving offspring. This is the case with man. We have noted, however, that reproduction, to achieve its end, must assume the form of over-reproduction. Otherwise, as we stated, if each pair of individuals, for example, gave only rise to one other pair of individuals, the vicissitudes of existence would tend to reduce the number of individuals in a species and, perhaps in all cases, eliminate in course of time the species altogether. Accordingly, we find that the fecundity of species prodigiously differs with their ability to resist annihilation. This process of over-reproduction has hitherto generally marked the human species, but there are indications that man will eventually succeed in regulating to a nicety the loss through death by the gain through reproduction.

Hence over-reproduction may be conceived as not necessarily present in the human species.[1]

(g) HEREDITY.—Reproduction creates individuals in the likeness of the reproducers. That is, foxes do not give birth to lions, still less to birds, fishes, or trees. Offspring resembles its procreators sufficiently closely to be regarded as practically identical with them in general appearance. However, where reproduction is the outcome of the coalescence and fusion of two cells, the new organism cannot faithfully represent both. Thus if the one parent is tall and the other short, the progeny cannot be both tall and short. In such cases we speak of the offspring inheriting, in addition to its general constitution, certain characters from the one or the other parent or a blend of these. All this is true of man as of every species bisexually propagated.

(h) GERMINAL VARIATION.—Confusingly alike as parent and offspring appear on a cursory examination, closer scrutiny reveals numerous minor deviations which nothing transpiring within the life-time of the individual or the constitutions of his ancestors explains. Differently stated, the occurrence of variations in the germ cell must be accepted as a universal fact. Man's solidarity with the rest of life is demonstrated in this instance also.

(i) EVOLUTION.—The law of organic evolution is the result of the interrelation between favourable germinal variations and the imperfect adaptation of a species to a given quasi-permanent inanimate or animate environment ; but since man adapts himself by non-congenital means more and more to his environment and adapts his environment by the same means more and more to himself, the favourable germinal variations which show themselves may remain undeveloped by his environment. Hence in man's case organic evolution may be superseded by cultural evolution.

Man, then, possesses integrally all the fixed characters common to plants and animals, SAVE THOSE OF OVER-REPRODUCTION AND OF EVOLUTION.

3. *Man as Animal.*

Man, we learnt, is a multi-cellular being. But is he a plant or plant-like ? He certainly is not. Plants transform inorganic substances, such as carbon dioxide and nitrogen-containing minerals in

[1]According to a recent writer, " evidence has been produced to show that everywhere among primitive races either abortion, infanticide, or prolonged abstention from intercourse are practised in such a degree and in such a manner as to have as their primary result the restriction of increase " or the maintaining of an optimum number. (A. M. Carr-Saunders, *The Population Problem,* Oxford, 1922, p. 292.) On the other side, C. E. Pell (*The Law of Births and Deaths,* London, 1921) argues that by nature fertility varies inversely with easy or difficult conditions of life.

solution, into organic ones. Man, on the contrary, depends on plants having performed this service for him. Again, plants are rooted, whilst man is a locomobile being. Man is therefore more intimately allied to animals than to plants, since the animal kingdom, as we have learnt, is, primarily, distinguished from the vegetable kingdom by its members possessing the power of moving integrally from place to place and, secondarily, by their depending, for this reason, on prepared organic substances. Man, therefore, we assume to be an animal, at least until further examination should prove him to possess characters which differentiate him from animals as animals are differentiated by certain characters from plants.

What, then, is the place man, *so far as animal,* occupies in the animal kingdom ? He manifestly does not belong to the lowest phyla. Being multi-cellular, he is to be classed with the metazoa, and is therefore not a member of the extensive protozoan or uni-cellular phylum. He is almost equally removed from the Porifera or Sponges and from the Cœlenterata, which include polyps, jelly-fish, sea-anemones, and coral-forming animals ; for these, unlike man, consist of a series of branched tubes whose walls are made up of two layers of cells separated one from another by a secretion of semi-fluid consistency known as the jelly. Nor need we linger over the Platyhelminthes, Nemertinea, Nematoda, and Annelida, four phyla of worms.

We next come to a more highly evolved and exceedingly comprehensive and interesting phylum, that of the Arthropoda. These embrace the Crustaceans the generality of which swarm in the waters of the globe ; the Arachnida, including spiders, scorpions, and their like ; and the Insecta comprising some hundreds of thousands of species not a few of which, despite their diminutive size, are among man's most formidable foes—attacking the plants he cultivates, the animals he has domesticated, and his own body as well as his material possessions. The Arthropoda show a division of the body into successive rings, which indicates their decided kinship with the preceding phylum and, by implication, their remoteness from man.

The phylum which follows, that of the Mollusca or shell-fish, need only be mentioned to be dismissed as not comprehending the human species. Similarly with the related Brachiopoda and the almost microscopically small Polyzoa.

We reach now the last of the non-vertebrate phyla, the Echinodermata, among which are to be counted star-fish, sea-urchins, brittle-stars, feather-stars, and sea-cucumbers. All of these are characterised by the radiate symmetry of their structure. The common star-fish may be regarded as a type of this phylum which manifestly is widely divergent from man in its form, habits, and habitat.

(a) MAN A VERTEBRATE.—We have arrived at the last, highest, and most prominent phylum among animals, the Vertebrata. "The chief characteristics of Vertebrata are three, *viz.*: (1) There is an internal skeleton known as the backbone which runs the whole length of the animal, beneath the central nervous system, but above the digestive tube or gut; (2) the central nervous system is situated near the upper or 'dorsal' surface of the animal, and has the form of a tube running along the length of the animal; (3) the front part of the digestive tube communicates with the exterior by means of clefts or pores"[1] which in land forms exist only in the very young animal or embryo.

Since the description of the Vertebrata just offered unmistakably harmonises with the vertebral structure in man, we cannot, on the animal plane, continue our analysis negatively. Man, *as an animal*, accordingly belongs to the sub-kingdom or phylum Vertebrata. In view of this positive relation of man to the lower creation, the ensuing fuller statement touching the general characters of the Vertebrata should prove enlightening:—

"The Vertebrata Craniata share with the Cephalochordata the fundamental characters of the group Chordata. They are bilaterally symmetrical animals with a well-marked metameric segmentation of the muscles and muscle septa, with a gut opening by an anterior ventral mouth, with lateral gill slits in the embryo or adult, and with a ventro-posterior anus; with a dorsal tubular central nervous system, under which lies in the embryo or adult an unsegmented notochord of endodermal origin; with the body prolonged posteriorly to the anus to form a metamerically segmented tail containing notochord, nervous system and muscles; with a spacious cœlomic cavity and separate blood-vascular system." (P. Chalmers Mitchell, in *Encyclopædia Britannica*, 11th edition, article "Vertebrata.")[2]

This phylum is usually divided into five classes: fishes, amphibians, reptiles, birds, and mammals, leaving out of account the ascidians or sea-squirts which, in early life, may be classed among the Vertebrata.

Seeing that there are five classes in this phylum, we are bound to continue the process of rejection until we either reach a class which contains man or find that he has to be placed in a class by himself.

Man evidently does not belong to the fishes, for his power of living submerged in water, as he knows to his cost, is narrowly limited, whilst his limbs do not assume the shape of fins supported by spines.

The members of the class Amphibia begin their existence as aquatic beings and man is therefore excluded from that class.

There remain now reptiles, birds, and mammals. To the first of these classes, consisting of five living orders, man cannot be said to belong considering their distinctive features:—

"Reptiles are cold-blooded, the temperature of the body not greatly exceeding that of the surrounding medium; the heart is three-chambered, except in Crocodilians, where four chambers first occur; mostly venous blood goes from the heart to the anterior viscera, and mixed blood to the posterior region, only the head and anterior regions receiving purely anterior blood; the body is covered with scales,

[1]The above classification follows E. W. MacBride, *Zoology*, 1922, ch. 5, and A. E. Shipley and E. W. MacBride, *Zoology*, 1920.

[2]On the same subject, consult also the same author's *Outlines of Biology*, London, 1911.

with which subjacent bony scales or scutes are sometimes associated; the skull articulates by a single condyle with the backbone, and the lower jaw works against the quadrate bone; the great majority are oviparous, while in some the eggs are hatched within the mother." (*Chambers's Encyclopædia,* ed. 1926, Article "Reptiles.")

Nor can man be included in the class Aves, seeing that neither pair of his limbs exhibits the character of wings, feathered or otherwise. He is even less a bird than an aquatic animal.

Is man, then, to be regarded, other things being equal, as belonging to the last of the Vertebrate classes, the Mammalia, whose fundamental character it is that they suckle or nourish their newly-born young by means of mammæ? Our reply must be in the affirmative, for in this respect no difference obtains between man and other mammals. This being the case, we shall epitomise the salient characters of the Mammalia, of whom there are about 32,000 species:—

"Female mammals always nourish their young for some time after birth with the milk produced by the mammary glands. Except in the oviparous Monotremes, the young are born viviparously; and in all mammals above Marsupials the embryo in the womb is organically connected with the mother by means of a Placenta. The skin always bears at least some hairs, and these usually cover the whole body, so that most mammals may be justly called furred quadrupeds. The high body-temperature is some index to the pitch of the life, and mammals are also like birds in having this temperature almost invariably constant (warm-blooded). A complete muscular partition (midriff or diaphragm) separates the breast from the abdominal cavity. The lungs lie freely and are invested by (pleural) sacs; the heart is four-chambered and gives off a single aortic arch to the *left* side (to the *right* in birds); the red blood corpuscles are non-nucleated when fully formed. The parts of the adult brain show a greater curvature than in lower forms, while the cerebral hemispheres predominate, become more and more convoluted, and are united by an important bridge called the *corpus callosum.* Except in Monotremes, the rectal and the urino-genital apertures are separate; and, with the same exception, the ova are small and poor in yolk, and undergo total segmentation. The skeletal characteristics are necessarily more technical, but it is important to notice that the skull moves not on one condyle as in birds and reptiles, but on two as in amphibians; the lower jaw is a single bone on each side, and articulates not with the quadrate as in Sauropsida but with the squamosal; a chain of three ear-ossicles (mallus, incus, and stapes, probably equivalent to the articular, quadrate, and columella or hyo-mandibular of lower forms) connects the drum with the internal ear; the teeth, rarely quite absent, are set in distinct sockets; the vertebræ of the neck are (with four exceptions, seven in number; the coracoid bone (except in Monotremes) is a mere process of the scapula; and so on." (J. A. Thomson, in *Chambers's Encyclopædia,* ed. 1925, Article "Mammals.")

(b) MAN A PLACENTAL MAMMAL.—Mammals are divided into two sub-classes, primitive and placental—(a) *Primitive* mammals which, like the Monotremes (duckmole and Echidna), are oviparous or, like the Marsupialia (Kangaroo, Opossum, etc.), bring forth their young in such an imperfectly developed state that a pouch or external uterus becomes a necessity; and (b) *Placental* mammals which are viviparous in the fullest sense and depend immediately after birth on only one organ, the mammary glands. Here also there is no difficulty in reaching a classificatory decision, since man is viviparous and not oviparous and since he is not born in a semi-developed condition requiring in the initial stages a special receptive organ in addition to mammæ. Man should be therefore included among the Placentalia, the Mammals possessing a placenta, an organ whereby the embryo is nourished within the body of the female until the offspring is fit to be born.

We have travelled far on the road which leads to the discovery of man's precise place in nature. We learnt that man is a living being, since the unit of his body is the protoplasm-containing nucleated cell; that he belongs to the multi-cellular grade; that he possesses integrally *all but two* of the characters common to plants and animals; and that he is, *without prejudice to any new characters which we may yet find,* an animal, a vertebrate, and a placental mammal.

If we proceeded no further in the process of exclusion and inclusion, our position would be perplexing. Man might belong to one of a dozen widely diverging Orders. We must therefore resume our journey of exploration. We shall commence with a comprehensive genealogical survey of the mammalian orders :—

"Leaving the Monotremata (1)—duckmole and Echidna—and Marsupialia (2) kangaroo, opossum, &c.—by themselves in marked contrast to one another and to the placental series, we begin the latter with two orders in many ways more primitive than the rest—*viz.* the Edentata (3)—sloths, ant-eaters, armadillos, &c.—and the Sirenia (4)—dugong and manatee. It seems possible to group the other orders along three definite lines. One of these is especially marked by the Carnivora (5)—cats, dogs, bears, and seals—to which the Insectivora (6)—hedgehogs, moles, shrews—are apparently allied, while these in turn lead to the divergent Chiroptera (7) or bats, and to an aberrant genus—the flying lemur or Galeopithecus, for which some would erect a special order. Another line is especially characterised by the great order Ungulata (8), including (a) odd-toed or Perissodactyle forms—horse, rhinoceros, tapir, &c.—(b) Proboscideans or elephants, (c) the unique genus Hyrax, and (d) the Even-toed or Artiodactyle forms—sheep and cattle, chevrotains, camels, hippopotamus, and pigs. But with the Ungulates there are many reasons for connecting two other orders, the Cetacea (9)—whales and dolphins—and the Rodentia (10)—rats, hares, squirrels, &c. Finally, along a third branch, which probably had its origin in a stock common to the Ungulates on the one hand, to the Carnivores and Insectivores on the other, we have to place the Lemuroidea (11)—lemurs—and the Primates (12), the latter including the marmosets, the New-World monkeys, the Old-World monkeys, and . . ." (*Chambers's Encyclopædia,* ed. 1925, Article "Mammals.")

(c) MAN A PRIMATE.—To which of these orders man is most nearly akin is too patent to require painstaking investigations. As Huxley writes: "The most superficial study would at once convince us that, among the orders of placental mammals, neither the Whales, nor the hoofed creatures, nor the Sloths and Ant-eaters, nor the carnivorous Cats, Dogs, and Bears, still less the Rodent Rats and Rabbits, or the Insectivorous Moles and Hedgehogs, or the Bats, could claim our *Homo,* as one of themselves." (*Man's Place in Nature,* London, 1894, pp. 95-96.)

There is left, consequently, the vast and variegated Order of the Primates, of which Order the following is a somewhat full description :—

"All the members of the order are plantigrade mammals, normally with five fingers and five toes, which are generally armed with broad flattened nails, although these are rarely replaced on single digits, or on all the digits, by claws or claw-like nails. The dental formula is *i.* $\frac{2}{2}$, *c.* $\frac{1}{1}$, *d.* $\frac{2}{2}$ ($\frac{3}{3}$), *m.* $\frac{3}{3}$ ($\frac{2}{2}$); all the teeth in advance of the molars being normally preceded by milk-teeth. The molars are three-, four- or five-cusped, but the cusps may in some cases coalesce into transverse ridges. The thumb and great toe are, as a rule, opposable to the other digits. The clavicles (collar-bones) are complete; there is nearly always a free central bone in the wrist, or carpus, in which the scaphoid and lunar are likewise generally separate. The orbits (and the eyes) are directed more or less forwards, and generally surrounded

by bone, while the lower jaw has a vertical movement on the upper. With a few exceptions the stomach is simple; and a duodeno-jejunal flexure of the intestine and a cæcum are present. The diet is generally vegetable, but may be mixed, or, rarely, consisting of insects. The uterus may be either bicornuate or simple; and the placenta either discoidal and deciduate, or diffuse and non-deciduate, with a great development of the allantois. The clitoris may or may not be perforate; the penis is pendent; and the testes are extra-abdominal, situate either in a scrotum behind the penis or in a similarly situated fold of the integument. At most the teats are four in number, but generally only two situated on the breast, although occasionally abdominal or even inguinal. As a rule only a single offspring is produced at a birth, such offspring being always born in a completely helpless condition. With the exception of man, who has adapted himself to exist in all climates, the Primates are essentially a tropical and sub-tropical group, although some of the monkeys inhabit districts where the winter climate is severe. The great majority—in fact nearly all—of the members of the order are arboreal in their habits. In size there is great variation, the extremes in this respect being represented by man and the gorilla on the one side, and the marmosets and tarsiers, which are no larger than squirrels, on the other." (R. Lydekker, in *Enc. Brit.*, 11th edition, Article "Primates.")[1]

Have, then, the Primates some claim to man, *qua* animal, as one of their Order? The compact and imposing array of facts just quoted leaves us no choice in the matter. Now this Order is said to consist of two Sub-Orders: (a) the lowly developed lemurs, constituting the Lemuridea; and (b) the Anthropoidea, comprising the New World and Old World Monkeys, Catarhinæ or narrow-nostrilled and Platyrhinæ or flat-nostrilled respectively, and the Anthropomorpha or man-like apes. Within this Order we notice an amazing advance—from a half-monkey, the lemur, to a half-man, the ape. Man clearly is not intimately related to the lemurs, for in structure these carry us little beyond the smaller land mammals. The family of monkeys, Darwin states, "is divided by almost all naturalists into the Catarhine group, or Old World Monkeys, all of which are characterised (as their name expresses) by the peculiar structure of their nostrils, and by having four premolars in each jaw; and into the Platyrhine group or New World Monkeys (including two very distinct sub-groups), all of which are characterised by differently constructed nostrils, and by having six premolars in each jaw. Now man unquestionably belongs in his dentition, in the structure of his nostrils, and some other respects, to the Catarhine or Old World division; nor does he resemble the Platyrhines more closely than the Catarhines in any characters, excepting in a few of not much importance and apparently of an adaptive nature." (*The Descent of Man*, 1885, p. 153.) The Old World Simian stem, with its characteristic dentition and the comparatively thin partition between the two nostrils, of which the Anthropomorpha are an offshoot, is manifestly the division to which man is more nearly allied.

(d) MAN AND ANTHROPOMORPHA.—If the Lemuridea represent an interesting transitional stage between monkeys and humbler forms of life, the anthropoid apes may be said to bridge the gulf between monkeys and man in a startling manner by indicating the road along

[1]See also Henry O. Forbes, *A Hand-Book to the Primates*, 2 vols., London, 1896-1897.

which pre-man passed before becoming man. As types, they constitute veritably the organic chain which links us to the lower creation.[1] They show man in the making, so to speak. If the apes were missing among the living or the fossils, we should have laboriously to reconstruct them in the imagination.

From the bodily viewpoint the most striking general distinction between man and monkeys is that he is tailless and walks erect and that they have almost all tails and move along quadrupedally. Now the Anthropomorpha are without tails and to a greater or lesser extent assume the erect posture. The latter fact is the more significant from the evolutionary and structural aspect. We find here creatures exhibiting several bold compromises between the quadrupedal and the bipedal mode of progression—arms so long that, as with the gibbon, the animal can walk erect whilst its half-closed hands rest on the ground, or at least sufficiently long, as in the other apes, to be of substantial assistance in moving in a semi-upright condition—arms, too, as in the gibbon, which are adroitly used, so it seems, for balancing the imperfectly poised standing ape-body both on the ground and on the branches of trees.[2]

We have caught here nature experimenting in her laboratory, in the very act of seeking to evolve a new type of progression. To complete the picture, however, we ought to meet with hairless apes; but such species are not known to exist or to have existed. In this matter we should guard against exaggerating the closeness of the hairy covering of the apes, for in some cases the lighter skin is readily visible and in others parts are almost hairless. Here we must content ourselves with the reflection that at a certain stage in the earlier development of the human fœtus the body is covered with fine hair, the lanugo, proving that man's relative bodily hairlessness—the degree of which still widely varies among human adults and between races and men and women generally—was acquired in the course of his ascent from some lower form of life.[3]

[1]Friedrich Hempelmann (*Tierpsychologie,* Leipzig, 1926, pp. 440-441) reasons to the same effect.

[2]Not only does the gibbon frequently resort to the bipedal mode of progression, but his normal method of moving on trees is by swinging, with the lower limbs practically inactive and hanging down vertically. The present author has also seen the gibbon lie down at full length in the characteristic human posture; but this is not confined to gibbons.

[3]Man's head, face, arm pits, and pubic regions, are in most cases richly covered with hair; many men's bodies are thickly clothed with sensibly long hair; and examples of long-haired human specimens have been frequently described. Zoologists speak of man as being "less hairy." See the illustrations in Robert Wiedersheim, *Der Bau des Menschen als Zeugnis für seine Vergangenheit,* Tübingen, 1902, and that of an exceptionally hairy Ainu in Hans Friedenthal, *Beiträge zur Naturgeschichte des Menschen,* Lieferung II., Jena, 1908. As to apes: "The hair of the apes hangs in sparse, matted masses from certain regions only, leaving large areas quite or nearly as bare as in Man." (H. H. Wilder, *The Pedigree of the Human Race,* New York, 1926, p. 237.)

The anthropoid apes are imperfectly developed in regard to the erect posture. If we thought of them as perfectly developed in this respect,—certainly a permissible hypothesis,—we should be obliged also to surmise that they have a broader pelvis, a vertebral column markedly curved, feet flatter and more specialised for progression and for the support of the body, arms considerably shorter than at present and correspondingly longer lower limbs, more muscular calves, a proportionately lither trunk, and more orthognathous features. Maybe that their brains would share in the advantage of the upright position and appreciably increase in volume and weight.[1] Such a speculative evolution of the man-like apes we are bound to indulge in if we are to comprehend fairly man's place in the animal world. Thus, broadly speaking, a number of highly distinctive physical features in man are shown to be due to the erect posture, a posture which is in the main a logical or practical development of the semi-erect position observable among the Anthropomorpha. In other words, a truly erect ape, of the stature of the larger apes (think, however, of the pigmy races of man), one living entirely on the ground and who perhaps through sexual selection or other causes had become virtually hairless, would bear an uncanny corporeal resemblance to man and materially differ from him only in possibly having a comparatively lighter brain, a somewhat prognathous physiognomy, and poorly developed nostrils.[2] The erect ape and the man would bear a relation to each other such as that which marks the rather widely differing genera constituting the larger Anthropomorpha. Erect stature is consistent with the appreciable differences observable in human races, *e.g.*, the Caucasian, the Mongol, and the Negro facial, colour, and hair type and may no doubt be consonant with types perhaps as far removed from each other somatically as the orang-utan and the chimpanzee.

Huxley, in his classic work, *Man's Place in Nature,* deals more especially with the problem which we have envisaged in the immediately preceding paragraphs, to wit, that of man's physical relation to the apes. According to this famous systematist, "the Ape which most nearly approaches man, in the totality of its organisation, is either the Chimpanzee or the Gorilla" (p. 97), and for practical reasons he selects the latter for comparison with man, on the one hand, and with the rest of the Primates, on the other.[3]

[1] "Human evolutionary changes which are recorded are: more erect posture; shorter arms; perfection of thumb opposability; reduction of muzzle and of size of teeth; loss of jaw power; development of chin prominence; increase in skull capacity; diminution of brow ridges; diminution in strength of zygomatic or temporal arch; increase in size and complexity of brain, especially frontal lobes; development of articulate speech." (Richard S. Lull, *Organic Evolution,* New York, 1917, p. 673.)

[2] In this connection we should remember that some monkeys are orthognathous and others have prominent nostrils.

[3] Detailed information on the anatomical aspect here discussed may be found in Robert Hartmann's *Der Gorilla* (Leipzig, 1880) and *Anthropoid Apes* (London,

We dispense with the examination of the figures furnished by Huxley pertaining to the proportional differences between the limbs of man and the gorilla. Suffice it to state that " in whatever proportion of its limbs the Gorilla differs from Man, the other Apes depart still more widely from the Gorilla and that, consequently, such differences of proportion can have no ordinal value." (p. 100.) Our systematist arrives at an identical conclusion concerning the vertebral column, the ribs, and the pelvis.

The cranial cavity next engages his attention, and, after examining the evidence, he concludes as follows : " The difference in the volume of the cranial cavity of different races of mankind is far greater, absolutely, than that between the lowest Man and the highest Ape, while, relatively, it is about the same. For the largest human skull measured by Morton contained 114 cubic inches, that is to say, had very nearly double the capacity of the smallest ; while its absolute preponderance, of 52 cubic inches—is far greater than that by which the lowest adult male human cranium surpasses the largest of the Gorillas ($62—34\frac{1}{2}=27\frac{1}{2}$). Secondly, the adult crania of Gorillas which have as yet been measured differ among themselves by nearly one-third, the maximum capacity being 34.5 cubic inches, the minimum 24 cubic inches ; and, thirdly, after making all due allowance for difference of size, the cranial capacities of some of the lower Apes fall nearly as much, relatively, below those of the higher Apes as the latter fall below Man. Thus, even in the important matter of cranial capacity, Men differ more widely from one another than they do from the Apes ; while the lower Apes differ as much, in proportion, from the highest, as the latter does from Man." (pp. 107-108.) In other words, " for every constant difference between the Gorilla's skull and the Man's, a similar constant difference of the same order (that is to say, consisting in excess or defect of the same quality) may be found between the Gorilla's skull and that of some other ape. So that, for the skull, no less than for the skeleton in general, the proposition holds good, that the differences between Man and the Gorilla are of smaller value than those between the Gorilla and some other Apes." (p. 111.)

Huxley's conclusions in respect to the teeth of the gorilla and of man are of an analogous character to those relating to their respective skulls.

Our systematist deals next in some detail with the supposed crucial differences between the extremities of Man and those of the Gorilla.

1885) ; also in W. L. H. Duckworth's *Morphology and Anthropology* (Cambridge, 1915) and C. F. Sonntag's *The Morphology and Evolution of the Apes and Man* (London, 1924). See also Harold Peake and Herbert J. Fleure, *Apes and Men,* Oxford, 1927. The pre-Darwinian and anti-evolutionary view may be studied in the abstract of a paper " On the Anthropoid Apes," contributed by Richard Owen to the British Association Meeting in 1854.

He examines man's hand and foot, and finds that "the foot of man is distinguished from his hand by the following absolute anatomical differences :—

"1. By the arrangement of the tarsal bones.

"2. By having a short flexor and a short extensor muscle of the digits.

"3. By possessing the muscle termed *peronaeus longus*." (p. 124.)

What now of the gorilla's extremities ? "The terminal division of the fore limb presents no difficulty—bone for bone and muscle for muscle, are found to be arranged essentially as in man, or with such minor differences as are found as varieties in man. The Gorilla's hand is clumsier, heavier, and has a thumb somewhat shorter in proportion than that of man ; but no one has ever doubted it being a true hand." (pp. 124-125.)

The casual observer is inclined to think that the gorilla's "feet" are really "hands." On this point we shall therefore quote our systematist in full :—

"At first sight, the termination of the hind limb of the Gorilla looks very hand-like, and as it is still more so in many of the lower apes, it is not wonderful that the appellation 'Quadrumana,' or four-handed creatures, . . . should have gained such wide acceptance as a name for the Simian group. But the most cursory anatomical investigation at once proves that the resemblance of the so-called 'hind hand' to a true hand, is only skin deep, and that, in all essential respects, the hind limb of the Gorilla is as truly terminated by a foot as that of man. The tarsal bones, in all important circumstances of number, disposition, and form, resemble those of man. The metatarsals and digits, on the other hand, are proportionately longer and more slender while the great toe is not only proportionately shorter and weaker, but its metatarsal bone is united by a more moveable joint with the tarsus. At the same time the foot is set more obliquely upon the leg than in man.

"As to the muscles, there is a short flexor, a short extensor, and a *peronaeus longus*, while the tendons of the long flexors of the great toe and of the other toes are united together and with an accessory fleshy bundle.

"The hind limb of the Gorilla, therefore, ends in a true foot, with a very moveable great toe. It is a prehensile foot, indeed, but is in no sense a hand ; it is a foot which differs from that of man not in any fundamental character, but in mere proportions, in the degree of mobility, and in the secondary arrangement of its parts." (pp. 125-126.)

The gorilla has, therefore, true hands and feet. And once again Huxley produces evidence tending to show that the gorilla differs as much from other apes in regard to his extremities as man differs respectively from the gorilla. In fact, "hardly any part of the bodily frame, then, could be found better calculated to illustrate the truth that the structural differences between Man and the highest Ape are of less value than those between the highest and the lower Apes, than the hand or the foot."[1] (p. 130.)

"And yet, perhaps," he continues, significantly, "there is one organ the study of which enforces the same conclusion in a still more striking manner—and that is the Brain." (p. 130.)

[1]The problem of the genesis of the human foot is exhaustively discussed by Franz Wiedenreich in "Der Menschenfuss" (*Zeitschrift für Morphologie und Anthropologie*, Stuttgart, 1921-1922), and that of the bodily proportions generally of the Primates by Th. Mollison, "Die Körperproportionen der Primaten" (*Morphologisches Jahrbuch*, Leipzig, 1910).

In order to appreciate "what constitutes a great and what a small difference in cerebral structure," Huxley supplies us with "a brief study of the chief modifications which the brain exhibits in the series of vertebrate animals." (p. 130.) We make no apology for quoting this statement almost in its entirety :—

"The brain of a fish is very small, compared with the spinal cord into which it is continued, and with the nerves which come off from it: of the segments of which it is composed—the olfactory lobes, the cerebral hemispheres, and the succeeding divisions—no one predominates so much over the rest as to obscure or cover them ; and the so-called optic lobes are, frequently, the largest masses of all. In Reptiles, the mass of the brain, relatively to the spinal cord, increases and the cerebral hemispheres begin to predominate over the other parts ; while in Birds this predominance is still more marked. The brain of the lowest Mammals, such as the duck-billed Platypus and the Opossums and Kangaroos, exhibits a still more definite advance in the same direction. The cerebral hemispheres have now so much increased in size as, more or less, to hide the representatives of the optic lobes, which remain comparatively small, so that the brain of a Marsupial is extremely different from that of a Bird, Reptile, or Fish. A step higher in the scale, among the placental Mammals, the structure of the brain acquires a vast modification—not that it appears much altered externally, in a Rat or in a Rabbit, from what it is in a Marsupial—nor that the proportions of its parts are much changed, but an apparently new structure is found between the cerebral hemispheres, connecting them together, as what is called the 'great commissure' or 'corpus callosum.' . . . The two halves of the brain being once thus knit together, the progress of cerebral complexity is traceable through a complete series of steps from the lowest Rodent, or Insectivore, to Man ; and that complexity consists, chiefly, in the disproportionate development of the cerebral hemispheres and of the cerebellum, but especially of the former, in respect to the other parts of the brain. . . . In the lower and similar forms of placental Mammals the surface of the cerebral hemispheres is either smooth or evenly rounded, or exhibits a very few grooves, which are technically termed 'sulci,' separating ridges or 'convolutions' of the substance of the brain ; and the smaller species of all orders tend to a similar smoothness of brain. But in the higher orders, and especially the larger members of these orders, the grooves, or sulci, become extremely numerous, and the intermediate convolutions proportionately more complicated in their meanderings until, in the Elephant, the Porpoise, the higher Apes, and Man, the cerebral surface appears a perfect labyrinth of tortuous foldings." (pp. 131-133.)

This compressed study evokes in Huxley certain apposite reflections :—

"As if to demonstrate, by a striking example, the impossibility of erecting any cerebral barrier between man and the apes, Nature has provided us, in the latter animals, with an almost complete series of gradations from brains little higher than that of a Rodent, to brains little lower than that of Man. And it is a remarkable circumstance, that though, so far as our present knowledge extends, there *is* one true structural break in the series of forms of Simian brains, this hiatus does not lie between Man and the man-like apes, but between the lower and the lowest Simians ; or, in other words, between the old and new world apes and monkeys, and the Lemurs." (p. 134.)

The testimony of the convolutions of the brain is not less emphatic :—

"As to the convolutions, the brains of the apes exhibit every stage of progress, from the almost smooth brain of the Marmoset, to the Orang and the Chimpanzee which fall but little below Man. And it is most remarkable that, as soon as all the principal sulci appear, the pattern according to which they are arranged is identical with that of the corresponding sulci of man. The surface of the brain of a monkey exhibits a sort of skeleton map of man's, and in the man-like apes the details become more and more filled in, until it is only in minor characters, such as the greater excavation of the anterior lobes, the constant presence of fissures usually absent in man, and the different disposition and proportions of some convolutions, that the Chimpanzee's or the Orang's brain can be structurally distinguished from Man's. So far as cerebral structure goes, therefore, it is clear that Man differs less from the Chimpanzee or the Orang, than these do even from the Monkeys, and that

the difference between the brains of the Chimpanzee and of Man is almost insignificant, when compared with that between the Chimpanzee brain and that of a Lemur."[1] (pp. 139-140.)

Finally, our anatomist-systematist turns to the problem of the respective mass and weight of man's brain and that of a gorilla :—

"There is a very striking difference in absolute mass and weight between the lowest human brain and that of the highest ape—a difference which is all the more remarkable when we recollect that a full-grown Gorilla is probably pretty nearly twice as heavy as a Bosjesman, or as many an European woman. It may be doubted whether a healthy human adult brain ever weighed less than thirty-one or two ounces, or that the heaviest gorilla brain has exceeded twenty ounces. This is a very noteworthy circumstance, and doubtless will one day help to furnish an explanation of the great gulf which intervenes between the lowest man and the highest ape in intellectual power ; but it has little systematic value, for the simple reason that, as may be concluded from what has been already said respecting cranial capacity, the difference in weight of brain between the highest and the lowest men is far greater, both relatively and absolutely, than that between the lowest man and the highest ape. The latter, as has been seen, is represented by, say twelve, ounces of cerebral substance absolutely, or by 32 : 20 relatively ; but as the largest recorded human brain weighed between 65 and 66 ounces, the former difference is represented by more than 33 ounces absolutely, or by 65 : 32 relatively."[2] (pp. 140-143.)

[1] "The enlargement of the brain has been accompanied by modifications in the cranium and secondary modifications in the face, such as the forward-directed orbits, the reduction of the nasal region with a corresponding loss of olfactory sense, the shortening of the jaws and the retreat of the teeth, the latter causing the formation of the chin in the lower jaw. Very likely the shortening of the face developed as the hand, with its opposable thumb, came to be used more and more to bring food to the mouth, thus relieving the latter of seeking and grasping food." (H. L. Wieman, *General Zoology,* New York, 1927, pp. 299-300.) See also C. J. Herrick, *Introduction to Neurology,* Philadelphia, 1918, chapter on "The Evolution and Significance of the Cerebral Cortex."

[2] Here are some of the average human brain weights (in grammes): Europeans generally 1.360 ; Scotch 1.415 ; Italian 1.308 ; Women 1.290 ; Negroes 1.326 ; and Chinese 1.400. These averages, however, do not allow for differences of size in human beings, which largely accounts for the seemingly very light brain of women. In regard to Huxley's figures, it should be noted that we have knowledge of too small a number of gorilla brains to enable us to know the limits within which they differ in weight.

In Jacques de Morgan's *L'humanité préhistorique* (Paris, 1921, p. viii), Henri Berr submits the following interesting statement concerning relative brain weights: "Assuming the brain-weight as equal to 1, the body-weight of fishes averages 5.688, of reptiles 1.321, of birds 212, of anthropoids 100.60, and of men 36.32."

According to Hermann Klaatsch, "Die Stellung des Menschen im Naturganzen," in *Abstammungslehre* (Jena, 1911, p. 477), the weight of the brain of a cœbus compared to its body weight is as 1 to 18, whilst the ratio for man is 1 to 45. More generally expressed: "Many of the smaller American monkeys have as large a volume of brain, relatively, as man." (Donald C. Babcock, *Man and Social Achievement,* New York, 1929, p. 45.)

J. A. Thomson (*Outlines of Zoology,* London, 1921, p. 792) furnishes these figures: "The brain of a healthy human adult never weighs less than 31 or 32 oz. ; the average human brain weighs 48 or 49 oz. ; the heaviest gorilla brain does not exceed 20 oz."

The following figures have reference to cranial capacity and are taken from W. J. Sollas (*Ancient Hunters,* London, 1924, pp. 60-61). Out of 904 Tyrolese skulls one was found with a volume of 880 c.c. ; the cranial cavity of *Pithecanthropus erectus* has, according to Dubois, a volume of 850 c.c. ; and the cranial capacity of the higher apes is said not to exceed 600 c.c.

See also Christopher Dawson (*The Age of the Gods,* London, 1928, p. 10) who says: "The modern average of cranial capacity lies between 1.400 and 1.500 cubic centimeters, while that of the fossil man of Cromagnon has been estimated at 1.650 c.c., that of Chancelade at 1.710 c.c., and that of Barma Grande, near Mentone, higher still."

Summing up the results of his enquiries into the degree of the cerebral differences between man and apes, Huxley concludes: "Regarded systematically, the cerebral differences of man and apes, are not of more than generic value; his Family distinction resting chiefly on his dentition, his pelvis, and his lower limbs." (pp. 143-144.)

There is no ambiguity in Huxley's final conclusion respecting the relations of man to the lower animals to which he felt driven: "Whatever system of organs be studied, the comparison of their modifications in the ape series leads to one and the same result—that the structural differences which separate Man from the Gorilla and the Chimpanzee are not so great as those which separate the Gorilla from the lower apes." (p. 144.) Man may be therefore justly regarded, according to Huxley, as "a member of the same order . . . as the Apes and Lemurs."[1] (p. 145.)

Starting from the simple protoplasm-controlled cell, the headwater of life, we have slowly travelled down the winding stream until, passing on our long journey all groups of animals, we have reached our objective, Man. We found that in general bodily structure he intimately resembles the Anthropomorpha who represent the most advanced stage in the evolution of the Primates. These form manifestly the highest division in the highest order, class, and phylum. Man occupies, it seems, a definite, ascertainable place in nature, a place just above that of the higher apes. He may be the beginning of a new series; but that he is closely related to the old series, it would be extravagant to doubt.

(B) Mental Filiations.

When, in the last Chapter, we referred to the fundamental cleavage between plants and animals, we pointed out that even more marvellous than the resulting complex organism of the higher animals is the amazing mental development engendered by the entry of locomobile organisms on the world's stage. We shall therefore direct our attention now to this phase of life in order to ascertain man's mental filiations with the lower living forms. However, having already roughly established man's systematic position in the world of life, we shall be able to dispense with a comprehensive survey of mental development in the plant and animal series.

[1]Arthur Keith, in his *The Antiquity of Man* (London, 1925, p. 206), has some remarks which bear out Huxley's general point of view of the relation of man to the higher apes, and Ernst Haeckel, in his *Last Words on Evolution* (London, 1910, p. 73), also quotes impressive illustrations in support of the same thesis. H. H. Wilder, in his *The Pedigree of the Human Race* (New York, 1926, p. 153), writes confidently: "We have now a complete series of links that show man's ancestry more completely than that of any other animal form."

On the causes of the evolution of the human races, see also Arthur Keith, "The Evolution of Human Races in the light of the Hormone Theory," in *John Hopkins Hosp. Bulletin*, 1922.

1. THE SENSES.—In Chapter II. we saw that the higher animals generally are possessed of the senses of sight, hearing, smell, taste, touch, temperature, pain, and a few others. In some cases, as in the birds of prey, the visual sense may be particularly penetrating, and in others, as in the dog, the olfactory sense may be strongly developed; but these differences are of an adaptive character and are of small systematic value. The monkeys and apes form no exception as regards their senses, save that, as we saw in Chapter II. (Section 6), they are capable of focalised vision. And man shares his sensory apparati to such a degree with the higher animals generally that for anatomical purposes it matters little which of the highest animals we dissect with a view to becoming acquainted with all that is material in the sensory apparati of man. So far therefore as the senses are concerned, the differences between man and the higher animals are too trivial to deserve comment. One can only confirm that man's sensory equipment markedly corresponds to the sensory equipment of the highest animals.

This is equally true of the conditions of the sensations. In animals as in man: (1) "total rest excludes all sensations"; (2) "sensations only exist where there is change and where such change is not monotonous or repetitive"; (3) "without after-sensations, there are no sensations proper"; (4) "sensations are given in an organised mental system"; and (5) "all sensations and sensation complexes, all movements and movement complexes, as they appear in the life of an adult, are more or less close repetitions of previous sensory and motor complexes." (G. Spiller, *The Mind of Man*, 1902, pp. 55-57.)

2. INBORN NEEDS AND INSTINCTS.—Man's principal needs are broadly those of the higher animals generally. A human being requires a continuous supply of relatively *pure air*, giving rise in man to the problems of ventilation and sanitation. He requires *warmth*, which leads to the evolution of clothing and artificial heating generally. He requires *light* in the dark and in dark places, whence the evolution of glass and illuminants. He requires *shelter* from inclement weather and also *sleep, rest,* and *comfort,* which explains nearly the whole history of architecture and furniture. He requires *exercise, cleanliness, sanitary arrangements,* and *healing,* which leads to the sciences of hygiene, sanitation, and medicine, and also to hospitals, asylums, and sanatoria. He requires to use his unresting *senses* and his physical and mental *energies,* whence numberless provisions for satisfying them. He requires, of course, *food,* which results in the development of agriculture and cookery, and the keeping of certain animals for milking, etc. He requires *drink,* which results in the sinking of wells and the creation of water works, aqueducts, and other plant. Inadequately furnished with organic tools and energies for his ends, he requires

non-organismal tools and energies, whence the enormous growth of simple and complicated tools and machinery and the utilisation of mechanical and animal energies. He must *maintain* himself and his family, whence vocations of every type, competition, and sometimes lapses from honesty. He requires *recreation* and *æsthetic satisfaction,* whence games and sports, convivial gatherings and clubs, wit, the drama, literature, and the arts, and æsthetic gratification generally. He seeks to *perpetuate his kind and his culture,* whence courtship, the family, the home, the nurture of the young, and teaching establishments. He needs his *fellows,* whence the social organism and associations, fellowship and collaboration, direct and transmitted speech, written and printed matter, hotels and apartment houses, roads and means of transport, industry and trade, workers' and employers' unions, social insurance and benevolent institutions, systems of government, defence of countries, law, customs, manners, and morals. He demands being *reassured,* whence philosophies of life or religions, with all they imply. He displays *curiosity,* whence follow philosophy, science, history, and travel. He is averse to *death, injuries, pain, uninviting labour, indigence,* and *tedium* and fond of *life, wholeness, pleasure, leisure, luxury,* and *excitement,* whence the most varied efforts to obviate and escape the first and to secure and prolong the others, degenerating often into cowardice, effeminacy, indolence, trivial amusements, and neurasthenia. He loves *change,* whence fashions and endless preferences and habits. He is subject to the law of mental economy or *habit formation,* whence a certain uniformity in thought and action and a difficulty and reluctance to entertain new conceptions of life and thought. Pressed by needs, man's *intelligence,* in the form of more or less sustained individual and collective reflection, recalls the past and draws lessons therefrom, coordinates and guides present interests and relates them to futurity, prepares and provides for the immediate and the distant future, seeks for explanations, evolves imaginary situations and worlds, and invents and discovers in all departments of existence. Inasmuch as *crass error* and *grave conflict* are inevitable until pan-human culture reaches a very high stage, numerous factitious wants spring up, these accounting for numberless eccentricities and perversities in civilisations. Lastly, through the critically distinctive human need and capacity of *learning from his fellows* near and far in space and time or, its equivalent, of assimilating the cultural heritage, the individual raises his mental status almost infinitely.

The earlier psychologists tended to ignore the fact that the urge to human action came mainly from organismal and mental needs. They laid the stress on feelings of pleasure and pain as the spur. This view is being superseded by a transitional theory to the effect that instincts underlie man's activities. As the most popular representative

of this school writes: "Directly or indirectly the instincts are the prime movers of all human activity." (W. McDougall, *An Introduction to Social Psychology,* 1928, p. 38.) And the principal human instincts are said to be by this writer, the common animal instincts of flight, repulsion, curiosity, pugnacity, self-abasement, self-assertion, and maternity. Thus, as we see, the great multitude of fundamental needs of animal and human nature are silently passed over; the radical modifying influence of man's superior intelligence is overlooked; and the revolutionary importance of the specio-psychic[1] factor (especially expressed in language, sustained reflection concerning the future, and historically developed ideas, tools, and tool-made products) receives no recognition. In fact, accepting McDougall's list of principal human instincts at their face value, we should expect man's mental and social life to differ no more from that of the chimpanzee's than the chimpanzee's differs from that of the monkey. This, we submit, is surely an untenable attitude to adopt. To repeat, the basic needs and ways of animal and human nature should not be ignored but rather regarded as of supreme and practically exclusive importance when we seek for "the prime movers of all human activity" and for "the driving power by which all mental activities are sustained" (*Ibid.,* p. 38), and the whole adaptive outfit (Chapter II., Section 8) rather than instincts alone ought to be emphasised in this connection. The comparative unimportance of instincts in man will be considered in the sequel.[2]

3. FEELINGS.—According to Linnæus minerals grow, plants grow and live, and animals grow, live, and feel. An examination of the facts of human life certainly supports the last assertion in this adage, especially on the emotional side.

In view of the multitude of feelings manifested by the higher animals and the limited space at our disposal, we shall assume that the reader is well acquainted with the emotional life of our domesticated animals and more particularly with the dog and cat. This will render superfluous individual illustrations and permit us to take a comprehensive survey. Accordingly, we shall content ourselves with providing a bare serial statement of man's feelings, and invite the reader to observe that these feelings are traceable to a substantial extent among the higher animals generally.

We note *pain,* from a scarcely felt discomfort to agonising cries culminating in exhaustion and swooning, and *pleasure,* from faint satisfaction to rapturous delight; *dislike,* from an almost unfelt aversion to racking disgust and to blind, insensate hatred, and *like,*

[1] The term "specio-psychic" is employed to indicate that human individuals may profit almost infinitely by assimilating the thoughts and experiences of their countless fellows near and far in space and time.

[2] L. L. Bernard, in his *An Introduction to Social Psychology.* London, 1927, criticises in detail McDougall's instinct theory.

from a colourless inclination to passionate love and mad infatuation; *depression,* from an unanalysable feeling of tedium to a state of abysmal despondency leading here to frenzy and there to complete listlessness, and *elation,* from barely felt relief to transports of joy and a peace which passes all understanding; *fear,* from just noticeable anxiety to collapse or terror-stricken flight, and *valour,* from indifference to a heroism which cheerfully faces torture and death; *excitement,* from negligible uneasiness to health-wrecking nervousness, and *equanimity,* from slowness in resentment to unruffled composure in great crises; and *anger,* from bubbles of annoyance to tempestuous rage. Nor should we omit to take account of *jealousy, envy, vanity, pride, shame, wonder, admiration,* and *humour.* Of so-called feelings there is no end.

Darwin supplements Huxley, inasmuch as in his *Descent of Man* he deals pre-eminently with the mentality of man and animals, an aspect which Huxley only touched on incidentally. The subject of the feelings is consequently not overlooked by Darwin, and we shall hence cite a few passages from him in order to illustrate the wider basis of comparison involved in our enquiry.

"The lower animals," Darwin says, "are excited by the same emotions as ourselves. . . . Terror acts in the same manner on them as on us, causing the muscles to tremble, the heart to palpitate, the sphincters to be relaxed, and the hair to stand on end. Suspicion, the offspring of fear, is eminently characteristic of most wild animals. It is, I think, impossible to read the account given by Sir E. Tennent, of the behaviour of the female elephants, used as decoys, without admitting that they intentionally practise deceit, and well know what they are about. Courage and timidity are extremely variable qualities in the individuals of the same species, as is plainly seen in our dogs. Some dogs and horses are ill-tempered, and easily turn sulky; others are good-tempered; and these qualities are certainly inherited. Every one knows how liable animals are to furious rage, and how plainly they show it. Many, and probably true, anecdotes have been published on the long-delayed and artful revenge of various animals. . . . The love of a dog for his master is notorious; as an old writer quaintly says, 'A dog is the only thing on this earth that luvs you more than he luvs himself.' . . . We see maternal affection exhibited in the most trifling details; thus Rengger observed an American monkey (a Cebus) carefully driving away the flies which plagued her infant; and Duvaucel saw a Hylobates washing the faces of her young ones in a stream." (pp. 69-70.)

Darwin is not less clear concerning the more complex emotions:—

"Most of the more complex emotions are common to the higher animals and ourselves. Every one has seen how jealous a dog is of his master's affection, if lavished on any other creature; and I have observed the same fact with monkeys. This shews that animals not only love, but have desire to be loved. Animals manifestly feel emulation. They love approbation or praise; and a dog carrying a basket for his master exhibits in a high degree self-complacency or pride. There can, I think, be no doubt that a dog feels shame, as distinct from fear, and something very like modesty when begging too often for food. A great dog scorns the snarling of a little dog, and this may be called magnanimity. Several observers have stated that monkeys certainly dislike being laughed at; and they sometimes invent imaginary offences. In the Zoological Gardens I saw a baboon who always got into a furious rage when his keeper took out a letter or book and read it aloud to him; and his rage was so violent that, as I witnessed on one occasion, he bit his own leg till the blood flowed. Dogs show what may be fairly called a sense of humour, as distinct from mere play; if a bit of stick or other such object be thrown to one, he will often carry it away for a short distance; and then squatting down with it on the ground close before him, will wait until his master comes quite close to take it away. The dog will then seize it and rush away in triumph, repeating the same manoeuvre, and evidently enjoying the practical joke." (p. 71.)

The richness of the emotional life of animals is thus demonstrated, indicating that man and the higher animals have much in common in this respect.

4. INTELLIGENCE.—An unorganised mind would drift, being tossed hither and thither by any fugitive emotion or idea. A semi-organised mind would be able to halt here or there, and pay passing attention to individual matters. And a well-organised mind would be in a position to control the motley procession of hurrying thoughts and fix the *Attention* for a considerable period and intently on a given subject or object. Animals are not entirely devoid of this faculty. A cat will, with exemplary patience, watch a mouse hole or a bird in the grass near by, while, in certain circumstances, a dog will listen or look, with its body still and stiff and its mind manifestly centred on one object exclusively. Animals attend.

That animals exhibit the essential traits of *Memory* is equally obvious. All observation and all attention involve memory, seeing that duration is implied in both and that without memory neither observation nor attention would have any meaning. In fact, a memory enduring for appreciable periods is necessary for survival and the familiarity with many objects and actions which our domesticated indoor animals display, pertinently illustrates this. They also, like ourselves, remember for a few moments most of what they perceive or do from second to second, only, as with us, quickly to forget. They, too, require considerable reiteration for fairly establishing anything in the memory. Likewise, their memory is equally a fading one, and one which grows confused with time. Leaving aside the thorny question of images, we are therefore constrained to admit that the essentials of the human memory are present in animals.

Life, the bulk of life, perhaps the whole individual life, is primarily irrational. We are taught when we are young. This teaching develops throughout life into further bodily and mental activities and products, the life of one minute profiting by, and being based on, the life of the preceding minute. Owing to the narrowness of the field of consciousness, the limited speed of ideation, the hurrying desires, and the consequent need for mental economy, mental processes tend to be stripped of all that is superfluous, becoming virtually mechanical. Such simplified courses of action we call *Habits,* and practically all our life is necessarily controlled and dominated by habits of thought and action. Similarly with the higher animals : their life from the time of waking in the morning to falling asleep at night consists mainly of habit-determined acts and the application of habit-determined intelligence. Some of these habits may be slowly acquired, others rapidly ; some of them may be displaced slowly or rapidly ; in substance they rule the animal's life. Man and the higher animals

therefore agree in converting their relatively novel experiences into relatively novel habits.

Imitation is frequently observed among animals. Darwin writes on this subject:—

"Animals sometimes imitate each other's actions : thus two species of wolves, which had been reared by dogs, learned to bark, as does sometimes the jackal, but whether this can be called voluntary imitation is another question. Birds imitate the songs of their parents, and sometimes of other birds ; and parrots are notorious imitators of any sound which they often hear. Dureau de la Malle gives an account of a dog reared by a cat, who learnt to imitate the well-known action of a cat licking her paws, and thus washing her ears and face ; this was also witnessed by the celebrated naturalist Audouin. I have received several confirmatory accounts ; in one of these, a dog had not been suckled by a cat, but had been brought up with one, together with kittens, and had thus acquired the above habit, which he ever afterwards practised during his life of thirteen years. Dureau de la Malle's dog likewise learnt from the kittens to play with a ball by rolling it about with his fore paws, and springing on it. A correspondent assures me that a cat in his house used to put her paws into jugs of milk having too narrow a mouth for her head. A kitten of this cat soon learned the same trick, and practised it ever afterwards, whenever there was an opportunity." (p. 73.)

The principle of imitation is, however, in all probability more distinctly developed in some animals than in others. Fowls, for example, are perpetually repeating one another's actions. Wherever one is, there the others tend to congregate, however unusual the locality ; and if one preens her feathers or dusts herself, the others are almost certain to follow suit. On the other hand, contrary to the common belief, monkeys rarely imitate human beings.[1]

Animals exhibit *Curiosity*. Darwin writes on this point: "They sometimes suffer from this latter quality, as when the hunter plays antics and thus attracts them ; I have witnessed this with deer, and so it is with the wary chamois, and with some kinds of wild-ducks. Brehm gives a curious account of the instinctive dread, which his monkeys exhibited, for snakes ; but their curiosity was so great that they could not desist from occasionally satiating their horror in a most human fashion, by lifting up the lid of the box in which the snakes were kept." (pp. 71-72.) On several occasions the author has seen a cat attentively observing the actions of her kittens. He also noticed a young cat watch for a sensible period and with marked interest a tortoise devouring her frugal meal and even follow her with sustained curiosity when she left her meal for her shady retreat. Likewise any rearrangement of furniture or introduction of a prominent object into a room is examined by some cats with no little curiosity.

[1]However, P. Chalmers Mitchell (*The Childhood of Animals*, London, 1912, p. 253) writes: "Chimpanzees and Orangs watch what is happening round about them. If you take a wooden match-box out of your pocket and open and shut it, and then give it to one of them, it will try to repeat the movement. They copy their keeper in sweeping out their cage. They are taught many kinds of tricks and performances almost as much by doing the various motions required in front of them as by actually guiding them. They will run when you run, dance when you dance, shoot out their lips and scream when you set them the example."

In the instance just alluded to, *Observation* and *Examination* are implied. This is seen to advantage, for instance, when a cat has lost a mouse or a dog his master. The former will excitedly and minutely examine the immediate surroundings, whilst the latter will run planfully in many a direction and halt from time to time to look whether he can see the object of his quest.

Differentiation and *Discrimination* are also involved in the above and are frequently exhibited by animals to no mean a degree. Moreover, animals have a keen sense of *Resemblance* and *Difference.*

Hesitation and *Doubt* are often observable in animals: "When the timid dog alternately attempts to slip down the high wall and then withdraws; when the fowl is as much attracted by the grain as it is repelled by the horse's hoofs; when an orang-utan wonders whether it was that particular part of the wall against which he struck when swinging; or when a pig on a country road is measuring our good or evil intentions" (G. Spiller, *The Mind of Man,* p. 300), we have illustrations of hesitancy and doubt. The cat may wish to jump, but be uncertain as to whether the feat is practicable. She will make the required preparations for jumping, then relax, and continue thus for some time vacillating. At last she may resolve to clear the space—jump, and fail or succeed, as the case may be. A dog will in this way entertain doubts as to the intentions of some one who is calling him and manifest diverse signs of a divided will, now advancing and now retreating.

Animals learn by *Experience.* If a cat hears a noise suggestive of the presence of a mouse, she becomes alert and approaches the locality whence the sounds emanate. Having satisfied herself that she has made a mistake, she ceases to take note of the persisting noise. Indeed, her many habits show that she is ever ready to profit by experience.

Generalisation involves the application of one experience to one or more identical or analogous ones. Since this is presupposed in every class of activity of the kind treated of in the immediately preceding paragraphs, animals must be assumed to be capable of elementary generalising.

There is no more patent fact than that of animals *Communicating* with their kind. If we doubted their capacity to do this, their cries and calls and songs, and the answers which they evoke, would lose their significance for us. Here is a more complicated instance: "I am in a room with the door closed, and on the sofa lies a cat which is a stranger to me, though not to the house. Suddenly footsteps are heard; apparently also something is scented, and the cat runs to the door. Mark what happens. She does not inanely scratch. She

tries deliberately the lower corner of the door where it opens, but without success. She then walks along the door and looks at its edges. Then she looks up and at the lock. Then she touches something that is hanging from a nail on the door, which object moves without the desired result. Then she touches the object again, but quite gently, as who would say, 'It's no use.' At last, she turns round, walks up to me, though a stranger, and mews pitifully." (G. Spiller, *The Mind of Man,* p. 465.) In fact, cats frequently appeal for aid. When through her ineptitude a young cat had lost her kittens only a few days old, she not only roamed about the house and the neighbourhood disconsolately searching and stentoriously calling for them, but dogged the steps of the members of the household, turning her head up to them and mewing most plaintively.

We have seen in Chapter II. that the *Associative Memory* of monkeys far exceeds that of other animals and that their interest in objects is insatiable, considerably more so than that of other orders and classes of animals. The author's observations at the Zoological Gardens in London well illustrate the high stage of intellection noticeable in apes, a stage where reasoning and various other developed mental powers were also exemplified. "The apes were generally occupied in action or observation, the facts of attention applying to them in every way. The movements of their eyes closely resembled—even in rate of motion—those of the human family. Now the apes seemed curious, now interested, now fascinated, now agitated. Now their eyes rested on an object; now they took a comprehensive view; now there were expressions indicating hesitancy, doubt, familiarity, surprise, and alarm; now the eyes returned again and again to an object. On many occasions, too, their behaviour suggested that they were puzzled and were seeking for a solution. The first of the apes, the most active of the three, especially showed signs of thought. He would quietly gaze round his capacious cage, his eyes furtively resting on various objects; then they would slowly alight on something, and he would move in that direction. Frequently he appeared to look for some special article. Once while swinging on a trapeze, he came into collision with the partition. He then calmly turned round and looked at the particular spot. He never appeared to be in a hurry. He seemed to observe, and quietly solve difficulties. His whole manner was strangely reflective and human, and unlike that of a cat or dog. If I held out my hand, the second orang-utan would look round, in an even more lazy fashion, for a suitable piece of straw, pick it up, and give it me. When I kept my hand open, he would try in various ways to place the straw so that I should retain it, this fact arguing decidedly for consistent thought. The third orang-utang would, in taking a basket into a higher branch of his tree, overcome difficulties in a variety of ways; he would hold the basket in one hand, then in one foot,

then between his teeth, and then place it on his head."[1] (*Ibid.*, pp. 462-463.)

A consideration of the basic mental faculties of man and animals thus compels us to assent to the proposition that in regard to the senses, to inborn needs, to feelings, and to intelligence, man is intimately related to the lower creation. As Darwin admirably expresses it in a memorable passage: "Man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men but to the humblest living creature, with his god-like intellect which has penetrated into the movements and constitution of the solar system—with all these exalted powers—Man still bears in his bodily frame [and, we would add, in his mentality] the indelible stamp of his lowly origin." (*Descent of Man*, p. 619.)

(C) Conclusion.

According to Huxley and Darwin, and their followers, the gist of the reasoning in the two preceding Sections contains the truth, the whole truth, and nothing but the truth, concerning man's place in nature. For this reason the problem of determining man's systematic position in the animal kingdom is for them readily solved. "Man is a member of the same order," Huxley affirms, "as the Apes and Lemurs. This order is now divisible into seven families, of about equal systematic value; the first, the Anthropini, contains Man alone; the second, the Catarhini, embraces the old world apes; the third, the Platyrhini, all new world apes, except the Marmosets; the fourth, the Arctopithecini, contains the Marmosets; the fifth, the Lemurini, the Lemurs—from which Cheiromys should probably be excluded to form a sixth distinct family, the Cheiromyini; while the seventh, the

[1] Edward B. Tylor, in his *Anthropology* (London, 1895, pp. 47-52), also points to the numerous features wherein the human and the animal mind agree. He cites several examples of ape intelligence.

Wolfgang Köhler's *The Mentality of Apes* (London, 1927) is the first adequate study of ape mentality, or rather of the mentality of chimpanzees. His observations and experiments were conducted at Teneriffe with a half-dozen or so of these animals. The present author is gratified to find that this study corroborates his limited observations. Here is a passage showing the remarkable resourcefulness of chimpanzees. "When the bananas are hung out of reach on the smooth wall of the house, he [Koko] takes a green plant-stalk, then a stone, a stick, a straw, his drinking bowl, and finally a stolen shoe, and stretches up towards the fruit; if he has nothing else to hand, he takes a loop of the rope to which he is attached, and flaps it at the bananas." (p. 36.) One of the apes used spontaneously a wooden box (dimensions 50 cms. by 40 by 30) to reach a banana. (p. 40.) "Chica often inspects and touches those portions of her body which have borne the brunt of the fall and walks away with slow and subdued gait." (p. 73.) Still better results should be obtained with orang-utans.

See also Frédéric Cuvier, "Description d'un orang-outang, et observations sur ses facultés intellectuelles," in *Annales du muséum d'histoire naturelle*, vol. 16, Paris, 1810, pp. 46-65.

Galeopithecini, contains only the flying lemur Galeopithecus." (*Op. cit.*, pp. 145-146.) Man is therefore accorded the rank of a family in his earlier classificatory scheme. Later, however, as Darwin states below, Huxley raised Man to the somewhat higher rank of a sub-order.

Darwin, on the other hand, considered that man should possibly be only regarded as constituting a sub-family. He says: "Although, as we have now seen, man has no just right to form a separate Order for his own reception, he may perhaps claim a distinct Sub-order or Family. Prof. Huxley, in his last work, divides the Primates into three Sub-orders; namely, the Anthropidæ with man alone, the Simiadæ including monkeys of all kinds, and the Lemuridæ with the diversified genera of lemurs. As far as differences in certain important points of structure are concerned, man may no doubt rightly claim the rank of a Sub-order; and this rank is too low, if we look chiefly to his mental faculties. Nevertheless, from a genealogical point of view it appears that this rank is too high, and that man ought to form merely a Family or possibly even only a Sub-family."[1] (*Op. cit.*, p. 152.)

According to Huxley, the possession of articulate speech, and in Darwin's opinion the highly developed brain and the erect posture, form the distinctive character of man; but both reason that the characters just mentioned are not of such a nature as entirely or greatly to overshadow the countless resemblances between man and his more immediate predecessors.

Darwinians, therefore, commonly look upon man as being one animal among many and as subject to the general laws which control animals. On this account Darwinians have repeatedly insisted that it is wanton folly, and perilous to boot, for man to disregard what they consider to be the deeper nature of his being. As we shall have frequently occasion to observe, the assumption pervades the writings of large sections of present-day thinkers that for human beings, precisely as for animals, native capacity and heredity are of paramount consequence, and that therefore the supreme duty of society is to multiply the innately most highly developed men and women and discourage the birth of children among those who are innately least developed. William Ridgeway, for instance, has echoed this widely prevalent attitude: "The legislator must not merely look to improved housing of the poor and the development of the physique of city populations. He must, as far as possible, conform to the principles of the stockbreeder, whose object is to rear the finest horses, cattle, or sheep. . . . The legislator, on his part, ought similarly to foster the increase of the best element in the State, and on the other hand discourage the multiplication of the worst." ("The Application of

[1] H. H. Wilder (*The Pedigree of the Human Race*, New York, 1926, pp. 39-40) divides the Hominidæ into three sub-families: gibbons and siamangs, other apes, and man.

Zoological Laws to Man," in *British Association Report for 1908,* p. 846.)[1]

In the immediately following Chapters we shall endeavour to ascertain whether man, notwithstanding his multitudinous and highly important affinities to animals, does not possess some crucially distinctive character of evolutionary origin which separates him from, and raises him above, the animal kingdom, as the character of locomobility separates animals from, and raises them above, the plant kingdom.

[1]See also W. Schallmayer, *Beiträge zu einer Nationalbiologie* (Jena, 1905), and Galton's works generally. For a recent pronouncement on the subject, see J. Arthur Thomson's paper on " Biological Contributions to Sociology," in the *Sociological Review,* London, April 1923 ; also S. J. Holmes, *The Trend of the Race,* London, 1921 ; H. W. Siemens, *Race Hygiene and Heredity,* London, 1924 ; and *Scientific Papers of the Second International Congress of Eugenics* (New York, Sept. 22-28, 1921), 2 vols., Baltimore, 1923.

Chapter IV.

HUMAN AND ANIMAL BEHAVIOUR COMPARED.

1. *Recapitulation.*

In the first Chapter we enumerated the most general characters common to plants and animals. In the second Chapter we pointed out wherein animals differ from plants and the far-reaching organismal and mental modifications entailed by the locomobility of animals. Having thus prepared the ground, we asked ourselves in the third Chapter the pregnant question as to what characters man has in common with plants and, more particularly, with animals. Ascending step by step from the uni-cellular forms of life through all intermediate stages to the highest mammals, we found that man is as regards readily noticeable physical characters, most closely related to the man-like apes and is probably about as far removed physically from these his nearest relatives as they are from their nearest relatives, the monkeys. Man's most salient physical peculiarity, we noted, is his completely erect posture and in this respect we observed the no less remarkable fact that the man-like apes, especially the gibbon and the gorilla, occupy an intermediate position which bridges theoretically the gulf between normally quadrupedal Primates and normally bipedal Man.

Having ascertained that man is, as regards his body, closely allied to the apes, we were ready to learn, and eventually learnt, that in countless respects his mentality intimately corresponds to that of the most advanced mammals and most especially to the cast of mind of the anthropoid apes. Many evolutionists, believing that man has been shown to be in *every* respect nearly related to the sub-human world, arrest their enquiry at this point. They declare that man should be classed with the Primates and that no reasonable object would be served by pursuing the enquiry further.

2. *Man's Mental Status.*

If Darwin and Huxley had solemnly affirmed in their respective works on the descent of man that man's mental superiority over the Anthropomorpha was only proportionate to his physical superiority over them and that those who vaunted man's surpassing intelligence were as much in error as their predecessors who fatuously repudiated

any decided bodily filiation between man and apes, it would have seemed eccentric to break with what would then have been almost an agreed scientific tradition. This, however, is far from being the case. Darwin speaks in one passage of the "god-like intellect" of man and in another connection he boldly styles man "the wonder and glory of the Universe," whilst his most distinguished supporter, Huxley, is no less emphatic in this matter and insists on "the immeasurable and practically infinite divergence of the Human from the Simian Stirps."

3. *Enquiry should be Extended.*

Darwin's and Huxley's almost ecstatic admiration for man's mentality, merits the closest attention and fully justifies us in taking up the enquiry into man's mentality at the point where they abandoned it. After all, their examination, like ours a few pages back, only skimmed the veriest surface of the mental life of man, as we shall see, and never raised the problem of whether some basic mental *dissimilarity* had not evolved with the appearance of the human species, a dissimilarity that might effectively account for man's "god-like intellect" and his "practically infinite divergence . . . from the Simian Stirps."[1] Our scientific duty is hence clear. We must institute an exhaustive comparative enquiry into the mode of life and thought of human beings and of animals and undertake a no less thorough analysis of the facts thereby revealed. Only after this has been accomplished, shall we be able to affirm or deny that man's mentality is in some respect unique or that the human stirps presents an "immeasurable and practically infinite divergence . . . from the Simian Stirps."

4. *A Concrete Presentation of the Life of a Human Being.*

We believe we shall reach our goal with the greatest certainty if we eschew, to begin with, all generalised statements and all attempts at classification. We ought to have before us an unequivocally concrete presentation, a rough inventory of our civilisation, if we are fairly to compare man's mentality with that of animals. An abstract statement supported by a few selected illustrations, would leave us in the grip of hackneyed generalities. Accordingly, we shall make a somewhat minute study of the surroundings and one day's movements of one human being who in his life embodies much of the culture of mankind. After the subsequent analysis we shall be in a position to

[1] Friedrich Albert Lange, in his *Geschichte des Materialismus* (Leipzig, 1887, p. 617), raises pointedly the primary issue of this work by declaring that whereas the descent of man from lower forms of life is, on the physical side, readily understood, man's peculiar mentality remains an enigma even if we grant all the implications of such an evolutionary corporeal change.

compare his behaviour and surroundings with the behaviour and surroundings of some of the brightest animal species.

Let us imagine that we possess magic rings like that of Gyges, enabling us to enter uninvited and unobserved the sleeping apartment of Sir Fullman Lovetruth, the Principal of Camblonox University. It is morning and time to rise. A maid glides in to draw back the heavy curtains from the partially open windows and deposits by the washstand a jug of hot water. Sir Fullman prepares to emerge from his cosy bed. It being winter time and still dark, he switches on the electric light, which, we perceive, is softened by an inverted alabaster shade. We at once explore the view presented. We notice the artistic steel and brass bedstead. On it a spring mattress ; on that a horse-hair mattress ; on that a blanket and over it a linen sheet ; then for the head a bolster and two pillows ; and, as covering for the body, another linen sheet, two woollen blankets, a down quilt, and a lace cover (thrown back). Sir Fullman wears, as we remark, a silken pyjama suit. He sits now for a moment at the side of his bed and gazes round the room half-abstractedly. We follow his eyes and perceive sundry pictures on the green-paper covered walls. Some are original oil paintings and water colours ; there are reproductions in colour and in art tones of paintings by Raphael, Rosa Bonheur, and Watts ; and we further observe a few photographs in colour and otherwise of landscapes and seascapes. We also notice, among other objects, a silent night clock on the mantelpiece illuminated in the dark by phosphorescence, statuettes and nicknacks in prominent positions, light and heavy rugs on the parqueted floor, ventilating apertures in the windows and walls, a well-filled medicine chest, and a system of perpendicular and connected pipes in one corner of the room, whence the mysterious heat issues which keeps the whole apartment snugly warm.

Sir Fullman now draws on his felt slippers, dons his dressing gown, and adjourns to the bathroom the walls of which are covered with glazed tiles to a certain height. He turns on the cold water tap, steps into and settles for a moment or so in the flood, sponges himself or has a shower bath ; and in less than half-a-minute stands on the dry cork mat, unless he chooses to take a warm bath when the sister tap simply, or the geyser, supplies the hot water. A huge rough sheet towel soon removes the moisture from the body and an ordinary towel from the head and face. Within a short time he is back in his room. He proceeds then to the washstand, where we notice on the white marble slab a small china dish containing soap, a tooth brush in a special receptacle, tooth paste in a quaint little tube, a nail brush and some other brushes, a face cloth, a pumice stone, a bottle of drinking water the mouth of which is covered with a glass, a large washing basin, and a porcelain jug filled with cold water and also one

with hot water. Sir Fullman now performs his ablutions and having recourse to a pair of towels which he takes from the towel rest, he soon feels dry, immaculately clean, and refreshed.

Sir Fullman's attention is next directed to his hair. He walks across to the lace-covered dressing table, extracts from a drawer—where we also notice silver cuff-links, gold shirt-buttons, a clinical thermometer, button hooks for boots and gloves, and a safety hair-cutter—brushes and comb, places himself before a mirror, and brings the rebellious hair to reason. Looking at the dressing table, we see a pin cushion with ordinary and safety pins, one or two needles, and a few bejewelled tie pins. The small crystal bottles of perfumes and hair-washes he leaves to-day untouched.

Sir Fullman, using a safety razor, though several unprotected razors lie on the table in their sheaths, shaves himself now before a special mirror. We cast a glance at his shaving stick, shaving brush, drying powder, alum block, strop, and other accessories to this somewhat tedious diurnal operation. His finger nails next engage Sir Fullman's attention. With specialised scissors, file, soft brush, polish, and ivory nail cleaner, these soon become irreproachable.

Ready to dress, he opens the capacious wardrobe. We discern hanging there, or neatly folded on shelves, jacket suit, afternoon suit, dress suit, smoker, academic robes, suits for walking tours, for riding, golf, cricket, football, running, boating, and bathing, spring overcoat, winter overcoat, a heavily fur-lined overcoat for severe weather and winter travel, a mackintosh, and various changes in suits and other garments, in addition to caps, soft and hard bowlers, Panama straw, and ordinary and collapsible silk hats, braces and belts, varieties of gloves, and ties of diverse hues and shapes in abundance. There, too, is a tie press and a trousers press. Placed at the foot of the wardrobe, we perceive slippers, sandals, ordinary and dress shoes, boots, goloshes, top boots, golf boots, climbing boots, snow boots, gaiters, shoe horns, and garters. He presently dresses, having previously selected from the well-filled chest of drawers near by his woollen vest and pants, pullover, socks, shirt, collar, cuffs, handkerchiefs, and the like.

Sir Fullman, slipping on his wedding ring and one or two others set with precious stones, is at last ready to break his fast. Casually looking out of the glass-paned windows which are partially covered with light curtains ornamented with a beautiful design and outside which there are Venetian blinds, he walks towards the door—where we notice the panels, the handle, the latch, the lock and key, and the hinges,—opens it, and proceeds down the carpeted staircase in order to join his family in the apartment reserved for meals.

Following him thither, we observe in the middle of the room a large mahogany table covered with a dazzlingly white embroidered tablecloth. On this we see, appropriately placed for each person, plates of varying sizes, cup and saucer with teaspoon, small and large forks, knives, and spoons, and serviette. On the central portion of the table we perceive, all in suitable and attractive glass, china, or silver receptacles, together with the appropriate cutlery, butter, white and brown bread, rolls, toast, biscuits, milk, cream, marmalade, honey, fruit, salt, a cruet for pepper, oil, mustard, and vinegar, a bottle of appetising sauce, and Demerara, granulated, and cubed sugar. Overtopping these is a gay selection of flowers in copper, bronze, silver, and crystal vases. For their breakfast beverage some of the adults favour tea, others coffee, the children milk or cocoa. Among the food served to-day is porridge, eggs, bacon, fish, and cold fowl. Comfortable chairs are placed round the table, and soft carpets and rugs cover the parqueted floor. Everybody is in good humour. The children are ready for school and mother and father for their respective duties. The conversation during breakfast is brief, but ranges over a variety of topics. The apartment, the walls of which are oak-panelled, contains relatively little furniture, the most conspicuous being, apart from a few large family portraits by well-known painters, the sideboard where the cutlery, corkscrews, nutcrackers, fruit dishes, and sundry other table requisites are kept. An artistic wireless apparatus, with loud-speaker, as well as a movable gramophone cabinet, are visible in a corner. On the ceiling there is an exquisite fresco having for its subject a famous story from Norse mythology.

Whilst Sir Fullman is partaking of his breakfast, let us slip out of the room and inspect the culinary department. We perceive there the massive and complex kitchen range, the gas and electric stoves, plate racks, and scores of pots and pans, some in copper but mostly in stainless steel and aluminium, placed on shelves, hanging up on the walls, or being used. We also see dozens of ingeniously devised kitchen appliances, including a number for cleansing and burnishing utensils, besides knife sharpeners, kitchen cloths, and the like. There, too, is the larder, a cupboard loaded with crockery, and food and other stores to which almost every part of the world has contributed its quota. We descry even some cookery books resting on an easily accessible shelf. Returning, we peep into the drawing room replete with tasteful furniture, pictures, statuary, mirrors, electric clock, and bric-a-brac of more than one period. British, Dutch, and Italian art are here worthily represented ; nor is the Far East, with its variegated Persian rugs, grandiose Chinese vases, and superb Japanese paintings, neglected. Here visitors are welcomed and may listen to the tones of the grand piano or the varied musical instruments of the sons and daughters. A glance at the conservatory, revealing luscious fruits and

a blaze of flowers in mid-winter, and nearly stumbling over the favourite cat and dog on the door mat (waiting to be admitted), and we are back in the breakfast room.

Sir Fullman retires for a little while to the library, whither we follow him. On the table he finds the morning's mail and some daily papers. Having correspondents near and far, communications reach him from many countries. One letter, for instance, is from Vera Cruz and another from Peking. Just as he has finished perusing his correspondence, the telephone bell rings and he engages in an animated conversation with some one living several miles away. He then scans the daily papers for the news of the day—general home news and foreign news, law and art news, entertainments and sports, reviews of books, striking events, letters to the editor, the week's weather forecast, parliamentary and financial news, news in pictures, and so on. Whilst the Principal of Camblonox University is thus occupied, we examine his sanctum. On the spacious top-roll desk we observe, each in its proper place or pigeon-hole, black, blue, red, and copying pencils, penholders and nibs, inkstand, fountain pens, a bottle of fountain pen ink, pencil and ink erasers, paper clips, paper knife, sealing wax, matches, ball of string, book marker and book cover, stamp box, stamp wetter, post cards and telegraph forms, blotting pad, note paper and envelopes of various sizes and qualities, and sundry other writing materials, as well as a scribbling block, a diary, a calendar block, an address book, an account book, and letter and bill files. On a table near by we note a microscope, a hand telescope, magnets, a compass, and a pair of letter scales, and on his secretary's table a series of reference books, a typewriter, a cyclostyle, and a calculating machine. Near the latter's table, on the ground, stands a large globe and in another part of the library an orrery. Along the walls, on shelves, reaching nearly to the lofty ceiling, are rows upon rows of books—some thousands of volumes in several languages, dealing with mathematics and astronomy, the physical and biological sciences, psychology, anthropology, philology, sociology, religion, philosophy, ethics, art, æsthetics, history, economics, law, hygiene, travel, biography, autobiography, fiction, poetry, the drama, essays, etc., etc. Here are the recognised ancient classics of many peoples and also much of modern lore.

Suddenly Sir Fullman appears startled. He looks first at the quaint grandfather clock and then at his chronometer and decides that it is high time to depart. Wishing to make sure of the temperature in the open, he examines the thermometer fixed on the street side of one of the library windows. He then skips down the stairs, just casts a glance at the barometer in the hall (whilst we examine the electric vacuum cleaner and the clothes and umbrella stands), says affectionately good-bye to his wife in her study, and, putting on his overcoat,

gloves, hat, and eye glasses, and taking his umbrella, he steps briskly into the street, with us inevitably in pursuit.

Naturally the outdoor life strikes us at once. Men, women, and children are walking on the asphalted pavement, with here a nurse pushing a perambulator and there a man drawing an invalid chair. Dogs, too, are in evidence, and timid cats cautiously keep out of their sight. The concreted and tarred roadway is alive with vehicular traffic and a rider here and there is also to be seen. There is the lad pushing a barrow, the donkey or pony pulling a small cart, the ordinary and motor bicycle, the motor cycle with side car, the motor car, motor taxi, motor omnibus, motor lorry, and motor coach, the electric tramway, a few horse-drawn carriages, carts, and vans, and a sprinkling of steam-driven conveyances, including a steam roller. From the eminence where we are, we overlook the sea. Here also there is abundance of movement : rowing and motor boats, sailing and steam vessels, yachts, and much other craft, from a fragile canoe and a resting seaplane to a 60,000 ton ocean hound. In the distance two visiting fleets catch our eye, the fishing and the fighting fleet. Gazing up into the sky, a new sight meets our view—due probably to an air festival—specimens of monoplane, biplane, and triplane, helicopter and autogiro, old-fashioned balloon, and up-to-date airship, all silently or noisily coursing through the heavens at various altitudes and in diverse formations.

Walking down the road, we pass numerous establishments overflowing with a multitude of articles for sale or serving other purposes—nurseryman, greengrocer and fruiterer, dairyman, provision merchant, baker, butcher, fishmonger, refreshment caterer, restaurant keeper, confectioner, tobacconist, domestic stores keeper, coal and wood retailer, ironmonger, optician, jeweller, stick and umbrella maker, furniture dealer, piano and gramophone manufacturer, builder and decorator, hosier, draper, milliner, costumier, clothier, hatter, furrier, dyer and cleaner, footwear supplier, laundress, hair-dresser, druggist, stationer, news agent, book-seller, book-binder, picture dealer, photographer, toy vendor, car distributor, garage owner, gas and electrical fitter, wireless specialist, universal provider, undertaker, post office licensee, house agent and surveyor, insurance agent, banker, solicitor, doctor, dentist, oculist, veterinary surgeon, and sundry other types of establishments.

Boarding a motor bus, his own car having broken down, and mounting to the open top deck, Sir Fullman, buttoning his fur-lined coat, is swiftly carried along and we dutifully accompany him. We glance at squares and parks (the latter providing facilities incidentally for open bathing, croquet, tennis, cricket, and football), small and large and ugly and beautiful residential structures, factories and offices, barracks and palaces, schools and colleges, theatres and cinemas,

hospitals and hotels, concert halls and art galleries, monuments and monumental fountains. Occasionally we pass some church or public building, offering us an insight into the magnificent architecture which the ages have slowly developed. We also notice the police regulating the traffic and ready for emergencies, street cleaners and postmen, tax and insurance collectors, besides the useful incandescent gas and electric street lamps, telegraph and telephone poles, aerials over many buildings, receptacles for litter and for sand, and a carefully protected system of sewers. Right on the summit of yonder cliff is the wireless station. As we are hurried along, we discern underground and overhead electric railway stations, also one or two large railway termini sending out their swiftly moving feelers in several directions. We have reached now the outskirts of the city and we are just allowed to surmise everything pertaining to pasture and arable land, forestry and orchards, horticulture, dairy and poultry farms, golf links, race courses for horses and greyhounds, brickyards, quarries, and coal, tin, and other mines.

Sir Fullman presses the bell, the omnibus slows down, and precisely opposite the massive gates of one of a series of ancient college edifices mostly built in Gothic style, he alights and enters the time-hallowed precincts. To-day he has planned to visit several departments of his university. In crossing the large quadrangle, we remark in the centre a collection of meteorological instruments—thermometer, barometer, hygrometer, rain gauge, wind gauge, sunshine recorder, and a few others. As it chances, Sir Fullman directs his steps first to the Meteorological Department which has also assigned to it practical duties. We perceive there on the walls ocean maps indicating the mysterious currents which so decidedly affect the climate of extensive land regions ; wind maps showing the force and the direction of the prevailing air currents and their tendency towards producing rain, drought, and tempests ; diagrams and tables yielding valuable information concerning meteorological differences in altitudes, land and sea, localities, continents, and past periods of time ; physical studies, with models in relief, relating to the marked meteorological effects of neighbouring seas, rivers, lakes, mountains, plains, deserts, and forests ; and, on book shelves, impressive disquisitions on air currents, on cyclones and anticyclones, on clouds, on the different strata of the atmosphere, and on cognate subjects. Finally, we see a staff of experts silently engaged in collating information, there and then received by telegraph, telephone, and radio, relating to an approaching storm, and despatching forecasts and warnings to farmers, port commanders, and others interested.

The Principal next enters the suite of rooms constituting the Chemical Laboratories. We can only superficially scan the contents. Rows of test-tubes and other glass-tubes and tubings, rods, beakers,

jars, and funnels, some pigmy size and some veritable giants ; curiously shaped and graded flasks and retorts ; scores of bottles containing reagents, from the weakest to the strongest, besides chemicals generally ; bunsen burners, retort stands, sand baths, tripods, crucibles, basins ; various balances, including exceedingly delicate ones protected by glass and other means from a diversity of possible environmental deflectors ; instruments to ascertain temperature, moisture, atmospheric and other pressure, including chronometers of diverse types, and other instruments for producing maximum and minimum temperatures and pressures and as complete a vacuum as possible. We learn also incidentally that experiments are in progress regarding rare and inert elements. The fuller implications of Mendelyeff's Periodic Law are, we hear, also receiving at the moment close attention.

Sir Fullman, passing by, instead of through, the Biochemical Laboratories, spends a few minutes in the Geological Department. We are fascinated by the coloured maps of different strata of the earth, their tortuous windings and compressed contents demonstrating the titanic forces that shaped them ; the mode of formation of rivers and river valleys, of seas, of mountains, of continents, and of deserts is illustrated by appropriate models ; and, so far as they are known, the main forces responsible for the general form of the earth's surface are graphically illustrated. Specimens of the various strata and formations are exhibited in a flight of apartments, and a great hall, with galleries, provides space for the ordered paleontological collection.

In the Geographical Department, occupying a separate building, which we next pass rapidly through, we are most attracted by a series of maps illustrating the advance in the general knowledge of the surface of the earth—the information which antiquity (ancient China, India, Egypt, Babylonia, Judea, Persia, Crete, Greece, and Rome) possessed concerning the different regions of the world, increasing through the Middle Ages, the Renaissance, and the succeeding centuries, to to-day when well-nigh every square mile of ground has been explored in most parts of the world, and even the South Pole and the North Pole have been reached. A library of several thousand volumes bears eloquent testimony to the industry and insatiable curiosity of geographers. Extensive models in relief, illustrating many regions of the world ; an exhibition outlining the chequered history of map making ; and countless maps—physical, meteorological, geological, biological, political, demographic, and economic—we can only furtively glance at.

In proceeding to the fine modern structure devoted to the study of Engineering, we pass by the Physiological Laboratories. Through the windows we obtain glimpses of huge coloured anatomical charts, exemplifying the mountains of knowledge which man has accumulated pertaining to the morphology of man. Uncanny skeletons and skulls,

and numerous preparations preserved in alcohol and otherwise, are just visible. The army of appliances in the Laboratories, and the experiments in progress, unfortunately escape our limited view.

The genetic and evolutionary aspects appeal to our minds in the Engineering as they did in the other Departments. Presumably this principle pervades the whole of the University activities. The story of the protean wheel, than which few tools are more useful, is thus amply illustrated by models and specimens ; so is the history of road making, of the steam engine, bridges, and railways ; so, too, the employment of the diverse energies now employed in traction and in operations generally—*e.g.*, human and animal energy, fire, wind, water, gravity, springs, steam, gas, compressed air, petrol, and electricity ; similarly with special products of engineering, showing the evolution of diverse types of machinery, of the colossal energy transformers found to-day on the vessels of the merchant service and navy, of road, ship, bridge, railway carriage, and motor vehicle construction, and of mining, smelting, and agricultural machinery. The dynamic side is illustrated by a powerful engine or energy producer, communicating its energy through a system of shafts, pulleys, bands, wheels, to every species of appliances—lathes, hammers, cranes, saws, drills, punches, vices, planes, etc. On the benches we find a diversity of spanners, screws, screw-drivers, nuts and bolts, rivets, nails, pegs, saws, chisels, files, gauges, pincers, pliers, scissors, and hammers. Concentrating our attention on a locomotive, we take note of the main parts—axle box, ash pan, break cylinder, blast pipe, back tube plate, cylinder, connecting rod, fire arch, fire bars, firebox girder stay, funnel, inner fire box, fire door, foundation ring, front tube plate, horn plate, main frame, piston, piston rod, piston valve, regulator, regulator handle, reversing wheel, smoke box, super-heater, steam dome, steam pipe, smoke tubes, safety valve, and valve gear.

The Principal's last objective is the Fine Arts School. A different world is here opened to us—casts of the most exquisite sculptures of Greek antiquity, filling a large hall and reminding one of the principal art galleries of the day where the originals are preserved ; casts of a few examples of modern sculpture from Donatello to Auguste Rodin ; and gigantic casts from the trans-European world—India, China, Egypt, Babylonia, Chaldea, Persia, and modern Japan. Paintings have an equally prominent part allotted to them. Here more especially we observe numerous cases of drawers filled with superb photographs of pictures from the chief galleries of the world arranged chronologically according to painters and many sumptuous tomes containing a prodigious galaxy of reproductions of paintings in colour. The most distinguished engravers and illustrators are also heartily appreciated, to judge by the fine collection placed at the disposal of the students. The architectural section provides insight into the enthralling history

of architecture from the leaf shelter to the marble palace and comprises scores of casts in miniature of portions of world-famed edifices. Finally, the metal section gleams and glitters with artistic productions in iron, steel, copper, bronze, silver, and gold.

Somewhat fatigued by his extensive round of duties, Sir Fullman partakes of a quiet lunch in the refectory. Thence he adjourns to his Club for a brief repose and a game of chess, calls at the offices of a charitable society in which he is interested, spends some time at the scientific instrument maker, returns home to dine, when the family has occasion to enjoy by means of the wireless apparatus a concert which is being given at Madrid, attends then a council meeting of a reform association which is followed by a public meeting, and quickly, in the falling snow, walks to his home, which is in the vicinity, and retires to rest. There we will leave the Principal of Camblonox University, wishing him inaudibly "good-night!".

In the foregoing sketch we have not alluded to the life of Lady Lovetruth nor to the life of the children lived on different planes. We could not touch on the modes of existence of the various classes comprising modern society. We could not enter the shops and examine their wares, or roam over the factories with their wonderful and varied machinery. We neither passed the threshold of church or parliament, concert hall or art gallery, for the purpose of learning something about them. The country side we practically took for granted, nor had we time to descend a mine or inspect a school, or indulge in an excursion in order to enjoy the beauties of nature as only man can. We offered but the barest outline of the daily round of one person of a certain social standing living in a particular city and country. How otherwise could we have proceeded? Resolved to be rigidly exhaustive, should we not have been obliged, for instance, to read through every book in Sir Fullman Lovetruth's comparatively modest library or, as a minimum, to name each?

5. *Analysis of Human Life.*

The infinitely diversified world revealed to us in the preceding sketch of human life may be, we think, reduced to a few simple constituents. Broadly speaking, all we have observed may be classed under one of two headings—(a) tools and (b) tool-made products; or, to be a grade more precise, (a) tools, (b) modes of using tools, (c) tool-made products, and (d) modes of utilising tool-made products. All our civilisations, our homes and civic halls, our schools and churches, our law courts and hospitals, our industry and commerce, the little and the great in human life, are epitomised in the concept of tool and tool-made product, if we agree to regard acquired modes of procedure as forms of tools. Negatively expressed, if we ignored tools and tool-made products, Sir Fullman Lovetruth's cultural environment and

mode of life would suddenly vanish and leave not a wrack behind. He would have no home, no garments, no university, no encompassing city, no knowledge of science or the wide earth, and no language or sustained thought. The human world would have gone, and we have no means of imagining what would be his material and spiritual estate in those circumstances. With especial force as this may strike us in respect of highly cultivated individuals, it would be substantially no different if our eyes were focused on the most backward races extant to-day. Poor their tools and tool-products may be ; but these are, in effect, their all. The toolless community and individual are wholly unknown in any part of the globe.[1]

We must now proceed a step further. We have already, for the sake of simplification, classed modes of procedure as a variety of tools. The word tool, however, requires to be subdivided into two forms—(a) material and (b) mental tools. The meaning of (a) is fairly apparent when we include in the category every material tool, implement, appliance, instrument, weapon, and utensil. Nor is there any obscurity in (b), if clearly apprehended. Mathematics, inductive and deductive logic, informative books in general, and the countless methods employed by the sciences, the arts, and the professions, by industry and commerce, and by schools and universities, are among the numberless mental tools devised by men through the ages.

Since material and mental tools and their products are universal among mankind, we shall remain by our primary classification of tool and tool-made product, only occasionally referring to our secondary classification of material and mental tools and tool-made objects and ideas, and to modes of procedure as distinct from tools.[2]

Again. A tool, for man, does not signify some natural object employed for a certain end. It rather means a transformed tool, one that was an artificial kind of tool already and has been modified to serve a relatively novel purpose. Thus the telescope is an instrument which has been improved in numerous directions since the time of Galileo, and when we consider that certain of its parts consist of metal and others of glass, we shall be compelled to connect the telescope with the gradual discovery and manufacture of metals and glass some thousands of years ago. However, even this carries us only a short distance back,

[1] " The history of civilisation is very largely the history of technique." (Edwin R. A. Seligman, *Principles of Economics*, New York, 1926, p. 70.) " Weapons, tools, utensils,—these typify the onward march of the human race ; they are the outward technical manifestation of man's intellectual progress and the physical basis of his economic development." (*Ibid.*, p. 71.) In this volume the term " tool " is employed as a broad equivalent for the term " means."

[2] " Tools have been regarded as projections of bodily organs, as inanimate substitutes for and imitations of organismal means." (Ernst Kapp, *Grundlinien einer Philosophie der Technik*, 1877.) On the same subject, see also O. G. S. Crawford, *Man and His Past*, London, 1921, pp. 6-7 ; Jacques de Morgan, *L'humanité préhistorique*, Paris, 1921 ; and most particularly Paul Alsberg, *Das Menschheitsrätsel*, Dresden, 1922.

because the use of fire and the tools needed for producing the telescope translate us to the most primitive epoch. In fact, when we recall the teachings of archeological anthropology, namely that in the earliest, or pre-eolithic, times men must have used only natural unfashioned objects as tools, that in the somewhat later, eolithic and paleolithic, times first crudely worked and then skilfully chipped flints took their place, and that later still, in neolithic times, polished and ground flints predominated,—we are driven to the conclusion that our tools generally are gradual developments from pre-existing classes of tools, their ultimate genesis being coeval with man's emergence from animalhood.

If the tools of the most primitive times and those of the twentieth century form a practically unbroken series, the later being only explicable through the earlier, it is almost as true that geographically also the telescope, and the generality of tools, are a product of pan-human thought. Certainly a number of modern civilisations have directly or indirectly contributed to the perfecting of the telescope, and if we pursue the matter far enough we find it hazardous to identify the evolution of any class of tools with one or with a few peoples.

Let us now turn to the examination of the fundamental tendencies which spring out of man's tool life.

(a) The first salient aspect which arrests our attention is the profuse cultural diversity discernible in human life. Without additional information we might have inferred from the preceding account of a day's experience of a human being that, for instance, every man or woman is equally cultivated ; that every dwelling house and every class of apartment therein, were precisely like every other ; that all material modes of communication were utilised by all and to the same extent ; that every class of worker was necessarily always engaged on the same processes or transactions ; and that governments, schools, and arts were identical throughout the world. Almost the opposite, however, holds true. As we know, in man limitless cultural differences exist both as from community to community and from individual to individual. One man may be illiterate, another a doctor of science ; one man may reside in a miserable hovel, another in a luxurious mansion ; one man may never have left his village, another may have circled the globe ; one man may continue in his profession for a life-time, another may change his repeatedly ; one form of government may exist in one country, a different one in another ; schools and arts may widely diverge in the same land ; and so on *ad indefinitum*. So patent is this that we cannot help assuming that the reader readily assents to the proposition that, whatever be the reasons, human life is almost infinitely multiform. The life of mankind is therefore distinguished by its opulent diversity.

However, we might be tempted to believe that if we studied the ancestry of the diverse individuals, classes, and peoples concerned, we should encounter tiresome uniformity. That is, we might discover that the history of man is virtually devoid of differences. Yet if any one, for example, contemplates the history of Western Europe during the last three centuries, or even the last century, or so much as the last two generations, significant and innumerable differences will meet his eye. Our sciences, our laws, our governments, our manners, our education, and most other departments of culture, have undergone revolutionary changes during the centuries, and this, again, not in a mechanical or orderly manner, but spasmodically, now snail-like and now hound-like, now in this region and now in that, here uplifting and there dragging down the masses. All the heterogeneity of culture observable in contemporary civilisation, we find reproduced in examining Western civilisation historically. Not that variety need be considered a law either as to place or as to age, as indeed it is not when we learn how long customs sometimes persist unmodified. We should, accordingly, allow that man's annals reveal the widest conceivable divergences in countless directions. In this instance also, as in that of cultural differences from community to community and from individual to individual, it is difficult to think that any one should challenge the above line of argument.

Moreover, another qualification is suggested by a consideration of the cultural heterogeneity observable in space and in time. That is, spatially and chronologically we do not meet only with a picturesque variety, but we learn that the data, when fairly and patiently examined, disclose something further. We remark, in fact, that, geographically considered, culture is in some cases, as say among the Veddahs, an almost negligible quantity and, in other cases, as in the chief capitals of the West, present in luxuriant prodigality. And this is even more evident when we contrast modern civilisation at its best with the civilisation of eolithic man, since these two terminal stages offer the extremest possible disparity. Perhaps at the one end of the scale no language, no tools, no fire, no artificial shelters, no garments, no arts, no metals, and, at the other end, an immeasurably extensive and intensive culture. We learn thus of immense, almost limitless, quantitative differences in the cultural possessions of different periods and peoples.

(b) We may go further. Comparing primitive times with our own, there is not only noticeable an unintelligible less or more, but a qualitative difference as well. That is, when we compare the implements and energies employed, the methods of communicating ideas and transporting commodities, the buildings and their furniture, the organisation of the personal and the communal life, the existing knowledge of the universe of things, and much else, of primitive

times and of to-day, the conclusion is manifest that not only is there traceable a superabundant increase in diversity, but an incalculably great improvement. Or can any one argue, for example, that language is not an advance on inarticulate cries, that a modern language does not serve us better than a primitive one, that writing is not an added advantage, and printing a progress on this? Or that our modern transport facilities are not preferable to ancient ones, or that our machinery, science, art, and laws are not an amelioration of the tools, the knowledge, the tastes, and the laws of primitive man? Or, to take specific instances, that the microscope and the telescope, the thermometer and the laboratory scales, are not equivalent to a marvellous refinement of our senses? In a word, he who follows the broad outlines of history, will find it difficult not to admit the essential reality and stupendous magnitude of human progress along numerous lines.[1]

(c) Another leading characteristic should not be ignored. It is this, that mankind may be said to form, or tend to form, a unity.[2] For our own age this is readily demonstrated. We are by post and telegraph in communication with all the world; globe trotters travel round the earth, visiting its peoples; we possess hundreds of international organisations, including a League of Nations and a Universal Postal Union; and material and spiritual goods are freely and abundantly exchanged between East and West, North and South. Indeed, when we meditate on the distant future, we cannot help concluding, whatever our predilections, that the present growth of internationalism will eventually issue in the most intimate cooperation of all the countries with one another, that, in a sense,

> ". . . all man to be
> Will make one people ere man's race be run."—*Tennyson.*

In the remote past this solidarity of the human species was far from being apparent; but interchanges between different hordes, tribes, and peoples, however unsystematic, must always have gone on:

[1] Adam Ferguson already noticed the immanent unity of culture. "Nothing that the human species ever attained, in the latest period of its progress, was altogether without a germ or principle from which it is derived, in the earliest or most ancient state of mankind." (*Principles of Moral and Political Science,* vol. 1, Edinburgh, 1792, p. 196.) He also divined the chronological unity of this culture: "The latest efforts of human invention are but a continuation of certain devices which were practised in the earliest ages of the world, and in the rudest state of mankind." (*An Essay on the History of Civil Society,* London, 1768, p. 13.)

[2] "The unity of mankind which was once a prophetic vision, hidden from common eyes and accepted only upon faith, is at length being realised, as the most remote corners of the earth are brought under the influence of one civilisation. The process of integration has touched every race, and its farther advance will be toward a more intensive unity—a more intimate unity of peoples already in contact." (Arthur Fairbanks, *Introduction to Sociology,* London, 1922, p. 230.)

"The tree of knowledge cannot be conceived as being rooted in the soil of any particular country; its roots are scattered all over the civilised world, and derive some substance from almost every part of it." (George Sarton, "The New Humanism," in *Isis,* 1924, no. 1, p. 11.)

the relative universality of the principal contents of every civilisation, even the earliest, confirms this. But if this be so, we have before us a singular and significant fact, the radical bearing of which we shall examine later. As Pascal long ago divined it, the whole of mankind—past, present, and future—constitutes a unity growing ever more intimate.[1]

(d) Lastly. The preceding paragraphs have shown that a multitude of human groups and individuals have reached a high stage of perfection here and there. Now if we also take into consideration that educational experiences seem to have demonstrated that the members of probably all races may pass through modern universities, it appears reasonable to assume, at least provisionally, that mankind as a whole is limitlessly perfectible.

Such a general survey leaves naturally much unexplained. Four subsidiary laws will aid in further elucidating the matter. The first is the historic development of error. When man's knowledge was infinitesimal, his surmises were few in number and related to the narrowly circumscribed physical and mental world wherein small groups of men were hemmed in. With expansion of knowledge, however, surmises became more frequent and wider in scope and, the world being complex, error developed in breadth and depth. Likewise, as error included erroneous judgments in regard not only to abstract truth, but to conduct, hygiene, and tastes, error has played an all too conspicuous part in the ascent of man. However, as soon as integration of knowledge reaches a certain level, error begins to be more and more confined by positive truth until, as may be anticipated of the distant future, the volume and gravity of error shrink to negligible dimensions. Error was at the same time complicated and aggravated by a non-rational element, that of error-bred and error-maintained habits and customs which, in unfavourable circumstances, root themselves in men, cannot be eliminated by mere reasoning, and vigorously oppose themselves to contemplated change.[2] Secondly, to the inequality of cultural development in different localities and times, individual and group inequality of a social kind were naturally added. This was accentuated by the severity of the struggle for existence and comfort, lack of efficient social organisation, ignorance, and the

[1] At this very moment of time pregnant changes are proceeding in the East, suggesting that in the near future there will be a universal civilisation, peoples everywhere employing the same generally approved means to attain the same leading ends either separately or through the League of Nations.

[2] Graham Wallas's *Human Nature in Politics* (London, 1924) and numerous recent works and articles, legitimately stress the influence of the non-rational factor in life. In fact, there is at present a revival of the cult of the non-rational in all its forms. A restricted and largely transitory phase in human history is exalted into an imposing verity and even into a great ideal, the counter currents and the general historic tendency being overlooked. Still, in the light of these recent studies, the term "rational" should in future cover, besides the reason, enlightened sentiments, a purified will, and defensible customs and habits.

superior advantages, often erroneously, associated with the possession of wealth and social position. Growth of culture, by removing penury, defects in social organisation, ignorance, and the mirage of opulence and prestige will, however, abolish cultural and social inequality. In the third and in the fourth place, we must allow for the historic development and subsequent historic elimination of the spirit of exclusiveness and of the mass of individual and social imperfections.

6. *The Four Dynamic Laws of Human Development.*

More definitely stated, our analysis reveals four laws:—

(a) The law of the limitless increase, among peoples generally and through the ages, of diversity in cultural or tool-made products, together with the secondary law of the gradual development historically of error, of anti-progressive habits and customs, and of cultural and social inequality;

(b) The law of the limitless improvement, among peoples generally and through the ages, of the cultural or tool-made products which tend to satisfy ideally mankind as a whole, together with the secondary law of the gradual elimination historically of error, of anti-progressive habits and customs, and of cultural and social inequality;

(c) The law of the limitless growth, among peoples generally and through the ages, of cooperation, together with the secondary law of the historic development and subsequent elimination of the spirit of exclusiveness; and

(d) The law of the limitless perfecting, among peoples generally and through the ages, of the individual as a whole, together with the secondary law of the historic development and subsequent elimination of individual imperfections.

A separate Chapter will be devoted later to the elucidation of each of these laws.

These four laws appear to find their explanation in a single fact, namely the capacity and the need of human beings to assimilate and utilise, and infinitesimally to supplement, the thoughts of their fellows near and far in space and time.[1] Such an explanation enables us to understand the gradual and tortuous development through the ages of a culture beginning with speechlessness and eoliths and issuing eventually in imposing civilisations.[2] This is naturally not the place to justify the conception of man here involved.

[1] We shall have frequently occasion to employ the term "thoughts" in similiar expressions. In accord with our statement in the preceding footnote, the term should be taken to comprehend ideas, sentiments, volitional attitudes, and mental habits, acquired from others or self-developed, and should exclude native impulses and instincts.

[2] "Each of us, by his family and his fatherland, dates back to the first ages of the human race, through an unbroken line of ancestors belonging to all families and nations; and they have, of necessity, been the influences that have shaped our present state." (Pierre Laffitte, *The Positive Science of Morals*, London, 1908, p. 105.)

7. *Human and Animal Behaviour Compared.*

Having sketched, in an example, the nature of human life as exhaustively as circumstances permitted and having analysed its contents, we may now with some confidence venture on a comparison of human with animal behaviour.

The day we spent in imagination with the Principal of Camblonox University ripened in us the conviction that extra-organismal tools and their products constitute the substance of human life and that the absence of these would render human life as we know it unintelligible. How are animals situated in this respect? What part do such tools play in their lives?

Man comes in direct contact with a fair number of animals. Many a home has its cat and dog and canary, and in the country these are frequently supplemented by pigeons, fowls, turkeys, geese, ducks, swans, guinea pigs, cattle, goats, sheep, and pigs. In addition, the roads make us familiar with horse and ass, whilst in certain countries man also utilises the elephant, the camel, and the reindeer. Yet strange and incredible as it may seem, *not one of these ever employs any extra-organismal tool.* That is, whereas human life is inconceivable without such tools, employs armies of these, and owes its greatness to them, all our domesticated animals combined appear not to resort to a single extra-organismal tool.

However, it may be that domestication has had a deterring and prohibitive effect on the use of tools by these animals. Let us visit, then, a representative zoological garden and observe to what extent tools are employed by the animals congregated there. Again the same completely, or seemingly completely, negative result. Apparently not the faintest trace of tools anywhere.

Still, animals in a zoological garden pass a decidedly unnatural existence. Their activities are painfully restricted and the cage life must exercise of necessity a deteriorating and paralysing effect. We shall, therefore, extend the range of our observations. In fields and woods and waters we meet with multitudes of animals living in a free state of nature. Most men who are observant have thus become acquainted with scores of birds, small mammals, frogs, insects, worms, fishes, and other animals. And still no intimation of extra-organismal tools anywhere! Exquisite contrivances in profusion, but all without exception of an innate, organismal nature.

Yet wild animals may be diffident in displaying their tools, or may possess tools which are not readily recognised as such, or it might possibly be that few species of animals resemble man in the use he makes of tools, or that they employ tools on rare occasions only. Let us, therefore, hear what the prince of naturalists, with his almost world-wide experience and omnivorous reading, states on the subject:

" It has often been said," writes Darwin, " that no animal uses any tool ; but the chimpanzee in a state of nature cracks a native fruit, somewhat like a walnut, with a stone. Rengger easily taught an American monkey thus to break open hard palm-nuts ; and afterwards of its own accord, it used stones to open other kinds of nuts, as well as boxes. It thus also removed the soft rind of fruit that had a disagreeable flavour. Another monkey was taught to open the lid of a large box with a stick, and afterwards it used the stick as a lever to move heavy bodies ; and I have myself seen a young orang put a stick into a crevice, slip his hand to the other end, and use it in the proper manner as a lever. The tamed elephants in India are well known to break off branches of trees and use them to drive away the flies ; and this same act has been observed in an elephant in a state of nature. I have seen a young orang, when she thought she was going to be whipped, cover and protect herself with a blanket or straw. In these several cases stones and sticks were employed as implements ; but they are likewise used as weapons. Brehm states, on the authority of the well-known traveller Schimper, that in Abyssinia when the baboons belonging to one species (C. *gelada*) descend in troops from the mountains to plunder the fields, they sometimes encounter troops of another species (C. *hamadryas*), and then a fight ensues. The Geladas roll down great stones, which the Hamadryas try to avoid, and then both species, making a great uproar, rush furiously against each other. Brehm, when accompanying the Duke of Coburg-Gotha, aided in an attack with fire-arms on a troop of baboons in the pass of Mensa in Abyssinia. The baboons in return rolled so many stones down the mountain, some as large as a man's head, that the attackers had to beat a hasty retreat ; and the pass was actually closed for a time against the caravan. It deserves notice that these baboons thus acted in concert. Mr. Wallace on three occasions saw female orangs, accompanied by their young, ' breaking off branches and the great spiny fruit of the Durian tree, with every appearance of rage ; causing such a shower of missiles as effectually kept us from approaching too near the tree.' As I have repeatedly seen, a chimpanzee will throw any object at hand at a person who offends him ; and the before mentioned baboon at the Cape of Good Hope prepared mud for the purpose. In the Zoological Gardens, a monkey, which had weak teeth, used to break open nuts with a stone ; and I was assured by the keepers that after using the stone, he hid it in the straw, and would not let any other monkey touch it."[1] (*The Descent of Man,* pp. 81-82.)

The number of instances adduced by Darwin, in what purports to be an epitome of the whole subject, is so trifling that one is justified in asserting on the strength of his summary that, historically, man has possessed almost millions of times as many tools as any one[2] animal species below him. To compare, therefore, the tool life of Sir Fullman Lovetruth with the tool life of any one member of any one other species, is almost as if we contrasted the infinitely large with the infinitely small.

Apparently no survey however exhaustive, although it might add a dozen or so instances similar to those cited by Darwin, would reveal facts tending to alter our judgment in this matter. F. Houssay, an eminent authority, in his work on *The Industries of Animals,* implicitly confirms the conclusion we have thus far reached. In such an account, if anywhere, evidence should obtrude itself of the use of extra-organismal tools by animals. Nevertheless in the treatise mentioned, which teems with descriptions relating to the activities of animals, almost the only instance germane to our discussion is that of the fish, *Toxotes jaculator.* " He draws in some drops of water," Houssay writes, " and contracting his mouth, projects them with so

[1]It is only fair to the reader to state that some authors question the construction placed by Darwin and his informants on several of the above accounts.

[2]Manifestly, the comparison should be between man and any *one* animal species.

much force and certainty that they rarely fail to reach the chosen aim, and to bring into the water all the insects he desires." (p. 36.) However, a more recent writer (E. L. Bouvier, *The Psychic Life of Insects,* New York, 1922, pp. 355-356) adds several instances: "With *Ammophila urnaria* the tool is a small stone with which the female rams and packs the dirt that closes her burrow. With certain ants of India (*Œcophylla smaragdina*) and of Brazil (*Camponotus textor*) the instrument consists of larvæ of the same species which, held between the mandibles of the workers, glue and fasten the leaves of which the nest is constructed, edge to edge, with their thread. The implement of the crabs of the genus *Melia,* in the Indo-Pacific seas, is a delicate sea anemone which, held between the pincers of the animal, probably serves to paralyse its prey by its urticating exudations." These exceptional illustrations, *presumably all the result of specific instincts,* place the seal on our considered conclusion.

Still, we might apply to this subject the intensive instead of the extensive method. The bee, for example, is by many regarded as occupying a pre-eminent position among insects analogous to that of man among mammals. Yet this supremely social animal offers also a graphic illustration of our contention. Pan-man, by means of extra-organismal tools, transforms part of the raw material of the world into a limitless series of tools and tool-made products. The bee, on the other hand, depends *wholly* on organic implements. Its entire organism, from its limbs to its tongue, and from its head to its alimentary system, is first and foremost adapted for the production and storing of honey; note, more especially, on legs pollen baskets; comb for cleaning antennæ, brush for cleaning antennæ comb, brush for collecting pollen from the hairs of the back; claws whereby clustering takes place, which itself is partly intended to produce warmth; hairs with apparatus for entangling pollen; rings on abdomen for making wax and powerful jaws for moulding it; delicate antennæ acting, *inter alia,* as a substitute for vision in the darkness of the hive; and a specially adapted second stomach. Its body also produces wax, propolis, formic acid, and other substances, and it defends itself by the aid of a highly complicated sting. In brief, where man would employ quantities of extra-organismal tools, the bee employs *exclusively* organismal ones.

The same holds true of the bee's rival in some men's estimation, the proverbially industrious ant. Of the latter, Lord Avebury, who made such a protracted and sympathetic study of ant life, asserts: "The Anthropoid apes no doubt approach nearer to man in bodily structure than do any other animals; but when we consider the habits of Ants, their social organisation, their large communities, and elaborate habitations; their roadways, their possession of domesticated animals, and even, in some cases, of slaves, it must be admitted that

they have a fair claim to rank next to man in the scale of intelligence."[1] (*Ants, Bees, and Wasps,* London, 1893, p. 1.) Yet his scrupulously conducted observations, as well as those of Fabre, Forel, and others, do not disclose a particle of evidence of the use by ants of extra-organismal tools.

Our general conclusion on this head is therefore that man almost infinitely transcends all other animal species in the use of extra-organismal tools, even though he cannot claim an absolute monopoly in this respect.

However, we have dealt with only one aspect of the use of tools. In the diverse instances mentioned by Darwin and by the other writers we have quoted, the tools employed by animals are, without exception, natural or unfashioned.[2] Man's tools, on the contrary, are, as we have seen, tool-made tools, tools which have been gradually transmuted through centuries and have assumed endless shapes. One might almost say that when man was beginning to emerge from apehood, he strove to produce tools and that our present tools are the direct descendants or the final outcome of man's earliest successes in tool making. If man, then, is virtually unique in the use of extra-organismal tools, he is *wholly individual* in employing—and this to an enormous extent and almost exclusively—tool-made tools, tools which have been slowly developed through the ages by the efforts of countless individuals and are for this reason almost infinitely superior to unfashioned tools.[3]

We may now sum up our comparative remarks relating to tools, premising that by tools we mean extra-organismal tools:—

(a) Animals *virtually never* employ tools ;

(b) The tools of animals are *never* tool-made ;

(c) *Virtually* none of the possessions of animals are tool-produced ;

(d) The tools of animals are *never* the outcome of collective and historic thought ; and

(e) Animals are *virtually wholly independent* of tools and tool-made products.

[1]Maeterlinck, in his *La vie des abeilles* (1907, p. 23), puts forward the same claim in behalf of the hymenoptera generally.

[2]Köhler's classic work on *The Mentality of Apes* (1927) cites some instances proving that the chimpanzee is not entirely destitute of the power of fashioning or adapting tools. " If Grande wants to poke somebody through the bars, she will swiftly bite a board in two and thus get the splinters she needs. Sultan too, if there is no key about, will occasionally sharpen a piece of wood in order to poke about in the keyhole." (p. 132.)

[3]" Human civilisation commences with the production of tools." (Ludwig Stein, *Einführung in die Soziologie,* Munich, 1921, p. 110.)

On the contrary,

(a) Man *virtually always* employs tools ;

(b) The tools of man are *virtually always* tool-made ;

(c) *Virtually all* the possessions of man are tool-produced ;

(d) The tools of man are *virtually always* the outcome of collective and historic thought ; and

(e) Man is *virtually wholly dependent* on tools and tool-made products.

These statements, however, scarcely do justice to the distance which separates animals and man in the matter of extra-organismal tools, seeing that *apparently not a single animal species knows the use of more than one or two extra-organismal and invariably unfashioned and unimproved tools, whilst man has employed almost millions of fashioned and improved ones,* many of them, such as the Diesel engine, almost infinitely more complicated than those of animals.

From the above considerations it further follows that human life, in comparison with animal life, tends to become with the ages—

(a) almost infinitely more heterogeneous and richer geographically and chronologically,

(b) almost infinitely more progressive,

(c) almost infinitely more interdependent in relation to individuals, groups, and periods, and

(d) almost infinitely more perfect as regards the social structure and the intelligence and sentiments.

It is evident, then, that a measureless and unbridgeable gulf divides human from animal behaviour.

8. *Animals are Individuo-Psychics.*

From the last Section it seems to follow that animals are individuo-psychics for all intents and purposes, that is, that instincts and individual intelligence, as distinct from limitless culturability and collective intelligence, may be said to be their sole mental weapons. We shall now proceed to test the validity of this conclusion.

Who could be a more ardent admirer of the mentality of bees than Maurice Maeterlinck, the author of *La vie des abeilles* ? Yet his statements remarkably confirm the individuo-psychic character of the bee. In one passage he states: "The bees of different hives neither recognise nor help one another in the least." (p. 42.) And about the newly emerged bee: "In a word, she is complete from head to foot and knows immediately all that she needs to know." (pp. 167-168.)

Neither has Maeterlinck any doubt as to the virtual invariability of bee generations.[1] (p. 292.)

Moreover, a reliable observer whom Darwin repeatedly lays under contribution, J. C. Houzeau (*Etudes sur les facultés mentales des animaux*, Brussels, 1872, vol. 2, p. 502), incisively remarks: "He who has examined a nest of the red ant, has seen all the nests of this species of ant. All the nests, in fact, resemble each other closely. They are organised according to the same plan and present the same appearance. This is true of all other species of animals. A beehive is arranged everywhere according to an identical scheme. A village of beavers has everywhere the same aspect and the same character."

G. F. Stout, the distinguished psychologist, expresses himself with equal emphasis: "All the activities characteristic of ants, as well as of bees and wasps, are in their main outline instinctive. They are displayed by ants which have been taken from their nest immediately after being hatched, and set apart to form a new nest." (*Manual of Psychology,* 1899, p. 254.) Expressed more definitely as to ants: "Take a couple of ant eggs of the right sex—unhatched eggs, freshly laid. Blot out every individual and every other egg of the species. Give the pair a little attention as regards warmth, moisture, protection, and food. The whole of ant 'society,' every one of the abilities, powers, accomplishments, and activities of the species, each 'thought' that it has ever had, will be reproduced, and reproduced without diminution, in one generation." (A. L. Kroeber, "The Super-organic," in *American Anthropologist,* April-June 1917, p. 177.) And of ants and termites: "The specific structure and behaviour belonging to the different castes" "at least in the higher social insects (ants and termites)" "are definitively fixed on their emergence from the pupæ." (William M. Wheeler, *The Social Insects,* Their Origin and Evolution, London, 1928, p. 308.)

A noted sociologist is of the same opinion: "The social life of animals is controlled by a system of instincts and reflexes which are not substantially different from those that assure the functioning of the organism. There is this peculiarity, however, that they adapt the individual to its social and not to its physical environment and that they are aroused by social events. Still, they are of the same nature as those that determine in certain cases, without preliminary education, the movements required for flying or running." (Emile Durkheim, *De la division du travail social,* Paris, 1922, pp. 336-337.)

[1] So, too, Pascal: "The bee-hives were as accurately planned a thousand years ago as they are to-day and each bee constructs the hexagons as exactly the first time as the last." (*Pensées de Blaise Pascal,* vol. 1, Paris, edition 1812, p. 137.)

Maeterlinck, it is true, seeks to show that a certain progress may be traced among bees; but this evidence only indicates a measure of adaptability and a progress, from species to species, through the action of natural selection. The extremely specialised organs of the bee tell their own tale of pre-natally determined lines of behaviour.

There is hence no escaping the broad conclusion that animals are individuo-psychic or unable to learn from others of their kind and that, consequently, their cultural heritage approaches nil, their extra-organismal tools remain absolutely unchanged through the ages, and nothing corresponding to the bewildering variety of human culture observable within human communities, between human communities, and in different human generations and historic epochs, is traceable within animal communities, between animal communities, and in different generations and historic epochs of given animal species. Whether, with a view to testing our conclusion, we explore the lives of our domesticated animals, the animals in zoological gardens, the wild and free animals men are acquainted with, or specific species remarkable for their intelligence, such as bees or anthropoid apes, the inferences we have drawn are invariably corroborated.

That is, animals are without exception individuo-psychic or for all intents incapable of learning from others.

Already Blaise Pascal clearly grasped the difference between the individuo-psychic animal and specio-psychic man: " N'est-ce pas là traiter indignement la raison de l'homme, et la mettre en parallèle avec l'instinct des animaux, puisqu'on en ôte la principale différence, qui consiste en ce que les effets du raisonnement augmentent sans cesse au lieu que l'instinct demeure toujours dans un état égal ? . . . Par une prérogative particulière, non-seulement chacun des hommes s'avance de jour en jour dans les sciences, mais que tous les hommes ensemble y font un continuel progrès, à mesure que l'univers vieillit, parce que la même chose arrive dans la succession des hommes que dans les âges différents d'un particulier. De sorte que toute la suite des hommes, pendant le cours de tant de siècles, doit être considérée comme un même homme qui subsiste toujours, et qui apprend continuellement." (*Pensées de Blaise Pascal,* Paris, ed. 1812, pp. 136-138.)

David Hume is not less emphatic : " On the one hand, we see a creature, whose thoughts are not limited by any narrow bounds, either of place or time ; who carries his researches into the most distant regions of this globe, and beyond this globe, to the planets and heavenly bodies ; looks backward to consider the first origin, at least, the history of the human race ; casts his eye forward to see the influence of his action upon posterity, and the judgments which will be formed of his character a thousand years hence ; a creature, who traces causes and effects to a great length and intricacy ; extracts general principles from particular appearances ; improves upon his discoveries ; corrects his mistakes ; and makes his very errors profitable. On the other hand, we are presented with a creature the very reverse of this: limited in its observations and reasonings to a few sensible objects which surround it ; without curiosity, without foresight ; blindly conducted by instinct, and attaining, in a short time, its utmost perfection, beyond which it is never able to advance a single step. What a wide difference is there between these creatures ! And how exalted a notion must we entertain of the former, in comparison with the latter ! " (" Of the Dignity or Meanness of Human Nature," in *Essays and Treatises on Several Subjects,* vol. 1, Edinburgh, edition 1804, pp. 85-86.)

In writing the above, David Hume had perhaps the following passage of Cicero's *Offices* (bk. 1, ch. 4) dimly in mind: " The greatest distinction between a man and a brute lies in this, that the latter is impelled only by instinct, and applies itself solely to that object which is present and before it, with very little sensibility to what is past or to come ; but man, because endowed with reason, by which he discerns consequences, looks into the causes of things and their progress, and being acquainted, as it were, with precedents, he compares their analogies, and adapts and connects the present with what is to come."

Jean-Jacques Rousseau, in an exalted strain, refers to man's superiority over animals: " Quel être ici bas, hors l'homme, sait observer tous les autres, mesurer, calculer, prévoir leurs mouvements, leurs effets, et joindre, pour ainsi dire, le sentiment de l'existence commune à celui de son existence individuelle ? . . . Il est donc vrai que l'homme est le roi de la terre qu'il habite ; car non-seulement il

dompte tous les animaux, non-seulement il dispose des éléments par son industrie ; mais lui seul sur la terre en sait disposer, et il s'approprie encore, par la contemplation, les astres mêmes dont il ne peut approcher. Qu'on me montre un autre animal sur la terre qui sache faire usage du feu, et qui sache admirer le soleil. Quoi ! je puis observer, connaître les êtres et leurs rapports ; je puis sentir ce que c'est qu'ordre, beauté, vertu ; je puis contempler l'univers, m'élèver à la main qui le gouverne ; je puis aimer le bien, le faire, et je me comparerais aux bêtes ! Ame abjecte, c'est ta triste philosophie qui te rend semblable à elles!" ("Profession de foi du Vicaire Savoyard," in *Emile,* vol. 3, Amsterdam, 1764, pp. 36-37.) More pointedly still, speaking of man and animals: "Il y a une autre qualité très spécifique qui les distingue, et sur laquelle il ne peut y avoir de contestation, c'est la faculté de se perfectionner, faculté qui, à l'aide des circonstances, développe successivement toutes les autres, et réside parmi nous tant dans l'espèce que dans l'individu, au lieu qu'un animal est, au bout de quelques mois, ce qu'il sera toute sa vie, et son espèce, au bout de mille ans, ce qu'elle était la première année de ces milles ans." (*Discours sur l'origine et les fondements de l'inégalité parmi les hommes,* Amsterdam, 1755, pp. 32-33.)

Adam Ferguson, in his *Essay on the History of Civil Society* (London, 1768, p. 7), thus distinguishes the respective natures of animals and man: "In other classes of animals, the individual advances from infancy to age or maturity ; and he attains, in the compass of a single life, to all the perfection his nature can reach: but, in the human kind, the species has a progress as well as the individual ; they build in every subsequent age on foundations formerly laid ; and, in a succession of years, tend to a perfection in the application of their faculties, to which the aid of long experience is required, and to which many generations must have combined their endeavours."

9. *Human Beings are Specio-Psychics.*

Having produced in the last Section the required proof that all animals are strictly individuo-psychic, we shall endeavour in this Section to establish the complementary truth that all human beings are strictly specio-psychic, that is, capable of and dependent on assimilating by inter-learning the substance of the expressed thoughts of their whole species and infinitesimally improving thereon.

(a) MEN'S MENTAL CAPACITY.—Since man bears physically a positional relation to the Anthropomorpha analogous to that which the latter bear to the monkeys, we may expect that by nature man approximately excels the Anthropomorpha mentally as these do the monkeys. To conceive him therefore as being by nature extraordinarily superior to, or far different mentally from, the higher apes appears unwarranted, so it seems, by the genealogical facts.

Furthermore, since universally the members of all the animal species, and therefore of the species comprising the Primates, differ only minutely in innate mental capacity from individual to individual, from group to group, and from generation to generation, it would violate what appears to be a strict law of nature to assume in man vast innate mental differences as between individuals, groups, and historical periods, for if these exist in man, how are we to imagine that natural selection would not provide us with countless examples within animal species of similar enormous and endless mental divergences ? Accordingly, since throughout the animal world, if extensive epochs are ignored, the members and groups of each species, whether geographically or chronologically considered, only manifest inappreciable differences in innate mental capacity, we seem compelled to postulate

that man resembles animals in this universal trait,[1] appearances to the contrary being presumably due to post-natal influences.

To which may be added the following supplementary reflection. Culturability signifies in men viability. Accordingly, if men vastly differed in culturability, they would vastly differ in viability. Now the overwhelming majority of the members of any animal or plant species are for all intents equally viable. Hence since it is highly improbable that men should differ from the members of all other animate species in such a fundamental property, we appear justified in provisionally supposing that human beings are for all intents equally culturable.

So much for theory. In support, the following considerations may be advanced.

The unconscionably slow transformation of flint tools during paleolithic times definitely suggests that by nature, and unassisted, paleolithic men were only more or less capable of slightly improving the equivalent of a primitive tool during a life-time. It also suggests the total absence in those ages of any such high innate mental capacities as are alleged to reside to-day in average Europeans, let alone in so-called men of talent and genius. Now anthropologists are agreed that man has not changed fundamentally, or even appreciably, in inborn capacity from Cromagnon times.[2] Accordingly, since for thousands of years after Cromagnon man had appeared, the cultural advance did not proceed by appreciably less minute steps than before, it seems fair to suppose that modern man is not recognisably more advanced by nature than his big-brained Aurignacian ancestors and that the stateable or considerable variations in mental status between different men to-day are due for all intents to cultural causes.

That the historic growth of culture has not been the result of historic growth in innate mental capacity,[3] is also rendered probable

[1] On this point, see also Chapter VI.

[2] "Beyond any doubt we have traced men of the modern type—men belonging to races as highly evolved in body and brain as any now living—to the beginning of the Aurignacian period." (Arthur Keith, *The Antiquity of Man*, London, 1929, vol. 1, p. 339.)

[3] In earlier days, when reliable anthropological data were scanty, G. J. Romanes could write: "The intelligence of the race has been subject to a steady process of gradual development." (*Mental Evolution in Man*, London, 1888, p. 5.) And before his day Auguste Comte, the founder of Sociology, allowed for decided differences in mental capacity between nations. He stated: "As for . . . . the gradual and slow improvement of human nature, within narrow limits, it seems to me impossible to reject altogether the principle proposed (with great exaggeration, however) by Lamarck, of the necessary influence of a homogeneous and continuous exercise in producing, in every animal organism, and especially in Man, an organic improvement, susceptible of being established in the race, after a sufficient persistence. If we take the best marked case,—that of intellectual development, it seems to be unquestionable that there is a superior aptitude for mental combinations, independent of all culture, among highly civilised people; or, what comes to the same thing, an inferior aptitude among nations that are less advanced,—the average intellect of the members of those societies being taken for observation." (*The Positive Philosophy of Auguste Comte*, vol. 2, 1853, pp. 88-89.)

by recent scholastic experience. Benjamin Kidd writes: "The children of African aborigines, and even the children of the aborigines of Australia, learn when taught the same things quite as easily and readily as the children of Europeans." (*The Science of Power*, London, 1918, p. 271.) And of the educability of races generally, Kidd states: "At many centres of university and higher education in England . . . non-European students quite hold their own in intellectual achievement in comparison with European students." (*Ibid.*, pp. 290-291.) So far as the Australian aborigines are concerned, abundant evidence on this subject will be found in the present author's paper on "The Mentality of the Australian Aborigines" in *The Sociological Review* for October 1913.[1] Of the still more primitive and now extinct Tasmanians, H. Ling Roth, in his *The Aborigines of Tasmania* (Halifax, 1899, p. 25), writes: "'The master [of the school] informs me that with some exceptions these aboriginal children are not inferior in capacity to European children.'" To take another significant example: the present author had occasion once to invite to a private conference some *fifteen* West African students reading for the Bar in London. From such and similar evidence it transpires that the youth of a given race possessing a very primitive civilisation may pass directly to the highest civilisation. Hence growth in civilisation, however extensive, is not in any way necessarily conditioned by a long historic growth in innate mental capacity. Our present-day civilisation at its best may therefore well consist with an innate mental capacity in men not higher than that of our Aurignacian ancestors. On the negative side this conclusion is further strengthened by the consideration that some "white" peoples situated far away from the centres of Western civilisation have been for centuries stagnating and unproductive of high achievements, although they are presumably as capable of these as any other racially cognate people.

The preceding paragraph disposes incidentally of the race problem by showing that all races appear to be equally educable. To express

[1]Standard works on the subject of the Australian native civilisation are Baldwin Spencer and F. J. Gillen, *The Native Tribes of Central Australia*, London, 1899; Baldwin Spencer, *Native Tribes of the Northern Territory of Australia*, London, 1914; G. Horne and G. Aiston, *Savage Life in Central Australia*, London, 1924; and Herbert Basedow, *The Australian Aboriginal*, Adelaide, 1925.

The following words are cited from an official document entitled New South Wales, *Report . . . for the Protection of the Aborigines*, for 1909, p. 398: "Age for age and opportunity for opportunity, the attainments and mental powers of these children are equal to the average white children." A Chief Protector of Australian aborigines writes to the author: "I have every reason for believing that the aboriginal brain can grasp any modern idea or subject quite as readily as we who have all the advantages of heredity and culture on our side." We also read: "In general intelligence, common sense, integrity, and the absence of anything repulsive in their conduct, they are at least equal, if not superior, to the general run of white men." (James Dawson, *Australian Aborigines*, Melbourne, 1881, p. iv.)

As to savages in general: "In reading almost any account of savages, it is impossible not to admire the skill with which they use their weapons and implements, their ingenuity in hunting and fishing, and their close and accurate powers of observation." (Lord Avebury, *Pre-Historic Times*, 1900, p. 519.)

this inference in more general terms. About half-a-century ago the inhabitants of India, China, and Japan were widely regarded by Europeans as belonging to inferior races. In view of twentieth century educational and other experience, it would argue deplorable ignorance to maintain this now. In addition, the thousands of Negroes who have passed or are passing through the higher schools of learning and many kindred facts render it extremely improbable that any stateable racial differences in innate mental capacity exist among peoples. Granted the above, and we are not surprised at one scholar writing: "We have no reason to believe that one race differs from another in innate psychic equipment" (D. Wallis, "Race and Culture," in *The Scientific Monthly,* October 1926, p. 321) and another contending that the existence of substantial differences between races has yet to be proved (R. H. Lowie, "Psychology, Anthropology, and Race," in the *American Anthropologist,* July-September 1923). In fact, if the question of race inferiority and race superiority is to be raised, it would be only fair not to prejudice the answer by assuming that one or another given race is inferior or superior by nature.[1]

In the most important physical respects—that of the erect attitude, of specialised hands and feet, and of vocal organs suited for speech—the different races of men are indistinguishable, and they are about equally hairless, orthognathous, and endowed with brains. However, more especially with respect to features, skin colour, and nature of hair, the three principal races (Caucasian, Mongol, and Negro) differ so widely that certain naturalists have classed them as distinct species.[2] And yet with regard to mental type these races appear to be *identical* seeing that, for instance, an examination of a scientific or other work may leave us completely in the dark as to its author's race or considering that the perfectly smooth working of the League of Nations with its democratic Assembly and Commissions is unintelligible on any other supposition.[3] Thus specio-psychism is not only the most important, but the most fundamental character in man, the character which fuses the physically widely differing races of men into one mentally homogeneous race.

[1] In this connection, the historical aspect should not be overlooked. We should remember, for instance, that "up to a thousand years ago the Nordic peoples had indeed contributed ferment and unsettling, but scarcely a single new culture element, certainly not a new element of importance and permanence." (A. L. Kroeber, *Anthropology,* London, 1924, p. 506.) See also Ellsworth Faris, "The Mental Capacity of the Savage," in *American Journal of Sociology,* March 1918; G. H. Estabrooke, "The Question of Racial Inferiority," *American Anthropologist,* July-September 1928; J. R. Kantor, "Anthropology, Race, Psychology, and Culture," in *American Anthropologist,* April-June 1925; and the exhaustive paper by W. L. Thomas, "Race Psychology," in *American Journal of Sociology,* May 1912.

[2] On the numerous physical adaptations, see H. J. Fleure, "The Regional Balance of Racial Evolution," in *British Association Report for 1926.* There are, of course, greatly differing physical types *within* each race, particularly within the Caucasian race.

[3] The same problem is discussed further on in this Section in some detail.

Naturally, if the larger groups called races are by nature actually or virtually equals, it is manifest that the peoples composing them only differ among themselves in cultural respects.

Scientific history enables us to advance another step. Abundant evidence will be submitted in Appendix A. and in Chapter IXa. (Section 5), to suggest that greatness or genius is for all intents a socio-historic product and that the current estimates of the innate capacities of great men are not only enormously but monstrously exaggerated. And if great men are for all intents a socio-historic product, it is superfluous to inquire into the biological causes of the cultural status of so-called men of talent.

William Bateson, a leading Mendelian, delivered in Melbourne the first half of his Presidential Address at the meeting of the British Association for the Advancement of Science in 1914. The second portion dealt with Heredity in Man and was delivered in Sydney. We shall content ourselves with offering from the latter an extract, not less dogmatic nor more suggestive of unbiased observation than the rest. "Annul the work of a few hundreds—I might almost say scores—of men, and on what plane of civilisation should we be? We should not have advanced beyond the mediæval stage without printing, chemistry, steam, electricity, or surgery worthy the name. These things are the contributions of a few excessively rare minds. . . . To improve by subordinate invention, to discover details missed, even to apply knowledge never before applied, all these things need genius in some degree, and are far beyond the powers of the average man of our race; but the true pioneer, the man whose penetration creates a new world, as did that of Newton and of Pasteur, is inconceivably rare. But for a few thousands of such men, we should perhaps be in the Palæolithic era, knowing neither metals, writing, arithmetic, weaving, nor pottery. In the history of Art the same is true, but with this remarkable difference, that not only are gifts of artistic creation very rare, but even the faculty of artistic enjoyment, not to speak of higher powers of appreciation, is not attained without variation from the common type. I am speaking, of course, of the non-Semitic races of modern Europe, among whom the power whether of making or enjoying works of art is confined to an insignificant number of individuals. Appreciation can in some degree be simulated, but in our population there is no widespread physiological appetite for such things. When detached from the centres where they are made by others most of us pass our time in great contentment, making nothing that is beautiful, and quite unconscious of any deprivation. Musical taste is the most notable exception, for in certain races—for example, the Welsh and some of the Germans—it is almost universal. Otherwise artistic faculty is still sporadic in its occurrence. The case of music well illustrates the application of genetic analysis to human faculty. No one disputes that musical ability is congenital. In its fuller manifestation it demands sense of rhythm, ear, and special nervous and muscular powers. Each of these is separable and doubtless genetically distinct. Each is the consequence of a special departure from the common type. Teaching and external influences are powerless to evoke these faculties, though their development may be assisted." (*British Association Report for 1914*, pp. 32-33.) And so on *ad indefinitum*, with studied contempt for Baconian standards.

Still, may it not be that whilst no individual is of himself capable of more than slightly improving a primitive tool during a life-time, the average person falls greatly below this standard and is perhaps unable to improve any tool at all? This is evidently William McDougall's opinion, as expressed in his *The Group Mind* (1927, p. 210). He writes, speaking of traditions: "Now this traditional stock of knowledge and morality has been very slowly accumulated, bit by bit; and every bit, *every least new addition* to it, has been a difficult acquisition, due in the first instance to some *spontaneous variation* of some individual's mental structure from the ancestral

type of mental structure. That is to say, throughout the evolution of civilisation, progress of every kind, increase of knowledge or improvement of morality, *has been due to the birth of more or less exceptional individuals,* individuals varying ever so slightly from the ancestral type and capable, owing to this variation, of making some new and original adaptation of action, or of perceiving some previously undiscovered relation between things."[1] (Italics ours.)

This is painfully overstated. There is probably not an average person who has not made many such additions, although these additions may often not be preserved. Any artisan or craftsman—think of the Middle Ages !—is ever producing comparatively original objects and even the imaginative play of the young is shot through with new ideas. All healthy and untainted children pass ordinarily through the primary school (where one is provided) and some originality is shown by all such children. Individuals outside the class of imbeciles do much more than imitate: they adapt and to some extent transform, " making some new and original adaptation of action." Learning from others frequently means for them grasping, comparing, and correlating ideas.[2] If we add to this that in most cases capriciously and historically changing social circumstances (*e.g.,* a country becoming more prosperous) obviously determine whether the young are to go to the secondary school or the university or do original research, it will be clear that there are no factual grounds for believing that the " average " person falls greatly or noticeably below any of his fellow human beings in innate mental capacity.

Another line of attack has to be rebutted. It may be said that somatically no two new-born human beings are exactly alike and that this may be predicated of their senses and their temperaments. Indeed, it may be rightly contended that no two men are identically similar as regards any innate mental character. In recognising the justice of this view, a vital reservation has to be made. Different breeds of animals (dogs, for instance) are enormously more modifiable corporeally than mentally and this, we may note, should hold and holds just as true of the diverse human races and of individual human beings.

[1] Not all thinkers agree with McDougall. Thomas Carlyle, in his *Lectures on Heroes* (" The Hero as Priest ") writes: " Every man, as I have stated somewhere, is not only a learner, but a doer: he learns with the mind given him what has been ; but with the same mind he discovers farther, he invents and devises somewhat of his own. Absolutely without originality there is no man." Again : " The craftsman there, the smith with that metal of his, with these tools, with these cunning methods,—how little of all he does is properly *his* work ! All past inventive men would work there with him ;—as indeed with all of us, in all things." (*Lectures on Heroes,* ed. 1888, p. 258.) Otis T. Mason (*The Origins of Invention,* London, 1895, p. 410) states on this point: " Invention is indigenous in the nature of man. The first being on this earth worthy of that name was an inventor." And René Worms (*Philosophie des sciences sociales,* vol. 3, Paris, 1907, p. 102) says: " There is nobody, however lowly his condition, who, when the hour comes is unable to take a useful initiative in public or in private life, in technical or in moral matters." (See also Chapter V., Section 4.)

[2] See also Chapter V., Section 4, on the subject of originality.

That is, mental characters are far less modifiable than bodily ones and, irrespective of considerable bodily variations, differ comparatively little in different individuals and varieties of the same species. The existence of marked bodily differences does not therefore necessarily invalidate our conclusion that men are virtually equal in innate mental capacity. To illustrate. Tall and short men, powerful and frail men, blondes and brunettes, snub-nosed and hook-nosed, brachycephalic and dolicocephalic, Negroes, Mongols, and Caucasians, may be quite indistinguishable culturally and in temperament, whilst individual tall men, blondes, or other physical types, may be very different in the same respect: thus we may meet with a Caucasian university professor and a Negro illiterate and *vice versa,* or distinguished men of science in an assembly may represent strikingly different physical types without this in the least involving any traceable mental divergences. In a word, whatever the physical differences between individuals and between races may be, the evidence is conclusive that the intellectual, emotional, and volitional differences between them are, on the human plane, for all intents cultural products and not inborn. For example, the average youth of all races are taught in modern schools and colleges exactly the same things in exactly the same manner and apparently with exactly the same result, precisely as if they belonged to one race. (Not even the children of the extinct Tasmanian tribes presented a single special problem to the European teacher.) Hence, save for cultural influences, their mentality—senses, temperaments, memory, reasoning powers, imagination, ideas, purposes, æsthetic and moral feelings, and character traits—can only be inappreciably different. That is, so far as races and sub-races appear to differ in any mental respect from other races and sub-races, this must be taken to be due to cultural circumstances. In Darwin's time, before the children and adults of different races and peoples had met together at school and at Geneva respectively, the approximate coincidence in bodily and mental differences in races and peoples readily suggested that they were as different by nature mentally as physically; but to-day such an interpretation argues that the most patent facts have been overlooked. The whole of mankind may be therefore regarded as by nature strictly one mentally, however its constituent parts may diverge in colour, features, and other physical characters.[1]

[1] The sharp distinction commonly drawn between black, yellow, and white races can scarcely be considered scientific. "The descriptive term 'white' should be replaced in future by the expression 'slightly pigmented' or 'brightly coloured.'" (Rudolf Martin, *Lehrbuch der Anthropologie,* Jena, 1928, p. 446.) "It is only a question of a more or less dense accumulation of one and the same colouring matter." (*Ibid.,* p. 448.) "The colour of the separate fine pigment grains varies from the brightest yellow to the darkest brown; but this is the result of the more or less dense secretion of the same colouring matter." (*Ibid.,* p. 448.)

Much has been made of the early closing of the cranial sutures in the Negro. Dr. J. Frédéric states on this subject: "In my opinion the available

This equality of man is accentuated by the fact that in him the cultural factor may radically neutralise inborn deficiencies : a note book may compensate for an indifferent memory, self-control may checkmate a bad temper, and so on indefinitely.

The biological view of considerable innate mental differences among human beings is widely contested. Darwin states: "The inferiority of Europeans, in comparison with savages, in eye-sight and in the other senses, is no doubt the accumulated and transmitted effect of lessened use during many generations." (*Descent of Man*, p. 33.) Compare with this statement what two modern investigators write: "The results of the Cambridge Expedition to the Torres Straits have shown that in acuteness of vision, hearing, smell, &c., these peoples are not noticeably different from our own. We conclude that the remarkable tales adduced to the contrary by various travellers are to be explained, not by the acuteness of sensation, but by the acuteness of interpretation of primitive peoples. . . . We conclude, then, that no fundamental difference in powers of sensory acuity, nor, indeed, in sensory discrimination, exists between primitive and civilised communities." (Dr. C. S. Myers, in *Inter-Racial Problems*, edited by G. Spiller, p. 74.) Prof. R. S. Woodworth, who examined the many specimens of primitive peoples assembled at the St. Louis Fair, concluded: "On the whole, the keenness of the senses seems to be about on a par in the various races of mankind." ("Racial Differences in Mental Traits," in *Science*, 4th February 1910, p. 177.) And with regard to the emotions, we read: "As judged simply by his emotions, man is very much alike everywhere, from China to Peru. They are all there in germ, though different customs and grades of culture tend to bring special types of feeling to the fore. . . . Thus the quest for a race-mark of a mental kind is barren once more." (R. R. Marett, *Anthropology*, 1912, pp. 91-92.) Finally, "in temperament we meet with just the same variations in primitive as in civilised communities. In every primitive society is to be found the flighty, the staid, the energetic, the indolent, the cheerful, the morose, the even-, the hot-tempered, the unthinking, the philosophical individual." (C. S. Myers, in *Inter-Racial Problems*, p. 74.)

"Up to this time none of the mental tests gives us any insight into significant racial differences that might not be adequately explained by the effect of social experience." (Franz Boas, *Anthropology and Modern Life*, London, 1929, p. 57.) "I protest that there is absolutely no basis for saying that the colour of the skin or the shape of the eyes, or any other bodily characteristic, has anything to do with the intellectual or moral inferiority of an individual or a race." (Prof. Jacques Loeb, in *The Crisis*, New York, December 1914.) And he continues: "Science is a matter of method ; it does not require genius to be a scientist, but you must have the scientific method and in addition simple common sense, the power of application and consecutive thought. From my experience with pupils, I have found that the number of those who are not fitted to work out a problem and make a contribution to science, is extremely small if they are only taught the proper method, if they only realise that what they have to use in addition to the method is common sense."

A leader writer in *The Times* (October 5, 1912) admirably summarises the all-powerful influence of national traditions on the individual: "We have only to observe the joint physical and mental constitution of the population of our own country or of France—to go no further afield—to see that very distinct physical stocks can be trained to the acceptance of a well-formed national tradition. An old physical type may re-emerge, or perhaps even persist unchanged, but the mental characteristics are far more malleable. A large proportion of the country people of Hertfordshire or Buckinghamshire or Berkshire are small and dark, and in outward semblance more like the inhabitants of Cardigan or Montgomeryshire than the traditional fair English type. Yet mentally they have little or nothing of the traditional Celtic equipment, but are patient and tenacious, and lacking in fancy and ready quickness. Many of the Frenchmen of Normandy or the Boulonnais have the same stature and fairness of hair as a normal fair Englishman of Kent or

data are not sufficient for deciding negatively or positively the question whether the cranial sutures close earlier in the lower than in the higher races. Only this I can definitely assert that in no case have I observed in the lower races a point of time for the closing of the sutures which has not been also observed in Europeans." He proceeds to say that "in women the sutures close later than in men." ("Untersuchungen über die normale Obliteration der Schädelnähte," in *Zeitschrift f. Morphologie u. Anthropologie*, October 1906.)

Sussex. But even when these anthropological features closely agree, the gesture and the expression of the eye are unmistakably different; and these differences are only the outward indications of a habit of thought and a traditional civilisation which have marked features of distinction. Once a national type of civilisation has been thoroughly assimilated, mental habit and training have a strong tendency to persist, and to be uninfluenced by any physical approximation to an older racial type with an originally different mental endowment. Only the predominant power of a common national culture could have given, for example, so strong and uniform a national character to the population of the Scottish Lowlands, in spite of the very large admixture of Celtic blood with the dominant Teutonic strain. If mental characteristics can be modified and implanted so much more easily and enduringly than physical traits, it is clear that the apprehension aroused by the decline of the outward and visible marks of Teutonic blood is largely superfluous. In a well-ordered State there is no need to lose any of the qualities of character which have once been predominant; and it should not be difficult to cultivate what are virtually new ones by development of latent but neglected capacities. . . . If a nation has the will and the intelligence deliberately to preserve and develop its historic endowment of character and mental tradition, there is no need for perturbation of heart at a change in the colour of its eyes or its hair, or even of its stature, within the limits of health and fitness."

Arthur Keith appears to believe in "a great scheme of progress by evolutionary means." He writes: "Man's unconscious urge to race-building has been going on and is still taking place; the tribal instincts are in all of us and tend to cloud reason. To understand the nature of the strife is the first step towards its abatement. It seems to me that man's body and brain are fashioned to serve in the execution of a great scheme of progress by evolutionary means; that scheme is being foiled by civilisation—man's greatest discovery." (*The Evolution of the Human Races*, London, 1928, p. 320.) It would be interesting to examine the evidence for the assertion that "the tribal instincts are in all of us."

On grounds of fact and of intrinsic probability we therefore assume that *by nature all human beings possess roughly to the same degree the capacity of limitlessly assimilating and utilising and infinitesimally augmenting the cultural heritage.*[1]

Eugenists constantly assume that apparent physical or mental inferiority and superiority are certain tokens of inborn physical or mental inferiority and superiority. Accordingly, they insist that we must encourage the superior to breed and discourage the inferior from multiplying. The following citations will show that the problem is not as simple as eugenists imagine:—

"Most of the babies born in the slums are splendid little specimens of humanity—so far as physique is concerned—bearing no marks of degeneration to correspond with the deterioration of their parents." (Dr. C. W. Saleeby, *Parenthood and Race Culture*, London, 1909, p. 20.)

The following is a summary of three stories told to the author by London relieving officers of the poor. Because of his utterly depraved character, a man had his children taken away from him by the authorities and the shock turned him into a respectable person. A habitual criminal deaf to all appeals, was reformed through a kindness done to his dog while his master was in prison. Hooliganism has virtually disappeared during the last quarter of a century.

The *Report of the Commissioners of Prisons . . . for the year ended 31st March 1913*, Part I., p. 13, states: "It is not, perhaps, known that the class of young criminal who in so many cases has been reclaimed under the Borstal System is not what the popular imagination considers it to be—a 'Borstal boy' of gentle habit and disposition, who has lapsed occasionally into criminal acts—but a tough class of hardened young thieves and burglars, who a few years ago would be seen classed with the rest in our great convict prisons."

Of the problem of the criminal Sir John Macdonell, Master of the Supreme Court, is reported to have said at the International Eugenics Congress, 1912: "The habitual criminal was in most cases a manufactured article—made by his environment. He was the by-product of slums. No matter what his crime may have been, there was no warrant for assuming that he was the victim of certain qualities which would be transmitted to his progeny." (*Proceedings*, pp. 32-33.) And Dr. A. Newsholme, Principal Medical Officer of the English Local Government Board,

[1]Other aspects of this subject are treated somewhat fully in Chapter VI. (Section 3).

says: "Striking family histories have been published, in which related persons have, generation after generation, been supported by the public, either as paupers, or in asylums or prisons. But we do not know to what extent these results would have occurred had the children been sufficiently protected from an obviously evil environment. Pauperism and crime are probably truly hereditary in only a small proportion of their total amount. If this be so, the possibility of their control becomes an easier problem. For the majority it is highly probable that if the community gives the children a fair chance of success, in the reasonable belief that the expense will not be a recurring expense, this expenditure will be more than justified by results." (*The Declining Birth-Rate*, 1911, p. 54.)

In a careful statistical investigation of the history of children belonging to the lowest social strata who have passed through industrial schools and similar institutions, Miss Mary H. Thomson (*Environment and Efficiency*, 1912) finds that 72 per cent. of the records investigated proved satisfactory, and that of the 29 distinctly unsatisfactory cases, 13 were mental or almost deficient. Deducting the mental cases, and allowing for the advanced age of many of the children and the imperfection of the institutions, the percentage of success might apparently be raised to practically 100. Miss Thomson concludes her Introduction with the following words: "It seems to me that, until it can be proved to us that the transformation we see effected in these children is but a superficial growth doomed to be uprooted by the strong arm of heredity, for every drunkard we pass in the street, for every criminal who is driven past us in a prison van, we are bound to say—to paraphrase the words of John Bradford—'There, but for the force of circumstances, go I!'"

Herbert Spencer (*Essays*, vol. 3) tells of Colonel Montesinos organising the Valentia prison under his charge in such a manner that the average annual recommittals for ten years were reduced from the normal of 30 to 35 per cent. to one per cent.

Here is a specific case. "The phenomenon of bullying deserves to be studied by one who wishes to adjust the respective claims of heredity and environment. During the greater part of the last century bullying was such an everyday occurrence in boys' schools that it might well have been contended that the average boy was a born bully. And not more than twenty years ago a well-known writer on sociology, commenting on a gross case of bullying, said that there was a phase of atavistic savagery which every boy, in the course of his development, had to pass through. But the history of bullying proves conclusively that the 'savagery' of the average boy is the outcome of environment rather than of heredity. Children of all ages are prone to imitate their seniors; and much of the bullying which has disgraced our schools is due to the older and stronger boy passing on to the younger and weaker the kind of treatment which had been inflicted on himself. When boys were harshly, and even cruelly, treated by their masters, bullying was as brutal as it was widely prevalent. As the disciplinary *régime* of our schools became more humane, bullying became rarer and less brutal. And to-day, when school-boys, though still autocratically ruled, are on the whole kindly treated, bullying is but the shadow of its former self. And one may hope that even that shadow will gradually fade away. A master in a grammar school, who has given a generous measure of freedom to his pupils, was recently assured by more than one of them that, under the socialising influence of the new *régime*, their relations to one another out of school had greatly improved, and that bullying had entirely ceased." (Edmond Holmes, *In Defence of What Might Be*, London, 1914, pp. 362-363.)

The following statement is taken from an article on "Racial Decay" in (the Monthly Paper of) *The Church League for Women's Suffrage*, May 1914: "In the London County Council's syllabus of lectures on Infant Care it is stated on the authority of their chief (educational) medical officer, that 80 per cent. of the total blindness in the country is caused by ophthalmia neonatorum, which being interpreted means that the sins of the fathers have been visited on the children. The Royal Commission on blind, deaf, and dumb, in 1889, reported that 7,000 persons lost their sight owing to this cause, involving on the lowest—*i.e.*, the financial—plane a loss to the state of £350,000 a year. (*British Medical Journal*, Dec. 3, 1910.) As regards deafness, in a paper read before the Royal Sanitary Institute of Glasgow, Dr. Kerr Love showed that syphilis was the cause of a vast proportion of all cases of deafness observed during the first months of life. He also suggested that syphilis probably lay at the root of much of the meningitis to which so many children succumbed. (*British Medical Journal*, Dec. 14, 1912.) Then, as regards idiocy, recent investigations show as many as 38 per cent. (*School Hygiene*, Feb. 1913) infected with syphilitic poison, and in mental deficiency, with or without epilepsy, as many as 59 per cent. (Dr. Browning in *B.M.J.*, Jan. 10, 1914), while it is found to be a prolific source of congenital heart disease and other diseases too numerous to mention."

Later authorities confirm what precedes on the point of physical defects. We thus read in E. B. Reuter's *Population Problems* (Philadelphia, 1923), which exhaustively deals with the eugenic arguments: "Syphilis, especially in its combination with alcohol, appears to be the major cause [of insanity]." (p. 306.) "Feeble-mindedness . . may or may not be due to a hereditary cause. Syphilis is probably the largest single causal factor; non-nutrition, as in the case of cretinism, is a cause of some importance; and definite causes are known for a number of other clinical types." (p. 306.) Reuter quotes Rogers to the following effect in regard to defective children: "'Every family in the land into which children are liable to be born faces the possibility of having one or more defective ones among the number.'" (p. 310.) "Defectives of all sorts are notoriously short-lived." (p. 313.) "Poverty, pauperism, prostitution, inebriety, criminality, vagrancy, and the like, are symptoms of imperfect social organisation and within limits may be eliminated almost at will." (p. 315.)

Mental tests probably allow of a variety of interpretations. On this subject Paul A. Witty and Harvey C. Lehman, "The Dogma and Biology of Human Inheritance," in the *American Journal of Psychology,* January 1930, write: "There is a growing conviction among certain research workers that mental tests are in reality only *measures of educational opportunity and attainment.*" (p. 557.)

Lastly, here is a summary of the case against current notions on eugenics, by Prof. Samuel G. Smith: "Discussions on eugenics," he is reported to have said, "often implied that the business of human nature could be reduced to the terms of a stock-farm or a poultry-yard. Other animals realised themselves through their bodies, but with man psychological interests were the most important. It was asserted that talent could be inherited, and that one could achieve a good character by being born right. There was not the slightest evidence that either talent or character, either intellectual or moral qualities, were ever transmitted directly through the germ. Genius was the surprise of history. Nobody knows who were the parents of Moses. The parents of Luther did not matter. Burns and Shakespeare, Beethoven and Wagner, rose out of the common plane of human life. The talented and wealthy classes were said to have a larger proportion of talented children; but that was due to education and upbringing, and if they did not it would be a disgrace to them. The criticism of them was that they did so poorly—not that they did so well. Society suffered more from the vices of the rich than from those of the poor. By what legal methods could they restrain the vices of the rich? Social efficiency and physical fitness were by no means synonymous terms. We needed muscular force for the world's hard work, good lungs and heart and breathing power to make good soldiers; but the leadership of the world did not consist in these things. Kant was advised not to study philosophy, because his chest was weak. Sir Isaac Newton, when a baby, was not expected to live a day. A remarkable treatise could be written on what the world owed to invalids. He was not sure but that for intellectual efficiency, some little abnormality of the flesh was almost a pre-requisite. Of 600 slum children in a New York hospital, only 22 were found to have been badly born. Their mothers had not been properly fed afterwards, and had been sent to work too soon. The babies had been taken care of by other babies, dropped on the floor, poisoned by bad air, starved, injured by improper food; hence there was a maimed generation of 600, when there should have been only 22. We needed to take care of the babies we got. Nature did well in her transactions. The father might have one hand and the mother one eye, but the baby had two of each. If all the conclusions of physicians were correct, the race would have been rotten and doomed generations ago. Anything could be proved by positing a latent quality. We all had ancestors who either were hung or ought to have been hung, and we all had a saint among our ancestry. To trace criminality to criminal ancestry and saintliness to saintly ancestry was to use a hypothesis by which anything could be proved." (*Report of Proceedings of the First International Eugenics Congress held in 1912,* London, 1913, p. 36.) See also Prof. Smith's *Social Pathology,* 1911. His qualifications for expressing himself as he does in the above Report, are suggested by some of the posts he had occupied as noted on the title page on this book of his: Former President National Conference of Charities and Correction; Vice-President National Prison Association; Commissioner to visit European Institutions; Member Minnesota Board of Charities and Correction; President Minnesota State Board of Visitors; Founder and President St. Paul Associated Charities.

(b) MEN'S MENTAL INTERDEPENDENCE.—We have thus far laboriously sought to discover whether all men are by nature equally able to learn from their fellows and equally capable of

infinitesimally augmenting the cultural heritage. We did this because, if that were not the case, we should have no intelligible basis for specio-psychism. If the current beliefs as to the innate capacity of great scientists, philosophers, or artists, or even of men of eminence or talent, were justified, it would follow that many men owe little to their race and could even live tolerably by themselves as individuo-psychic beings. They would be scientists, philosophers, or artists, even if they had been suckled by a she-wolf and had never known other human beings. If at the same time they possessed the capacity of learning from others, this would be a matter of no consequence for them. Now such men could not be regarded as specio-psychic beings, as beings absolutely dependent on species-wide mental cooperation for rising appreciably above the animal stage. At the other extreme, if the mass of men were only faintly culturable and were incapable of contributing to the cultural heritage, they could only be considered specio-psychic in a limited sense. In either case, it would be inappropriate to use the term specio-psychic to denote a definite species character. There would be practically all the stages from human beings who were individuo-psychically to other human beings who were neither individuo-psychically nor specio-psychically viable.

Everything is different if our conception of man is correct. All men being in virtually the same position, a single descriptive term is applicable to the species as such. Since any one man's innate mental capacity is for practical purposes infinitesimal, all stateable culture whatever and all super-animal mental capacity whatever, are the result of socio-historic thought. The individual man is not individuo-psychic and is therefore incapable, as is actually the case, of leading a wholly cultureless life. He is, in fact, only himself in proportion as he is cultured. And since his nature can benefit indefinitely by culture, it can only be fully satisfied, as we shall see in Chapter VII., by an indefinitely or endlessly developed culture. The individual human being is thus distinguished from the individual animal by being dependent on collective thought, and the greater the store of this collective thought, the greater the possibility of fully satisfying his nature. Hence there is every inducement to learn from others and to improve on what has been accomplished and hence the illimitable growth of the cultural heritage through the ages. Hence, too, we can understand how, owing to man's lowly innate mental status, individual men, according to cultural circumstances, may differ almost infinitely, from the lowest Australian or even lowlier Chellean to a great modern scientist and artist.

We conclude, accordingly, that *just as all animals,* as we have seen in the last Section, *are by nature unmistakably individuo-psychic, so all men are by nature unmistakably specio-psychic*—by which we mean that, broadly, all men are by nature alike dependent on and capable

of learning freely from their fellows, alike capable (unaided) of the equivalent of slightly improving a primitive tool or idea during a lifetime, and alike responsible therefore for the high culture which develops in the course of the ages as the result of species-wide mental cooperation.

By assuming a virtually equal innate mental capacity in men, men may be conceived as calculable units, and man and his history as amenable to scientific examination. A science of man becomes in this way a possibility.

Now as against such an eminently helpful conception, consider some of the current views on man. We have already cited Bateson and McDougall. Here is a quotation from J. G. Frazer, the distinguished cultural anthropologist. "Not only are different races differently endowed in respect of intelligence, courage, industry, and so forth, but within the same nation men of the same generation differ enormously in inborn capacity and worth. No abstract doctrine is more false and mischievous than that of the natural equality of men. . . . At school and at the universities, at work and at play, in peace and in war, the mental and moral inequalities of human beings stand out too conspicuously to be ignored or disputed." (*The Scope of Social Anthropology,* London, 1908, p. 12.)

These emphatic assertions as to enormous differences in innate capacity are, as in Bateson and McDougall, supported by nothing better than the most cursory observation of individuals as we find them. (Most thinkers have not learnt yet to give unto nature what is nature's and unto culture what is culture's.) However, what interests us in the three cases we have cited, are the scientific implications. According to these, there are almost infinite differences in men's innate capacities: a few individuals are innately capable of making great inventions or discoveries and most men are innately *in*capable of making any inventions or discoveries at all. And since great men spring up unaccountably here, there, and anywhere, anything may happen at any time: a Gutenberg "invents" printing, a Newton modern astronomy, a Darwin organic evolution, and so on. Prediction and explanation, which are the very life-breath of science, are thus completely ruled out. We cannot explain the past, nor can we predict the future; we can only record events. Chaos holds here absolute sway. In a word, these current views on the nature of man are incapable of forming the groundwork of any science.

10. *Is Specio-Psychism in Man an Accidental Character?*

However, is not perhaps man's specio-psychic life the result of peculiar conditions and not of any inborn variation? Do circumstances never invoke in animals approaches at least to the specio-psychic life? Unless the negative to this be indubitably established, pan-species culture may prove to be a fortunate or unfortunate accident in mankind, an accident that may at any time convert any other particular animal species from an individuo-psychic to a specio-psychic mode of life.

That specio-psychism is an accidental phenomenon, appears eminently improbable. Not a few animals are kept as pets, and the attention lavished on them exceeds in many cases that bestowed ordinarily on human offspring and human companions. The pet dog, cat, and horse, are treated in these instances as beloved fellow beings, and if they were potentially specio-psychic, the treatment accorded them would inevitably tend to call forth in them the characteristically specio-psychic reactions. Yet, as we all know, the most affectionate familiarity and camaraderie leave the pet animal an individuo-psychic being pure and simple. At the fall of its life it has not, in the least measure, acquired the supreme art of being able to profit by the thoughts of others near and far in space and time.

However desirous the possessor of a pet may be to humanise the animal, he is rarely an adept in the matter. The animal trainer is this. Does he always or sometimes succeed, partially or entirely, in humanising his subjects? His interest, we should remember, lies wholly in exhibiting an animal which behaves like a human being behaves, that is, pan-psychically. His charges are supposed to understand him, to obey his orders, and to perform at his behest complicated feats reminding his audience of what a human intellect might accomplish under analogous conditions. Here, too, the range of subjects experimented on is extensive, for there is scarcely a limit to the creatures selected for experiment—from the flea to the elephant and from the snake to the ape. And, one must admit, the experiments are creditable to the trainer and his subjects or victims. When we attend these performances we are amazed to see how relatively modifiable a dog or cat, an elephant or chimpanzee, is. The ape most especially lends himself to startling experiments, for he can be made to act, and to appear, like a human being. These remarkable achievements of skilful trainers nevertheless underline the conclusion we have reached in regard to pets, to wit, that whilst by the method of unreflective trial and error, animals may be induced to perform certain feats, the net outcome involves no change whatever in the mentality of the animals concerned. Not a solitary instance of a reliable character appears to be known of animals being partially or wholly transformed, as in fairy tales, into seemingly human or specio-psychic beings by trainers.

Valuable work of a scientific nature has been accomplished in the same direction by experimental psychologists. Their experiments have brought to light much that is interesting in animal mentality and in the animal modes and motives of learning. Especially have these psychologists shown how much is, or may be, acquired by animals through the method of varied trial and error. However, none of their ingenious experiments has tended to support the view that animals can be prevailed on to learn freely, or even noticeably, from others.[1]

Nor is it different when we scour the world of natural history literature for illustrations of animals in whom special circumstances induced specio-psychic behaviour. Here also not a single example appears to be forthcoming to alter the conclusion first suggested by the facts as a whole and to be established in the succeeding Chapter, namely that man is the only, and only possible, specio-psychic being on earth and that all other animate creatures are actually and potentially, and necessarily, individuo-psychic.

[1]Here is a considered opinion concerning chimpanzees by the leading authority. "It is a continuous source of wonder, and often enough of vexation, to observe how every attempt to re-mould his biological heritage 'runs off' an otherwise clever and ductile animal of this species 'like water from a duck's back.'" (W. Köhler, *The Mentality of Apes*, 1927, p. 68.) See also *Mental Evolution*, by L. T. Hobhouse.

Of course, pre-scientific literature swarms with instances of "rational animals." Just as crude knowledge suggests the animistic theory that all things are alive, so a kindred state of mind encourages the belief that animals possess specio-psychic minds analogous to ours. When men are compelled to rely on hearsay, this attitude is not unreasonable ; and thus it was that after the Renascence the belief in "rational animals" was widely entertained. Presumably many stories resembling the following quaint one from Locke (*An Essay concerning Human Understanding,* London, ed. 1824, book 2, ch. 27, §8), have been told:—

"A relation we have in an author of great note is sufficient to countenance the supposition of a rational parrot. His words are: 'I had a mind to know from Prince Maurice's own mouth, the account of a common, but much credited, story, that I had heard so often from many others, of an old parrot he had in Brazil, during his government there, that spoke, and asked, and answered, common questions, like a reasonable creature ; so that those of his train there generally concluded it to be witchery or possession ; and one of his chaplains, who lived long afterwards in Holland, would never, from that time, endure a parrot, but said, they all had a devil in them. I had heard many particulars of this story, and assevered by people hard to be discredited, which made me ask Prince Maurice what there was of it ? He said, with his usual plainness and dryness in talk, there was something true, but a great deal false, of what had been reported. I desired to know of him what there was of the first ? He told me short and coldly, that he had heard of such an old parrot when he had been at Brazil ; and though he believed nothing of it, and it was a good way off, yet he had so much curiosity as to send for it ; that it was a very great and a very old one ; and when it came first into the room where the prince was, with a great many Dutchmen about him, it said presently, "What a company of white men are here !" They asked it what it thought that man was ? pointing to the prince. It answered, "Some general or other" ; when they brought it close to him, he asked it D'où venez-vous ? "Whence come ye ?" It answered, De Marinnan, "From Marinnan." The prince, A qui êtes-vous ? "To whom do you belong ?" The parrot, A un Portugais, "To a Portuguese." Prince, Que fais-tu là ? "What do you there ?" Parrot, Je garde les poules, "I look after the chickens." The prince laughed, and said, Vous gardez les poules ? "You look after the chickens ?" The parrot answered, Oui, moi, et je sçais bien faire, "Yes, I ; and I know well enough how to do it" ; and made the chuck, four or five times, that people use to make to chickens when they call them. I set down the words of this worthy dialogue in French, just as Prince Maurice said them to me. I asked him in what language the parrot spoke ? and he said, in Brazilian. I asked whether he understood Brazilian ? he said no: but he had taken care to have two interpreters by him, the one, a Dutchman that spoke Brazilian, and the other, a Brazilian that spoke Dutch ; that he asked them separately and privately, and both of them agreed in telling him just the same thing that the parrot had said. I could not but tell this odd story, because it is so much out of the way, and from the first hand, and what may pass for a good one ; for I dare say this prince, at least, believed himself in all he told me, having ever passed for a very honest and pious man. I leave it to naturalists to reason, and to other men to believe, as they please upon it ; however, it is not, perhaps, amiss to relieve or enliven a busy scene sometimes with such digressions, whether to the purpose or no.'"

This anecdote may "relieve or enliven a busy scene sometimes," but, like so many similar ones of a circumstantial character,[1] it only possesses a historical, not a factual, value.

[1]We may recall here the story of Balaam's ass: "And the Lord opened the mouth of the ass, and she said unto Balaam, What have I done unto thee, that thou hast smitten me these three times ? And Balaam said unto the ass, Because thou hast mocked me : I would there were a sword in mine hand, for now I would kill thee. And the ass said unto Balaam, Am not I thine ass, upon which thou hast ridden ever since I was thine unto this day ? Was I ever wont to do so unto thee ? And he said, Nay." (Numbers, xxii., 28-30.)

11. Conclusion.

We have not ventured in this Chapter on more than a bald statement concerning the colossal complexity of human behaviour and the primitive simplicity, by comparison, of animal behaviour, and the establishment of the probability that the immediate cause of this difference is limitless ability on the part of human beings, and complete inability on the part of animals, to profit freely by the achievements of their respective kinds.

In the three subsequent Chapters we shall seek to ascertain the precise nature and basis, as well as the profounder implications, of man's distinctive mentality.

CHAPTER V.

THE DISTINCTIVE NATURE OF MAN.

1. *Recapitulation of Last Chapter.*

OUR analysis of the diversified life and work of a certain human being has afforded us a glimpse of man's sweeping sphere of activity. The wealth presented we perceived to be broadly divisible into (extra-organismal) tools and tool-made objects of a material and mental character. Everywhere we encountered these and we saw that if we ignored them, human life as we know it would fade away and an enigmatic mark of interrogation would remain behind. Human life, that is, cannot be divorced from extra-organismal tools, without rendering it meaningless. They sway man's entire existence and to disregard them would constrain us to think of man not as civilised but as a brute, as he existed in pre-eolithic times before he became a fashioner of material and mental tools.

Examining the tools, we found that they could almost invariably boast of a pedigree which beggars that of our most ancient aristocratic families, since it reaches back to man's emergence from animality. In other words, our tools are evolved from ever simpler or different tools, and the history of a tool is intimately bound up with the history of tools in general. This is more especially exemplified in complex tools, such as a recondite mathematical formula or a great cathedral organ.

Entering more minutely into the significance of tools, we learnt that an incalculably great number has been evolved through the ages; that tools are distributed among peoples, periods, and individuals with extraordinary inequality; that regarded chronologically, from the times of speechlessness and unfashioned flint tools to the era of encyclopedias and dynamos to-day, they demonstrate the reality and stupendousness of general progress; that they irresistibly point to a steadily increasing cooperation between individuals and peoples, from the narrow exclusiveness of primeval human hordes to the all-inclusiveness to-day of international gatherings and associations embracing practically every people on the face of the earth; and that the very capriciousness of their distribution and improvement and the exceedingly slow rate of historic, and more particularly of pre-historic, progress suggest that practically all human beings possess potentially, or virtually, the same infinitesimal power of improving tools and tool-made products and the same possibility of rising limitlessly in the scale of being.

The above conclusions, which we shall attempt to justify later in detail, we summed up in four dynamic laws of human development.

What, then, is to account for this prodigious difference between animals who possess no tool-made tools and man who possesses countless thousands of these ? Seeing that tools have a history as old as the human species itself and that there is an unmistakable historic tendency for human collaboration to become universal and thoroughly organised, we inferred, and also sought to prove, that causally the vital distinction between man and animals lies in men being specio-psychic—dependent for the adequate satisfaction of their nature on profiting by the thoughts of their fellows near and far in space and time and that animals are individuo-psychic—dependent first and foremost on themselves as individuals, including, in certain instances, instinctive cooperation within groups limited in space and time.

This at once clarified man's genealogical position. Assuming that he is physically, in regard to easily recognised characters, little removed from the man-like apes, as Huxley and later anatomists have conclusively proved, we cannot imagine that his general mental structure should, quantitatively or qualitatively, immensely diverge from the mental structure of the apes. We are therefore not surprised to find, as shown in Chapter III., that the needs, senses, feelings, and intellectual attributes of man correspond somewhat closely to those of the higher animals. Men's chief peculiarity lies hence in their being able to supplement their own intelligence by that of the generality of their fellows. But, if this be so, we can understand how it is that, their cultural environment differing indefinitely, men, peoples, and ages differ enormously, almost infinitely beyond anything noticeable in the animal kingdom. We assume therefore that in mentality man is by nature only measurably superior to the Anthropomorpha ; but that, nevertheless, he almost immeasurably transcends and excels them mentally because of men's unique capacity of being able to assimilate the substance of the thoughts and sentiments of all their kind. It is evidently owing to this factor, *and to no other,* that the human life of the present age (and *a fortiori* of the ages to come) is almost infinitely richer, more varied, improved, and integrated than that of eolithic times. To assign any but the leading place to the cumulative or specio-psychic factor in explaining the respective achievements of men and animals is consequently, we saw, to overlook what alone is decidedly material to the issue. Man, according to this view, is in every respect, bodily and mental, an animal, one of the Primates, *except* for his specio-psychic attribute and what it involves.

The search for material homologies and the comparative improbability, from a general biological viewpoint, of man being more than a higher type of ape, hid from Darwin and from many of his followers what to us in this work is becoming more and more an unquestionable and momentous verity. That older view was practically inevitable in the circumstances. Unfortunately, such a manner of conceiving the

solution of the problem of man's position among living beings became traditional and obscured the issue, thus minimising the prospect of a consensus of opinion among men of science to the effect that man, and man alone, is a specio-psychic being and that specio-psychism, and specio-psychism alone, accounts for his potentially infinite superiority over animals.

2. *Analysis of Darwin's View of Human and Animal Mentality.*

Since we are now at the cross roads between the inferential and the factual view of human life, we trust we shall be pardoned for dwelling on this aspect.

In perhaps the most striking passage germane to this point, Darwin picturesquely imagines certain apes comparing themselves to men: "An anthropomorphous ape, if he could take a dispassionate view of his own case, would admit that though he could form an artful plan to plunder a garden—though he could use stones for fighting or for breaking open nuts, yet that the thought of fashioning a stone into a tool was quite beyond his scope. Still less, as he would admit, could he follow out a train of metaphysical reasoning, or solve a mathematical problem, or reflect on God, or admire a grand natural scene. Some apes, however, would probably declare that they could and did admire the beauty of the coloured skin and fur of their partners in marriage. They would admit, that though they could make other apes understand by cries some of their perceptions and simpler wants, the notion of expressing definite ideas by definite sounds had never crossed their minds. They might insist that they were ready to aid their fellow-apes of the same troop in many ways, to risk their lives for them, and to take charge of their orphans; but they would be forced to acknowledge that disinterested love for all living creatures, the most noble attribute of man, was quite beyond their comprehension." (*Descent of Man*, pp. 125-126.)[1]

[1]It would be difficult to find a more cautious and conscientious thinker than L. T. Hobhouse. Yet in his *Mind in Evolution* there is no attempt to ascertain men's differential inborn mental status, *i.e.*, what, in comparison with the highest animals, men could achieve if deprived of the benefit of the cultural heritage. Secondly, whilst as is common with authors, Hobhouse seeks to fix the novel factor in the mental make-up of man, he does not see that the importance of this factor lies wholly in the consequent result—in men's unique ability to multiply their own powers almost infinitely through learning freely from their fellows near and far in space and time. Consistent with this double oversight, there is no attempt to explain the infinite variety in the cultural attainments of epochs, peoples, and individuals in terms of cultural causes or on any other principles and his novel factor represents a sheer mutation, in no way suggested by the mentality of man's nearest animal relations. Hence his whole work is vitiated by a vagueness which tends to rob it of all solidity. Hence, too, he fundamentally occupies Darwin's position in the above citation, as the following passage, among others, illustrates: A dog or ape "has a self, *i.e.*, a pervading identity and permanent character, is aware at least of its present needs and seeks to satisfy them. What we miss is evidence that the self is present to it as a persistent identity in such a way, for example, as to shape the choice of immediate ends by considerations of lifelong welfare." (p. 312.) Exactly like Darwin, Hobhouse here omits to notice that such considerations

Here we have creatures compared as if there were no other distinction between them than that of *inherited* inferiority and superiority. The difference, in Darwin's opinion, is one of degree and not of kind. Yet the anthropomorphous ape is congenitally confined to the exploitation of its own thought, whilst the man who thinks of fashioning "a stone into a tool," who follows out "a train of metaphysical reasoning," who solves "a mathematical problem," reflects "on God," admires "a grand natural scene," expresses "definite ideas by definite sounds," has, because of his distinctive native outfit, been able post-natally to incorporate into his mentality the quintessence of the thoughts and sentiments of the thousands of millions of his kind, living and dead.

To select a particular example for analysis. In many a passage Darwin recurs to the existence among men of a belief in a Supreme Being, a belief which some thinkers had alleged sharply divides man from the animal world. Yet the modern concept of a deity as a being omnipresent, eternal, omnipotent, omniscient, and omnibenevolent, with all that is narrow, unjust, and cruel excluded, is a product of ever-advancing thoughts and sentiments; in fact, a practical embodiment of these. Earliest man was entirely deficient in such comprehensive and refined concepts. The idea of immortality only slowly evolved. The spiritual world seemed at first to man a mere double of the present world, as is well illustrated by *The Book of the Dead.* Animism and fetichism only gradually developed into a belief in spirits other than human beings and animals and on a different plane. Initially polytheism incorporated beings not more than appreciably superior to men. Only the imagined organisation of the under- and over-world on the model of earthly experience suggested more or less powerful transmundane rulers and when a supernatural over-lord was evolved, he exhibited most of the foibles and imperfections of a worldly over-lord: *e.g.,* in the Middle Ages God was conceived as a being possessing unlimited power and, like an over-lord, justified in using it as he pleased, ruthlessly punishing rebellion against himself or his commands and bountifully rewarding those who were loyal to him. To-day, again, as we saw, the concept of the deity among the *élite* of mankind is expressive of all that is deemed highest in our civilisation. Consequently, since the modern God idea is the product of ages of human thought, we could not conceivably contemplate apes, who are individuo-psychic, possessing that idea, unless the ape was, indeed, as regards native capacity, almost infinitely superior to individual men.

To render the comparison valid, we should have to compare the ape with an utterly uncultured man. If we succeeded in discovering

appear only as the outcome of a long cultural evolution. In a word, there can be no valid comparison between the mentality of men and animals so long as the precise magnitude of man's innate mental capacity and the influence of the inter-learning factor have not been, at least approximately, ascertained.

such an one, Darwin's ape would find little to admire in him and scarcely anything to distinguish the contents of that man's mind from those of his own. Only this he might say of that weird specimen of humanity : "Whilst you seem for all intents and purposes like me, only more consecutively and actively interested in the world around and especially in the doings of your fellows, you possess *potentially* the power, through your specio-psychic nature, of becoming a fashioner of tools, a metaphysician, one who reflects on God and admires a grand natural scene, who can express his thoughts in words, and whose love knows no bounds. In your meditations you have *potentially* the opportunity of being yourself plus billions of others, whereas I, poor creature, am doomed to remain for ever without this advantage of profiting by others' thoughts to any degree worthy of notice. Were I mentally only a little more advanced by nature, I could freely learn from others and, like you, achieve great things under certain favourable historical and social conditions."

Thus whilst Darwin is strictly correct in his statement as to the relative potentialities of ape and man, he overlooks the fact that the high culture implied in his comparison is a specio-psychic product. That is, exclude the racial heritage and a bare potentiality remains without any greater or nobler cultural content than that to be found in the minds of our pre-eolithic ancestors who did not fashion tools, who were not metaphysicians, who neither reflected on God nor admired a grand natural scene, who could not express their thoughts in words, and whose love had narrow bounds.

To Darwin everything is apparently a matter of gradation : "We must admit," he contends, "that there is a much wider interval in mental power between one of the lowest fishes, as a lamprey or lancelet, and one of the higher apes, than between an ape and man ; yet this interval is filled up by numberless gradations." (*Ibid.*, p. 65.) Here Darwin does not take into account that the ape and man are very closely, and that the lancelet and the ape are very remotely, related, thus rendering the analogy dubious. Besides, and this is the focal point, ape and lancelet agree in that for all intents they can only benefit by their own individual experience. Both therefore differ equally and to the same degree in this fundamental respect from human beings who can benefit by the experience of their whole kind.

Here is another passage admirably exemplifying Darwin's unfortunate disregard of the specio-psychic factor : "The savage and the dog have often found water at a low level, and the coincidence under such circumstances has become associated in their minds. A cultivated man would perhaps make some general proposition on the subject ; but from all that we know of savages it is extremely doubtful whether they would do so, and a dog certainly would not. But a savage, as well as a dog, would search in the same way, though

frequently disappointed; and in both it seems to be equally an act of reason, whether or not any general proposition on the subject is consciously placed before the mind. The same would apply to the elephant and the bear making currents in the air or water. The savage would certainly neither know nor care by what law the desired movements were effected; yet his act would be guided by a rude process of reasoning, as surely as would a philosopher in his longest chain of deductions. There would no doubt be this difference between him and one of the higher animals, that he would take notice of much slighter circumstances and conditions, and would observe any connection between them after much less experience, and this would be of paramount importance." (*Ibid.*, p. 77.)

And yet any savage with whom modern man is acquainted is saturated with the thoughts of his fellows and a savage's attitude to his environment cannot be therefore conceived as being in principle identical with that of the dog or pike who is individuo-psychic. Only if we abstracted man's traditional knowledge—what is most distinctive of him,—could he be justifiably compared to dog or fish.

It would be tedious to pile Pelion on Ossa. Suffice it to state that Darwin's interesting chapters on the moral sense and on the development of civilised nations equally assume that man is comparable with animals and that human progress is first and foremost due to the action of natural selection and the inheritance of long-practised habits. The specio-psychic factor slips through the fine meshes of his mind here as everywhere else. He misses the paramount pan-species character of man's mentality. He posits tacitly and overtly the occurrence of such frequent and rapid changes in man's innate mental structure, as are unrecorded in the whole animal creation. Nor does Darwin adduce any reason why, if man so rapidly alters and men so enormously differ, individual species of animals should not exhibit, even distantly, analogous divergences. In fact, in order to bring man under the hypothetical individuo-psychic law, Darwin unconsciously violates the universally observable law of the virtual stability and homogeneity of species.

The more scrupulous, then, our examination of man's nature, the more convinced we become that an abysmal gulf is fixed between animals and man, animals being individuo-psychic and man specio-psychic. Hence, relatively, follows the strictest uniformity and simplicity within individual animal species and the most copious variety and complexity within the human race.[1]

[1]Darwin was too broadminded and largehearted to overlook completely the factor of collective thought in mankind. On diverse occasions he refers to "habit, instruction, and example," a favourite expression of his; to the influence of religion and science; to accumulated knowledge; to culture, and the like; but these factors never have assigned to them a commanding, or even a conspicuous, part. They are touched on incidentally, their deeper implications being apparently unsuspected.

Abstractly, it might seem that Darwin's views, as above expressed, possess scarcely more than an historical interest, considering that his *Descent of Man* appeared in 1871. Unfortunately this is not the case. This may be illustrated by a recent work *What is Man?* (London, 1923), the author of which is Prof. J. Arthur Thomson, the most distinguished populariser of biological subjects in Great Britain. It is true that Prof. Thomson rarely forgets the cultural factor; but for him it is one factor among many and he assigns no basic importance to it. For this author the history of mankind is in no way dominated or explained by this factor. He proceeds repeatedly on the supposition that biological causes are at work where the specio-psychic theory assumes cultural ones. Natural selection and natural variation are frequently presumed to act when the question might be at least raised whether the inter-learning factor does not partly or wholly explain the facts.

"The emergence of a human genius" (p. 17) is for Prof. Thomson evidence that mutations are facts. He is so impressed with this that he repeats this statement later (p. 135),[1] imagining apparently that the proposition need not be probed because it is self-evident. Indeed, for him "primitive man expressed a mutation, a sudden uplift, separating him by a leap from the animal" (pp. 28-29). "Man's mutation included a great advance in the power of language, which added enormously to his stability and progressibility." (p. 33.) Besides, "Mutations in man include healthy gigantism, well-proportioned dwarfness, artistic skill, mathematical vision, genius of any kind, a roving disposition, having fingers all thumbs, calculating capacity, colour-blindness, and so on." (p. 136.) How simple! Research becomes thus wholly superfluous. Again, we read: "The repulsive habits of some tribes, such as promiscuity, are relapses to the animal, not primitive traits of mankind." (p. 29.) Might they not be due to cultural aberrations? Primitive man, according to Thomson, "was clever, kindly, adventurous, inventive, and very variable." (p. 31.) He pleads for "adequate recognition of the survival-value of gentleness, self-subordination, and mutual helpfulness," and adds "We suspect that those who had not more than a little of these qualities were eliminated." (p. 32.) And the process of advance is childishly simple. Here is an example. "Nature's sowing is evident to the observant eye, why not imitate it? We can picture early man being struck with the big kernels of the wild wheat which still grows on Mount Hermon, rubbing away the chaff in his hands, blowing the grains clean, and then enjoying them. He would make up his mind to sow this wheat." (p. 44.) Speaking of "the question of the mental difference between man and animals," he states: "The big differences seem to us to be man's capacity for looking at himself objectively, for framing and experimenting with general ideas and controlling conduct in relation to them, and for expressing judgment in language." (p. 76.) Thus men's capacity to increase their mental powers indefinitely through assimilating the thoughts of their whole kind, is not comprised among "the big differences." "Some races have shown greater advances than others, pointing" (how simple) "to innate differences in rate and intricacy of mental processes." (p. 78.) For Prof. Thomson animal and man are on the same plane: "The social heritage may include permanent products, such as a hive, a termitary, an ant-hill, a beaver village, and in these there is a registering of gains." (p. 87.) Yet our author omits to notice, as we have shown and as we shall see, that cultural evolution is *absolutely* non-existent among animals and that, on the other hand, it is the very life-breath of mankind. Among racial characters he mentions "temperament and intelligence." And he continues: "Here we have to do with the differences between Jew and Gentile, British and Japanese, White Man and Negro, and so forth." (p. 125.) Family peculiarities include "intellectual and temperamental characteristics, such as mathematical or musical talent, or a roving disposition." (p. 125.)

The sifting of early mankind was through natural selection: "In early days, before his foothold was strong, man was mainly in the grip of Natural Selection. There were wild animals disputing his claims, and men who were clumsy, dull, or foolhardy would be eliminated. There were plants to be tested, and men who were incautious when hungry, or forgetful of the fruits which made them ill, would be eliminated. There were shelters to be found or built, storms and floods to be avoided or foreseen, hard times to be provided for, and there must have been a long process of sifting which got rid of many of the shiftless and thriftless. These were the days of Nature's winnowing. There can be no doubt they meant much." (p. 147.) That cultural selection might account for perhaps all this, does not occur to our author. And he continues in this Darwinian vein: "Early man competed with beasts of prey, and it was doubtless good for him, for it meant eliminating the dull and reckless, fostering the brave and resourceful." (p. 152.) We are

[1]To the same effect, in his *Darwinism and Human Life*, London, 1909, p. 123.

not surprised, then, that Prof. Thomson is a eugenist: "For the individual, there is no doubt that Eutopias and Eutechnics count for much, but Eugenics goes deeper, touching the race." (p. 163.) Yet it is eutechnics alone which accounts for our being more than super-apes. "Climate," Prof. Thomson says, "is a very important evolution-factor. In Mr. Huntington's *Red Man's Continent* it is pointed out that the American Indians are endowed with a relatively conservative type of mind. They are observant, patient, enduring, but lacking in originality, adaptiveness, inventiveness." (p. 173.) Discussing inbreeding, Prof. Thomson writes: "The process was rather the fostering of those types who varied in the direction of repulsion to close endogamy and the elimination of those types who varied in the direction of attraction to close endogamy." (p. 181.)

Thus Darwin's Darwinism is far from obsolete, for a distinguished populariser would never champion a viewpoint which was not widely held. Theoretically it might be argued that we have neglected to examine the evidence whereon Prof. Thomson bases his conclusions. But as a matter of fact, like so many other eminent supporters of the biological view of man's status and historical development, our author is so completely convinced of his position that he dispenses with any attempt at scientific proof. The day must, however, be near when this touching faith in a theory will be subjected to the test of a critical examination. When that day arrives, the specio-psychic theory will stand vindicated, for its sole enemy is superficial observation followed by naïve inferences.

3. *The Specio-Psychic Theory Widely Canvassed.*

Of course, the specio-psychic theory, conceived crudely and without regard to a scientific basis, is not the author's own invention or discovery. In reality, the imposing part which tradition plays in human development is being more and more widely and emphatically recognised, as the following remarkable extracts illustrate:—

Auguste Comte taught the interdependence of individuals and generations. He says: "He who should imagine that he is independent of his fellows, in his feelings, his cogitations, or his actions, could not even formulate such a blasphemous thought without being immediately contradicted by the fact that the very words he employs in this process are borrowed." (*Système de politique positive*, vol. 1, 1851, p. 221.) In instituting the religion of humanity, he laid supreme emphasis for the first time in history on men's close dependence on mankind, asserting that "man, strictly speaking, is a pure abstraction; nothing is real but humanity, above all in the intellectual and moral order."

G. H. Lewes is among those who have shown profound insight into the problem. In his *Study of Psychology*, 1879, he reasons: "In relation to nature, man is animal; in relation to culture, he is social. As the ideal world rises above and transforms the sensible world, so culture transforms nature physically and morally, fashioning the forest and the swamp into garden and meadow-lands, the selfish savage into the sympathetic citizen." (p. 71.) So far as culture is concerned, "the savage has by no means so great an intellectual and moral superiority over the ape as the highly cultured modern has over the savage." (p. 144.) "History shows how individual experiences become general possessions, and individual labours become wealth; how facts become science, and industries commerce. The shifting panorama of history presents a continuous evolution, a fuller and more luminous tradition, an intenser consciousness of a wider life." (p. 153.) "The physiologist recognises the same organs and functions in the savage and the civilised, in Greek, Hindoo, old German, or modern European; but not the same thoughts and sentiments. The brain of a cultivated Englishman of our day, compared with the brain of a Greek of the age of Pericles, would not present any appreciable differences, yet the differences between the moral and intellectual activities of the two would be many and vast. These are not to be assigned to the organism and its functions. The co-ordination of sensory processes in the brain of the Greek was doubtless as perfect as that in the brain of the Englishman; but the quality of the moral feelings and the range of conceptions, so far as we could test them objectively would be very different. The Englishman has been nourished on the products of the centuries; his feelings and thoughts have taken form under conditions unknown to the Greek, so that what would have delighted the one is anguish to the other. The sight of a wounded foreigner, which agitates the Englishman, and prompts him by its very imagination to undertake hardships and dangers in the effort to relieve the sufferer, would have excited no more emotion in a Greek than

the sight of an injured dog. A proposition to send money, food, clothing, and medical aid to the relief of the wounded Cretans would have made the Agora ring with shouts of derisive laughter. And a treatise on algebra which is mastered by a schoolboy would have been like a wizard's scroll to Pythagoras and Hipparchus. Aristotle, with all his knowledge and aptitudes, would be as a child in Liebig's laboratory. So great has been the evolution of moral sentiments and scientific conceptions. Thus, while the laws of the sentient functions must be studied in physiology, the laws of the sentient faculties, especially the moral and intellectual faculties, must be studied in history." (pp. 153-154.) "Civilisation is the accumulation of experiences." (p. 166.) "What I have directly experienced by sensible contact forms but a small part of my mental wealth; and even that part has been largely determined by the experience of others. The consolidations of convergent thought in social forms, scientific theories, works of art, and, above all, language, are incessantly acting on me." (p. 166.)

D. G. Ritchie champions, on the whole, a similar standpoint: "It seems very doubtful whether, except in fairy tales or romances, the child brought up away from its parents and in complete ignorance of them (for this also is essential to a fair experiment) would present any of their moral characteristics in a definite form." (*Darwinism and Politics*, London, 1891, pp. 44-45.) "An energetic or apathetic temperament, a cool or a nervous temperament is transmitted; but it seems very doubtful how far mere inheritance goes beyond that." (*Ibid.*, p. 45.) "To explain Roman institutions by the national character of the Romans is, as Dr. Reich says, just like explaining phenomena by means of 'occult qualities.' People in general are far too ready to refer the differences they find between nations to race-characteristics, instead of taking the trouble to look for other explanations first, in geographical conditions, institutions, past history and other external influences. Only when we have eliminated what is due to any or all of these causes (if we ever can do this), are we entitled to ascribe the residual phenomena solely to race-characteristics." (*Ibid.*, p. 129.) "This capacity of social inheritance is *the* great advantage that mankind possesses over the brutes; and the greater perfection in the modes of transmitting experience constitutes the advantage of civilised over uncivilised races. I have already suggested a definition of civilisation as 'the sum of those contrivances which enable human beings to advance independently of [biological] heredity'." (*Ibid.*, p. 132.) "By means of language and of social institutions we inherit the acquired experience, not of our ancestors only, but of other races in the same sense of 'inheritance' in which we talk of people inheriting land or furniture or railway shares. Language renders possible an accumulation of experience, a storing up of achievements, which makes advance rapid and secure among human beings in a way impossible among the lower animals." (*Ibid.*, pp. 100-101.)

Archdall Reid is emphatic: "If the child of refined and educated English parents were reared from birth by African cannibals, then in body, when grown, the child would resemble its progenitors more than his trainers. Does anyone believe that the same would be true of his mind? . . . The English child we imagined as reared by African savages would certainly display no hint of the language and general knowledge of his parents, no tincture of their moral, social, religious and political ideals and aspirations. He would ruthlessly murder and enjoyingly eat the stranger. He would harry the stranger's property and annex the stranger's wives by the wool of their heads whenever practical. He would treat his own wives as beasts of burden, and perhaps thrash them as a matter of routine. His æsthetic ideals would be satisfied by a little paint, some beads, and plenty of grease; his moral ideas by a homicidal devotion to the tribal chief. His god would be the tribal fetish, to whom he would offer human sacrifices. He would go naked and unashamed." (*The Laws of Heredity*, London, 1911, p. 420.)

The converse opinion—of the great cultural possibilities inherent in "savages"—is expressed with no less freshness and vigour by Thomas Reid, the founder of the philosophy of common sense. Lest, however, his statement should appear extravagant to some readers, the author may premise that opinions not less bold than Reid's are expressed to-day by high authorities intimately conversant with the subject. "The two-legged animal that eats of nature's dainties, what his taste or appetite craves, and satisfies his thirst at the crystal fountain, who propagates his kind as occasion and lust prompt, repels injuries, and takes alternate labour and repose, is, like a tree in the forest, purely of nature's growth. But this same savage hath within him the seeds of the logician, the man of taste and breeding, the orator, the statesman, the man of virtue, and the saint; which seeds, though planted in his mind by nature, yet, through want of culture and exercise, must lie for ever buried, and be hardly perceivable by himself or by others." (*An Inquiry into the Human Mind*, London, 1785, p. 7.)

Lloyd Morgan expresses himself as follows: "Mental progress is mainly due, not to inherited increments of mental faculty, but to the handing on of the results of human achievement by a vast extension of that which we have seen to be a factor in animal life, namely tradition." (*Habit and Instinct,* 1896, p. 334.) Again, "Intellectual evolution, whether of primary or secondary value, is no longer by increment of human faculty, but by summation and storage in the environment it creates." (*Ibid.,* p. 334.) He enters into details in one passage: "Evolution has been [in man] transferred from the organism to his environment. There must be increment somewhere, otherwise evolution is impossible. In social evolution, on this view, the increment is by storage in the social environment to which each new generation adapts itself, with no increased native power of adaptation. In the written record, in social traditions, in the manifold inventions which make scientific and industrial progress possible, in the products of art, and the recorded examples of noble lives, we have an environment which is at the same time the product of mental evolution, and affords the condition of the development of each individual mind to-day. No one is likely to question the fact that this environment is undergoing steady and progressive evolution. It is not perhaps so obvious that this transference of evolution from the individual to the environment may leave the *faculty* of the race at a standstill, while the *achievements* of the race are progressing by leaps and bounds. This is no new doctrine. Buckle, in his *History of Civilisation* [London, 1869, vol. 1, p. 178], wrote as follows: 'Whatever, therefore, the moral and intellectual progress of men may be, it resolves itself not into the progress of natural capacity, but into a progress, if I may say so, of opportunity; that is, an improvement in the circumstances under which that capacity after birth comes into play. Here, then, is the gist of the whole matter. The progress is one, not of internal power, but of external advantage. The child born in a civilised land is not likely, as such, to be superior to one born among barbarians; and the difference which ensues between the acts of the two children will be caused, so far as we know, solely by the pressure of external circumstances; by which I mean the surrounding opinions, knowledge, associations, in a word, the entire mental atmosphere in which the two children are respectively nurtured.' No doubt the case is here overstated," continues Lloyd Morgan, we think unjustifiably. "It would probably be more correct to say that the differences in natural capacity between the civilised and barbarian infant are due to natural selection; the rest being due to 'the mental atmosphere.'" (*Ibid.,* pp. 340-341.)

Gumplowicz wrote: "No qualitative difference exists between the human mind of 4,000 years ago and that of to-day, nor does the latter show a greater development in perfection. However, the achievements of the intervening generations redound to the benefit of the human mind now and, with these achievements assimilated, the mind of our time performs seemingly much greater wonders than the mind of 4,000 years ago could have performed. Discounting these later achievements, the earlier mind may be said to have performed no smaller wonders." (*Grundriss der Soziologie,* Vienna, 1885, pp. 223-224.)

August Weismann, the famous upholder of Darwinism, writes in his *Essays on Heredity and kindred Biological Problems,* vol. 2, 1902: "The development of animals transforms one species into another and changes the physical nature; but what we generally understand by the intellectual development of mankind by no means necessarily entails any physical alteration even in the brain itself: it is indeed quite independent of such change. Such development represents *an increase in the intellectual acquirements of mankind as a whole:* this is the origin of civilisation using the term in its widest sense and applying it to all the numberless directions taken by civilising forces. Man, availing himself of tradition, is able, in every part of the intellectual domain, to seize upon the acquirements of his ancestors at the point where they left them, and to pursue them further, finally himself leaving the results of his own experience and the knowledge acquired during his life-time, to his descendants, that they may carry on the same process. This method of progress is most clearly shown in the history of science, and especially in that of natural science, which deals with an immense number of facts and experiences which have been very slowly acquired, collected, and transmitted to descendants during many centuries of civilisation; and in this way alone could the present state of our knowledge have been reached. The human being of to-day can be easily raised, by a short period of training, to this stage from which, if he be successful, he may make one or more onward steps. . . . The fact that we can now solve more difficult problems than at the beginning of this century, or in Aristotle's day, does not depend on any increase in the capacity of the human brain or any improvement in the delicacy of the faculty of observation; but it depends upon the heritage which we have received from our ancestors." (pp. 50-52.) "This [the power of transmitting the intellectual achievements of each generation to those who follow],

more than anything, is the cause of the superiority of man over animals—this, and not merely human faculty, although it may be admitted that the latter is much higher than in animals. And even if we were compelled to believe that human faculty has reached its limits and can never be increased again, even then we need not despair of the almost boundless progress of mankind. For each generation always starts from the acquirements of the preceding one; and the living child placed from the very first by tradition upon a somewhat greater height of intellectual achievement than that of his predecessors, is then able, with the same powers, to climb yet higher up the steep slope of the most advanced civilisation. Hence, even if our intellectual powers have reached the highest possible stage, human civilisation will nevertheless advance, however far we may look forward,—the conquests of the mind of man will never cease." (pp. 69-70.)

W. McDougall says: "Whereas animal species have advanced from lower to higher levels of mental life by the improvement of the innate mental constitution of the species, man, since he became man, has progressed in the main by means of the increase in volume and improvement in quality of the sum of knowledge, belief, and custom, which constitutes the tradition of any society. And it is to the superiority of the moral and intellectual tradition of his society that the superiority of civilised man over existing savages and over his savage forefathers is chiefly, if not wholly, due. . . . All that constitutes culture and civilisation, all, or nearly all, that distinguishes the highly cultured European intellectually and morally from the men of the Stone Age of Europe, is then summed up in the word 'tradition.' . . . National characteristics, at any rate all those that distinguish the peoples of the European countries, are in the main the expressions of different traditions." (*Introduction to Social Psychology,* 1928, pp. 282-284.) In his *The Group Mind,* 1927, McDougall appears to express diametrically opposite views, as we saw in the last Chapter.

L. T. Hobhouse affirms: "It is quite conceivable that with no change in the average level of racial capacity, the cumulative efforts of generations to better their life might produce a very great change in the social structure, and in point of fact it appears to be mainly by such a process of the summation of effort that the actual achievements of mankind have been effected." ("The Value and Limitations of Eugenics," in *The Sociological Review,* October 1911, p. 281.) "It is not human quality, whether original or acquired, that differs profoundly from period to period. It is the turn given to human quality by the social structure." (*Ibid.,* p. 291.) Or more precisely: "The rudiments of instruction which an ape, a cat, or a bird can furnish to its young, are limited to a few acts of restraint and encouragement, supplementing, or, rather, anticipating, the lessons which individual experience would teach. In human society, on the other hand, tradition goes to the root-principles of action, both as shaping the ends recognised as desirable, and as furnishing rules or methods of which but few could be found out in the course of individual experience, and those only by exceptionally gifted or exceptionally fortunate persons. In a word, tradition as based on the Universal brings the experience of the race to bear on individual conduct in a new sense. If we are right in holding that instinct is due to heredity, while heredity works through natural selection, then, as we have already seen, there is a sense in which instinct itself utilises the experience of the race to guide the individual. What is performed at that stage by the constant elimination of the majority of the individuals born, and by the stereotyping of the structure of those which survive, is executed at this higher stage by the organisation of the experience of those who have lived, and rests upon the plasticity of those who learn by it. In short, at this stage, we have organised racial experience largely taking the place of that hereditary structure which represents the result of an infinity of conflicting and chaotic experiences in past generations. In fine, in the highest animal species, instinct lays the ground plan of conduct, within which details may be remodelled by individual experience. In the human species, the ground plan is itself reconstituted by the organised experience of the race." (*Mind in Evolution,* 1901, pp. 319-320.) Again, "Tradition is, in the development of society, what heredity is in the physical growth of the stock. It is the link between past and future; it is that in which the effects of the past are consolidated and on the basis of which subsequent modifications are built up. We might push the analogy a little further, for the ideas and customs which it maintains and furnishes to each new generation as guides for their behaviour in life are analogous to the determinate methods of reaction, the inherited impulses, reflexes, and instincts with which heredity furnishes the individual. The tradition of the elders is, as it were, the instinct of society." (*Social Evolution and Political Theory,* New York, 1911, p. 34.)

Cattell, though a hereditarian, recognises the influence of culture. He says: "What we now are—as men—depends chiefly on social tradition; withhold it for

a generation and we should revert to savagery and further." ("A Statistical Study of Eminent Men," in the *Popular Science Monthly*, February 1903, p. 361.)

W. I. Thomas, in his *Sex and Society*, Chicago, 1907, swells the chorus: "If, then, we make due allowance for our instinctive tendency as a white group to disparage outsiders, and, on the other hand, for our tendency to confuse progress in culture and general intelligence with biological modifications of the brain, we shall have to reduce very much our usual estimate of the difference in mental capacity between ourselves and the lower races, if we do not eliminate it altogether; and we shall perhaps have to abandon altogether the view that there has been an increase in the mental capacity of the white race since prehistoric times." (p. 262.)

R. S. Woodworth, in an admirable study ("Racial Differences in Mental Traits," in *Science*, 4th February 1910), thus epitomises the problem of culture and heredity: "We are probably justified in inferring from the results cited that the sensory and motor processes, and the elementary brain activities, though differing in degree from one individual to another, are about the same from one race to another." (p. 179.) And "simple sorts of judgment, being subject to the same disturbances, proceed in the same manner among various peoples." (p. 180.) Professor Woodworth recognises that modern cultural advance cannot be explained biologically: "German culture to-day is much advanced from the days of Cæsar; shall we infer that the mental endowment of the Germans has advanced in like measure? Biologically, the interval, measured in generations, is not long, and from all biological considerations it is improbable that any advance in mental endowment has occurred. . . . We are still not many generations removed from witchcraft, curses, magic and the like savage beliefs and practices, and we cannot reasonably believe our recent forefathers to have been naturally more savage than we are." (pp. 181-182.)

Edward Bellamy, in *The Contemporary Review*, January 1890, well sums up the specio-cultural view: "All that a man produces to-day more than did his cave-dwelling ancestor, he produces by virtue of the accumulated achievement, inventions, and improvements of the intervening generations, together with the social and industrial machinery which is their legacy."

F. H. Hayward's view may commend itself to those who wish to make some allowance for the factor of heredity: "Let us suppose that two children are born of the same parent, and that certain of their *natural* endowments are in the ratio of 1:2; *i.e.*, one child is twice as capable as the other. They go to the same school, have the same environment, &c. When middle-aged, they are still found to differ considerably. 'The power of nature!' says some one. Or the inferior child may receive the better education, and yet remain inferior to his brother. 'The power of nature!' is again the comment. But this is to ignore the great mass of common acquirement which has civilised *both* of the children to much the same extent. If we wish to learn the real power of 'nurture,' we must consider two children brought up in widely different environments—*e.g.*, one among Red Indians, the other among Europeans. Supposing that the ratio of inherited quality is 1:2, children brought up in an English environment may, by middle age, be represented by the ratio 19:20; *i.e.*, the difference in innate ability is as great as ever, and is noticeable at once, but the great mass of acquired motives and ideals, common to the two, is not noticed at all." (*Education and the Heredity Spectre*, London, 1908, pp. 133-134.)

Victor Branford and Patrick Geddes, in *Our Social Inheritance* (London, 1919, p. xxiv), lay it down that "each one of us is human just in so far as he or she succeeds to this Great Estate of Man and takes possession thereof."

Edwin G. Conklin, writing on *The Direction of Human Evolution* (London, 1921, p. 71) says: "Increasing knowledge of, and control over, nature is the result of the labours of countless individuals, the preservation of these results and the handing down of them to successive generations." In another work (*Heredity and Environment in the Development of Men*, Princeton, 1923, p. 293), he writes: "There has been no perceptible improvement in human heredity within historic times."

Graham Wallas writes: "If the earth were struck by one of Mr. Wells's comets, and if, in consequence, every human being now alive were to lose all the knowledge and habits which we had acquired from preceding generations (though retaining unchanged all his own powers of invention, and memory, and habituation), nine-tenths of the inhabitants of London or New York would be dead in a month, and 99 per cent of the remaining tenth would be dead in six months. . . . After a few years mankind would almost certainly disappear from the northern and temperate zones. The white races would probably become extinct everywhere. A few primitive races might live on fruit and small animals in those fertile tropical regions where the human species was originally evolved, until they had slowly accumulated a new social heritage." (*Our Social Heritage*, London, 1921, p. 18.)

Alfred Korzybski states: "What is to be our definition of man? Like the animals, human beings do indeed possess the space-binding capacity [that is, the capacity of moving freely about in space], but, over and above that, human beings possess a most remarkable capacity which is entirely peculiar to them—I mean the capacity to summarise, digest and appropriate the labours and experiences of the past; I mean the capacity to use the fruits of past labours and experiences as intellectual or spiritual capital for developments in the present; I mean the capacity to employ as instruments of increasing power the accumulated achievements of the all-precious lives of the past generations spent in trial and error, trial and success; I mean the capacity of human beings to conduct their lives, in the ever increasing light of inherited wisdom; I mean the capacity in virtue of which man is at once the inheritor of the bygone ages and the trustee of posterity." (*Manhood of Humanity,* New York, 1921, p. 59.)

De Roberty declares in his *Sociologie de l'action* (Paris, 1908, pp. 22-23) that "the generations that succeed one another in the course of history succumb only physically. Their collective experiences, the social spirit that animated them, do not perish with them. When a generation of men disappears, when it seems to have quitted for ever the stage where the great human drama enacts itself, its spiritual possessions are already entirely transmuted into sciences, into philosophical or religious views, into æsthetic conceptions or art forms, and, also, into practical ideas and activities of every type."

Vernon Kellogg holds similar views: "The soundest of science leads us to the conclusion that man, by virtue of the possession of a social inheritance, as contrasted with the biological inheritance which is all the inheritance that other animal species have, . . . has in his own hands a great instrument for determining the fate of himself as species, the future of mankind." (*Human Life, as the Biologist Sees It,* New York, 1922, pp. 137-138.)

So Viggo Cavling (*The Collective Spirit,* London, 1925, p. 125): "The Collective Mind is the great instructor; it is this, and this alone, which has enabled man, in the course of a paltry hundred thousand years . . to build up the wide ramifications of that civilisation which we now enjoy."

Julian S. Huxley writes: "Not merely since the time of the Greeks, but probably for about fifty thousand years, the inherited constitution of the human type has been what it is to-day, and progress has consisted merely in the amassing of more knowledge and more power through accumulated tradition." (*The Stream of Life,* London, 1926, p. 49.)

"The nature of human society and the probable development of human social life," says Charles A. Ellwood, "can be understood only by understanding the differential factor which distinguishes all human groups from all animal groups. This differential factor is culture." (*Cultural Evolution,* New York, 1927, pp. 3-4.)

Even among eugenists the specio-cultural view is gaining adherents. Cyril Burt, in a study on "The Inheritance of Mental Characters," in *The Eugenics Review,* July 1912, concluded as follows: "In the case of man, the most conclusive evidence against the inheritance of acquired mental characteristics is afforded by the history of civilisation. Never have forces acted upon the mind with such persistence and in such numbers as during the historic period; never have habits, memories and ideas been acquired and re-acquired upon so vast a scale. Yet, there is a striking consensus of opinion to the effect that, in the main, the human race has, in its innate qualities, remained practically stationary. In inborn mental constitution the civilised inhabitant of Paris or London to-day is, if anything, inferior rather than superior to the Athenian of the time of Pericles or the Englishman of the time of Shakespeare; and, indeed, if anything, inferior rather than superior to his prehistoric ancestors. The evidence from the size and conformation of their skulls, from the tools and weapons they invented and manufactured, from the rude sculptures and paintings upon their implements and caves suggests that in native ability the primitive peoples inhabiting Europe before the dawn of history were not a whit behind their descendants. Civilisation, therefore, has been an advance in mental content, stored in the environment and re-acquired with each succeeding generation, rather than an improvement in hereditary capacities or an inheritance of the improvements acquired. All that is mentally inherited is the original constitution common to the race and the congenital variations that from time to time spontaneously occur. This is the inference of the most competent authorities." (p. 186.)

Edgar Schuster, another prominent eugenist, concurs in this judgment. (*Eugenics,* London, 1913, p. 158.)

A. M. Carr-Saunders, in his *Eugenics,* London, 1926, p. 96, writing from the same viewpoint, says: "By far the greater part of all that distinguishes us from our Neolithic ancestors may be set down to the social environment."

And in his *Mind of Man*, published in 1902, the present author wrote: "If we cut ourselves off from others, we bid adieu to every vestige of culture and become houseless, clothesless, languageless, artless, and scienceless animals. A cultured man is fed by the many rivers which hurry down the mountains of time." [1]

We may dispense with further augmenting this already swollen list of testimonies in regard to the plausibility of specio-psychism. The view of the pan-human origin of culture is, as we perceive, widely defended. Only this has been done, unfortunately, in occasional or scattered passages limited to bare generalities, or in books where the fundamentals of the subject received passing attention only.[2] The present work, on the contrary, aims first and foremost at a rigorously scientific solution of the central problem of accounting for the stupendous differences in mental status between human beings and animals, on the one hand, and between human beings belonging to the same or different peoples and epochs, on the other.

4. *The Fundamentally Distinctive Nature of Man.*[3]

We shall now seek to establish in precise detail the distinctive nature of man or, more correctly, that part of his distinctive nature which separates him in a fundamental respect from all animals alike.

In the last Chapter we endeavoured to prove circumstantially that all animals without exception are *incapable* of learning freely from others and that even under ideally favourable conditions they never manifest as much as a trace of this capacity. We must now try to demonstrate with equal rigour the complementary truth that all human beings without exception, leaving aside pathological cases, are *capable* of learning freely from others. We shall ascertain, first, how far this holds factually and, subsequently, what exactly are the immediate implications of the process of learning freely from others.

A given child acquires from its parents the language it speaks and many of the customs and usages of its human surroundings. It then frequents the primary school. It learns there to read, write, and spell. It learns arithmetic and the elements of algebra and geometry. It learns also, among other things and in a modest way to begin with, singing, drawing, handwork, dancing, games, history, geography, elementary science, ethicality, religiousness, literature, composition,

[1] Man's dependence on historically developed tools and methods is also assumed in a booklet by Keridon, quaintly entitled *Man: the Prodigy and Freak of Nature; or, an Animal run to Brain*, London, 1906.

[2] Recent American sociological works almost invariably stress, without however explaining, the cultural factor. See, for instance, William F. Ogburn's valuable *Social Change*, with respect to Culture and Original Nature, New York, 1922.

[3] Intelligent animals grow wiser as they grow older because they profit by their experiences and because here and there they slightly improve on their own ways. Man is in the same position, *except* that he can also profit by, and improve on, the experiences and improvements of his whole kind. Learning freely from others (and not a certain degree or kind of individual intelligence) is therefore man's fundamentally distinctive attribute.

grammar, and the rudiments of a second language. In a broad sense, therefore, this child's capacity to acquire what others have to communicate may be presumed to be comparatively limitless as regards subjects and quantity of detail.

What of children generally? The existence in most countries to-day—and no doubt in all countries to-morrow—of compulsory primary schools having approximately identical standards of attainment and covering sometimes the period up to sixteen years of age, provides the answer to this. Moreover, to illustrate the high learning powers of apparently all children, the author may mention that the headmaster of one primary school told him that he made it his duty to see that practically not one of his many hundred pupils should fail in the annual examinations. Accordingly, children generally may be said to be in the same position as our given child.

But are there some children or folk, however few numerically, who are individuo-psychic, namely who, like animals, could not so much as pass the entrance examination to an infant school, or who are incompletely specio-psychic? Universal experience testifies that not a solitary instance is known of a non-pathological human individual who is constitutionally incapable of, or wholly averse to, learning freely from others or who lives a normal life from birth onward outside the range of other human beings, that is, without a particle of socially created culture. So phenomenally rare, in fact, are strictly, or what seem strictly, non-societary human beings and so abnormal do they prove to be when encountered that this in itself offers an impressive testimony to the specio-psychic nature of man. Furthermore, apart from abnormality, there appears to be no evidence for the existence of however small a number of men and women who are incompletely specio-psychic. Leaving aside, then, pathological cases of every kind, we may confidently affirm that every normally constituted human being is in the fullest sense capable of learning freely from others.

Granted, however, that all men are specio-psychic, are there perhaps nevertheless marked inborn differences among individuals as regards this learning capacity? In the last Chapter we adduced reasons for rejecting the idea of perceptibly large innate differences in mental capacity among men. To the arguments there advanced, which we shall supplement under (a) below and generally in the following paragraphs, we will add here one relating more particularly to learning freely from others. There are still numerous primitive tribes extant. In most of these, equal demands are made on all the members of the tribe and there is no hint among them of class or group distinctions such as are to be found among Western peoples or among ants and bees. Indeed, in some instances we find a pure democracy, communities without leaders of any kind. This suggests that in prehistoric times the absence of social stratification was general

nd that for all intents all men learnt, and learnt with practically qual facility, whatever there was to be learnt. As there is no good eason to believe that human nature has appreciably evolved since, ay, early Aurignacian times some forty thousand years ago and as, noreover, the youth of backward peoples are found to be as fully ducable as the youth of advanced peoples who in favourable circumtances might all hold high university degrees, we may safely suppose, nless concrete evidence to the contrary is forthcoming, that by nature here are no mental grades of human beings and that all human beings re innately capable of learning freely from others to virtually the same legree. In fact, since, as we have seen, this limitless educability artakes of the nature of a species character and since, as we shall ee lower down when speaking of methods of learning, all higher bilities are socio-historic products and are therefore acquirable by all avourably situated individuals, we are theoretically bound to assume hat our broad conclusion is necessarily true. Hence any alleged vidence to the contrary would have to be viewed with legitimate uspicion and subjected to a searching scrutiny.

It may be agreed hence—on the evident supposition that what olds of children and their educability, holds *a fortiori* of the educaility of adolescents and of adults—that all human beings can be resumed to be capable of learning freely from others and virtually o the same extent, that is, capable of learning to know, love, and ractise the good, the true, and the beautiful as embodied in mankind nd its traditions and this virtually to the same degree. The question f human limits to learning we shall have occasion to discuss lower own.

We have roughly defined what we mean by "learning *freely* from thers." What, however, is implied by the term *others* in this xpression ? It might be imagined that learning freely from hundreds f millions of our fellows signified that we learnt directly something rom each of them. Now in the case of John Stuart Mill, for example, ve may assume that for years Mill practically saw his father only and hat, except casually, he met few people until adulthood when he was lready distinguished for rare culture. In fact, not many men have earnt directly anything of consequence from thousands and in any vent we can learn nothing directly from the vast number of human eings at a distance whom we have never met and certainly nothing t all directly from the dead who represent all but the whole of umanity.

To consider the matter concretely. The average child learns most rom his parents, his teachers, and his few books. A well educated hild may even have been reared in a remote village or brought up on secluded farm. That is, one individual human being may embody n himself the wisdom of millions and we may therefore learn from

him what, in fact, represents the thoughts of millions. But, again, these thoughts should not be conceived as consisting of the separate individual contributions of millions, but as either directly or indirectly comprehending these contributions, as we shall see, in a highly condensed and digested form. Our typical child illustrates this. For all intents he has learnt from his parents the language he speaks ; but this language has developed for innumerable ages as the result of countless individually and socially wrought changes, changes so radical in substance that generations of philologists have hitherto vainly striven to unlock the secret of the earliest forms of language. Similarly with the child learning his arithmetic. This roughly means: to master the four arithmetical rules and the various aids for solving common and more exceptional arithmetical problems, *e.g.,* vulgar and decimal fractions, weights and measures, and commercial arithmetic. Here, again, we have an elaborately built-up socio-historic product. And this reasoning holds of most other subjects. The teacher's knowledge may thus comprehend in a certain sense the sifted and simplified contributions of thousands of millions of human beings dead and living. Or suppose we take a large-scale encyclopedia and read therein the article Law, Zoology, Art, or Language. In an hour or less the quintessence of the result of the direct and indirect contributions of millions of human beings of many ages on the given topic is conveyed to us. Freely learning from our fellows near and far in space and time does not therefore mean learning from a few the strictly individual contributions of the many, but from a relatively small number the substance of the synthetised contributions of our contemporaries and their near and distant ancestors. To which we may further add that by "others" we virtually mean our human fellows exclusively, for from individual animals we can only learn what each has invented or discovered—that is, hundreds of millions of times less than we may learn from some human beings, even considerably less than we might learn from one early eolithic man.

We must now seek to determine more definitely the *form of knowledge* in which most subjects we acquire are usually cast. Consider arithmetic again. Some scantily civilised tribes, Darwin states, can only count up to four and aboriginal Australians are said to experience difficulty in counting up to seven,[1] whilst the more remote precursors of these social groups could doubtless not count at all. Having learnt, however, to count up to two, say, this becomes a more or less general social possession. Historic circumstances then favour a gradual growth in this department of knowledge until, in time, men can count up to comparatively high numbers. It is an enormous

[1] " Beyond four, counting [among the Australian aborigines] either goes by ' hands ' or ' feet,' or for ordinary purposes there are two comprehensive words in use which signify a ' small-large number ' and a ' large-small number.' " (Herbert Basedow, *The Australian Aboriginal,* Adelaide, 1925, p. 396.)

advance, after this, to develop a decimal notation (suggested no doubt by the ten fingers) and names for parcels of tens, hundreds, and so on. Also a gigantic advance beyond, to have written numbers—first of a complicated and cumbersome character (exemplified in the Roman numerals) and then, as the final outcome of various changes, of a marvellously simple character as in the Arabic, or rather Indian, arithmetical notation with its revolutionary zero figure. Simple adding and subtracting become in the circumstances relatively easy. But the labour-saving effected in the intricate later discoveries of multiplication, division, etc., is immense, *e.g.*, compare multiplying 23,456 by 78.948 by the method of addition and by that of multiplication respectively. (Algebra and the higher mathematics, with their brief symbols and crisp formulæ, carry, of course, this process much further and involve correspondingly complicated inventions.) In a word, what the child is presented with is not the unconnected ideas of millions of people on a given theme and all that has been excogitated in relation thereto, but something which is the final outcome of a socio-historic and almost limitless improvement along a certain line, with all irrelevant, redundant, erroneous, and inferior proposals cancelled and the remainder organised and simplified with ever increasing thoroughness. The arithmetic learnt by the child is hence a highly complex and integrated product of the ages. If, contrariwise, the child had to learn the unabbreviated story of the concrete growth of the science of numbers, with the multitude of tributary streams of fact and fancy that fed it, his whole life would not suffice to memorise a fraction thereof and the knowledge thus acquired would be too misleading and indefinite to be useful to him.

Or take geography. At first, men entertained fantastic notions concerning the world as spread out in space. Gradually truth on this subject more and more displaced fantasy and error ; mountains of information were collected and checked ; and increasingly superior methods were invented for representing graphically the surface of a country and of the world. When an average child looks, then, at a large map of his country, indicating the relative positions of its thousands of inhabited places as well as their approximate magnitude, of its provinces and districts, of its primary, secondary, and tertiary roads, of its railway, steamship, and air lines, forests, streams, rivers, lakes, mountains, seas, together with distance and altitude, latitude and longitude, and so forth, he finds on a single sheet, so far as his country is concerned, the immensely simplified and rationalised result of the labyrinthine history of geographical discovery.

Whilst our child benefits in this way directly and indirectly by the endeavours of practically the whole human race, these endeavours, as we see, are generally compressed for him into a modest set of paragraphs, formulæ, and charts, which do not in the faintest degree

suggest the ocean of labour that has been historically expended in developing them.

If the knowledge we acquire from others represents as a rule, as we have just seen, an elaborately constructed socio-historic product, it seems to follow necessarily that all men are by nature fitted for assimilating every *kind of knowledge*. The popular theory of man denies this. To be competent in any direction, we must possess special innate aptitudes for it, men say. Thus we may not only hear of somebody being a born physician, but a born oculist, a born aurist, a born dentist, a born laryngologist, a born lung or heart specialist, a born children's or women's specialist, or a born alienist. No doubt, if we press hard the popular theory, we shall have to suppose the existence of hundreds of different types of born medical specialists. And the same reasoning applies, of course, to every science, every art, every profession, and, generally, every walk of life. Such a view presupposes the atomist and heroist theory of man: each individual, uninfluenced by his fellows, makes individually his unique contribution and a Confucius, a Copernicus, an Erasmus, a Bramante, has learnt practically nothing of value from others. On the other hand, the last few paragraphs have shown that progress exhibits innumerable phases in most subjects. At a given time a certain stage has been reached in a certain direction and advance can only be secured if at that time that stage is further developed. On the supposition that all men are by nature about equally fitted for every type of mental activity, the historic process is readily understood: the individual adapts himself to whatever the particular circumstances may happen to be. He learns what there is to be learnt on the subject and seeks to improve in some modest way on what is given. Now on the popular theory of man, we have to suppose that whilst, for example, the science of medicine passes historically through scores of phases and develops in dozens of directions, there are in every age persons born who are specially fitted for each of these scores of phases and dozens of directions (which is, of course, wholly unwarranted by the facts). This theory thus appears a monstrosity when confronted with the data of history. Not so long ago savage peoples were supposed to possess acuter senses than civilised peoples and to dispose of special faculties. Comparative psychologists then showed that the phenomena under consideration only imply the acquisition of highly developed portions of the racial heritage.[1] In the successful practice of the different kinds of human activities existing to-day—scientific, artistic, ethical, practical—we meet, it is contended here, with the same fact, regardless of race, people, or class, namely historically and educationally developed aptitudes. Remaining therefore by our concrete historical

[1] See Charles S. Myers, "On the Permanence of Racial Mental Differences," in *Inter-Racial Problems*, edited by G. Spiller, London, 1911, p. 74. As we saw in Chapter IV., Section 9, this holds of every aspect of human mentality.

analysis, which shows us the remarkably slow, piecemeal, erratic, and synthetic development of the different leading aspects of civilisation and, in this connection, also the irrelevancy of race and the absence of an evolution in inborn aptitudes,[1] we find there is no escaping the conclusion that by nature all human beings are for all intents alike capable of acquiring any and every kind of knowledge and vocation. In other words, special and superior aptitudes and capacities are not inborn ; they are, primarily, acquired socio-historic products.

We have ascertained the immediate implications of the terms *freely* and *others* in the expression "learning freely from others." What of the third and last term *learning* ? Men sometimes confuse learning from others with simple imitation. If we are sleepy and observe another person yawn, it certainly does not require intricate reasoning on our part to enable us to yawn also. And in obvious matters, where a palpable advantage is to be gained or a glaring disadvantage is to be avoided, a similar immediacy in imitation will frequently be met with. Many customs, for instance, are in this way learnt without recourse to mental acrobatics. However, if we think again of an average child, we can appreciate at once that, broadly conceived, learning from others is not at all as simple a process as the preceding illustrations might suggest. The child very slowly and somewhat laboriously acquires his speech, and if we watched an adult learn a foreign tongue, we should have to confess that it is anything but a holiday undertaking. It may occupy the latter a *day* to peruse the massive volume which is to teach him the new language and a *year* to assimilate it thoroughly. Certainly, if we compared the time it would take an average school child to read through his arithmetic book, on the one side, and thoroughly to assimilate its contents, on the other, the disparity would be startling. And this is, of course, true of the gigantic body of knowledge acquired from the nursery to the university.

There are thus *obstacles* to the rapid acquisition of knowledge. Let us examine them. Our child, in learning his arithmetic, has to commit to memory diverse series of facts. In order to achieve this end, he must re-commit the series time and again, and even after he has succeeded in being able to call up at will the relevant facts, he is obliged to recall them at frequent intervals for a long time before he can be said to have securely acquired the knowledge coveted. So arduous is this task that under average circumstances the child never becomes an unmistakably proficient arithmetician. Only where a capable teacher has the opportunity of soundly and intelligently drilling his pupils or where, for some adventitious reason, the subject intimately appeals to the child, do we encounter the impeccable arithmetician. Arithmetic cannot be therefore learnt by perusing

[1]On the historical development of painting, for instance, see Chapter IX.

once a book or listening to a teacher who never repeats anything. Nor is it merely a question of remembering a certain simple series of memories. From the time the child begins to learn the shape and the meaning of the numerals until he has eventually mastered the fourth rule and what lies beyond, one series of memories is added to another and many of the series—together with special rules, such as those relating to tests of accuracy—have often to be utilised in a single operation. The memory required is hence a highly complicated one and there must be alert attention to remember the right thing at the right juncture. Studying arithmetic, however, is not only a question of indefatigably committing facts to memory and recalling them in varying connections. It is also a matter of understanding what is presented to the mind. The teacher explains as he proceeds and the child strives to follow the explanations. In truth, the teacher's time is largely absorbed in explaining and in bringing the subject down to the level of the child's understanding. Frequently also the figure work of the primary school requires of the child, within expanding limits, systematic observation, deliberate experiment, imagination, the formation of hypotheses, choice, judgment, asking and answering questions and proffering spoken or written explanations, generalisation, deduction, verification, logical classification, and even the discovery of old and new truths.

What holds of arithmetic, holds of most subjects our child sooner or later learns. Some are simpler and others more complicated. Should our child proceed in the course of time to the university and elect to become, for example, an engineer, he will be obliged to utilise in a highly involved manner many of the subjects he studied in the primary and the secondary school and to learn to apply exceedingly refined methods.

Generally speaking, therefore, learning from others cannot by any means be interpreted as being or resembling sheer imitation. It implies, on the contrary, a growingly intricate complex of mental functions.

Having ascertained the obstacles encountered in learning from others, we can readily appreciate that there are limits to what can be mentally assimilated by an individual. Of course, the child encounters difficulties peculiar to childhood in that his innate mentality has not attained its full development and in that he has yet to acquire the very elements of knowledge and the higher methods of fruitful observation and cogitation. But even assuming the child to have eventually reached maturity and this under the most auspicious conditions for learning, it would still remain a hopeless task for him to attempt to assimilate the whole existing fund of knowledge in a highly developed civilisation such as ours. The mere volume of reading to be undertaken (in all languages ?) would completely baffle him unless he could

extend his life-span to perhaps a hundred thousand years, while to read without pondering, observing, experiencing, and experimenting would leave him pitifully ignorant of the meaning and bearing of what he had read and also expose him to forgetting everything almost as fast as he read it. On this very ground, the utmost is systematically done to simplify every subject as thoroughly as possible. And even here those engaged in simplifying are thinking of their individual subject or specialism rather than of deluding men with the hope that methods may be devised which would enable them to make all knowledge their province. Still, a sweeping, general culture is within the range of all and hundreds of subjects may be at least intelligently read about in periodicals, encyclopedias, primers, text-books, and general works, whilst the most salient features in these subjects may be made a part of our permanent mental furniture. Further intellectual progress will issue no doubt in increased simplification and in greatly superior methods of learning and understanding, but there are insurmountable obstacles to men ever becoming expert in more than a few out of many scores of subjects. We conclude, therefore, that vast and comprehensive as may be the individual's possible mental acquisitions, there is a set limit to the *rapidity of learning*[1] and to the *amount of detailed knowledge assimilable* in an advanced epoch.

The process involved in acquiring a particular subject at school also shows, as we have seen, that we can only apprehend its higher forms after we have made our own, in ordered succession, its many lower forms. Thus to be proficient in the higher mathematics, we must start with learning to count and very slowly, during perhaps twenty years, work up to the point of being thoroughly at home in the mysteries of the infinitesimal calculus. It would be accordingly infantile to attempt to teach the higher mathematics to an individual who had not learnt to count. As a matter of fact, it may be laid down as an important pedagogical rule that learning will be speediest when the lower stage is completely assimilated before the next higher stage is approached. Effective and intelligent learning proceeds hence *by stages,* from the lowest to the highest.

Learning by stages carries with it certain implications. In actual learning, we do not utilise only our native powers. Language as such is already an enormous aid and its constituent words and expressions also suggest invaluable ideas and methods. For all intents the processes involved in learning from others, as shown a few paragraphs back, have been elaborated by ages of thought and then assimilated by the child or adult. This is manifestly so in the exact and circumstantial

[1]Great precocity, especially in figure work and in the musical sphere, is a not uncommon phenomenon and requires to be understood and explained, and so does the question of inferior and superior native memories. An examination of primitive civilisations, however, indicates that precocity cannot extend to originality.

methods applied in the higher departments of the sciences and is actually not less so as regards the primitive methods employed by all but infants. Thus the child learns from others the very *methods of learning*. His original outfit in this respect can be roughly studied in the methods resorted to by the man-like apes, by infants, by the lowest races living (who are already, comparatively speaking, highly educated), and, inferentially, in the methods of learning likely to have been employed by eolithic and early paleolithic man. Judging on this basis, we cannot assume in human beings inborn or self-acquired methods of learning more than moderately exceeding in efficacy those used by the Anthropomorpha. Conversely, this means that since superior ability signifies superior methods socio-historically generated by a continuous process of assimilating improvements and improving on what has been assimilated, such ability may be acquired by all favourably placed human beings.

Inasmuch as methods are individually acquired by stages, it might be supposed that these stages entail a corresponding growth in innately given capacity. The facts negative this. As in walking up a woodless mountain, we obtain a more extended view with every step we make, so we increase our mental powers as we acquire increasingly effective methods. And as in the first instance each step counts but for a step, so in the latter case each successive step in the attempt to acquire from others a more effective method counts but for a step. That is, to vary slightly the metaphor, having reached the lowest rung on the intellectual ladder and rested there awhile, the original amount of mental energy becomes again available for reaching the second rung. Thus with the successive rungs. In other words, having understood and assimilated a certain method of learning, we are back at our first position and are enabled by means of this new method to understand and assimilate a somewhat more effective method of learning, and so on. However high, then, we climb up the intellectual ladder, the same modest inborn mental equipment persists and suffices. To express this differently. Once a method is well learnt, it becomes a mere matter of recollecting what has been learnt, whilst the amount of organised knowledge we may commit to memory may be considered for practical purposes as unlimited. We may hence say that a Plato, a Giotto, or a Buddha, in his period of highest fruition, is probably for all intents no more and no less advanced in congenital, or strictly individual, mental capacity than any normal person of his age of life who has never heard of philosophy, painting, or saintship. Just, then, as both our lower and higher methods of learning are for all intents acquired from others and do not reflect our native capacity merely, so the exercise of the most far-reaching of methods involves no innate or organic mental faculties divergent from or higher than those, say, exercised by middle paleolithic man. The difference

between the individual who uses the most elementary and him who employs the most advanced methods, lies in the first having learnt very little and the second very much of methodological value from his fellows. Every stage of ability exhibited by individual human beings, however modestly or commandingly these individual human beings may be placed actually, involves therefore for all intents *the same lowly innate mental equipment.*

We may now sum up. We have endeavoured to prove in general terms that all human beings whatever (excluding pathological cases) are by nature able to assimilate to a practically unlimited extent, or FREELY, what others may have to communicate in the way of abilities, knowledge, sentiments, and character traits and that they all possess this native ability to *about the same high degree.* Now learning from OTHERS near and far in space and time, we find, means learning from a comparatively few of our fellows what they have assimilated directly or indirectly from a certain number of human beings, these frequently including, through some sort of tradition or record or endlessly improved mental or material tool, almost the whole of humanity past and present. Moreover, *the form of knowledge* thus acquired from others, we learn, is usually of a socio-historic, highly compressed, sifted, and synthetised character and is therefore most inadequately represented by the separate fragments invented or discovered by individuals. It is hence inconceivable that individuals should be born specially fitted for acquiring certain *kinds of knowledge* or vocations, whilst it seems to follow that by nature all human beings are for all intents alike capable of acquiring any and every kind of socio-historically developed knowledge, ability, sentiment, and character trait. Again, the process of LEARNING freely from others is beset with many *obstacles* and these set a limit to the *rapidity of learning* and the *amount of detailed knowledge assimilable* in a highly developed civilisation such as ours. This learning process also shows that learning has to proceed by *stages,* from the simplest to the most complex. Lastly, a careful examination of this progress by stages reveals that the *methods of learning,* except for an essential minimum, are themselves socio-historic products (representing an interminably lengthening chain of assimilated traditions, improved traditions, assimilated traditions, and so on) and that they involve about *the same lowly innate mental equipment,* irrespective of how high or low is the actual intellectual, moral, and æsthetic status of different individuals.

Human beings, we have seen, are supremely distinguished from all animals by their almost infinitely far-reaching capacity of freely learning from others. This, however, presupposes, it is alleged, two conditioning factors, namely (a) human originality and (b) human gregariousness. Let us examine these.

(a) *Human Originality.*—The sum of any number of zeros would equal zero even if the zeros to be added amounted to thousands of millions. Similarly, the advantage of being able to learn freely from our fellows would be nil if all men were unoriginal, for a thousand million nullities could be productive of no more new ideas or new tools than a single nullity. It is only because different individuals can each contribute something that the cumulative factor enters and that large numbers of individuals are of decisive importance. Quantity produces here quality and the greater the quantity the higher the possible quality. If we assume, then, thousands of millions of human beings offering their modest improvements on what is given, the total wisdom available for assimilation will be correspondingly prodigious and profound.

In the last Chapter (Section 9) we fully discussed the problem of man's innate mental capacity and here we shall therefore assume the correctness of the conclusions reached in that place. The problem of human originality requires, however, to be elucidated separately. For this purpose we may, to begin with, comment at some length on a passage from Prof. McDougall quoted in the last Chapter. Writing of traditions, he states : "Now this traditional stock of knowledge and morality has been very slowly accumulated, bit by bit ; and every bit, *every least new addition* to it, has been a difficult acquisition, due in the first instance to some spontaneous variation of some individual's mental structure from the ancestral type of mental structure." (Italics ours.)

All originality whatsoever is thus said to be owing, if we interpret the above passage correctly, to the birth of more or less exceptional individuals and therefore, according to this view, nothing new that any one produces results from contact with others or with the cultural heritage generally. Hence if the science of numbers has gradually developed, say, from counting up to two to the calculus, it is, according to this theory, because innumerable individuals have been born who were able, each at a specific point of time, to make the precise contribution needed to advance the science of numbers by one exceedingly restricted step. A battalion of potential Leibnitzes may have thus appeared in prehistoric days ready to invent the infinitesimal calculus, but the times were not ripe for them. Now in view of our account of the process of historical development in arithmetic and in all larger subjects, Prof. McDougall's conception is wholly inadmissible. If we could only learn from others the separate contributions of individuals, this would be conceivable, but in that case there would be no science of numbers nor any other science nor any art or morality, for these, as we have shown, are extremely complex products, the results of endless mental interactions through long ages. To imagine, therefore, that the method of progress consists of consecutive improvements

made by individuals born with just the flair for making particular improvements required by a given stage of development in a given subject, is to believe in an interminable series of miracles. In fact, it is in and of itself a startling proposition that human beings should be entirely unoriginal save insofar as they vary from the ancestral type, that "every *least* new addition" to the traditional stock of knowledge and morality should be "due in the first instance to some spontaneous variation of some individual's mental structure from the ancestral type of mental structure." Still, it is only fair to remember that Prof. McDougall is but the logically-minded exponent of the popular theory of man.

From subtle reflections, let us turn to the facts. The child of five is a tolerably fluent conversationalist. Now human speech is not sheerly imitative like the parrot's speech. The sentences and series of sentences used by the child are practically never purely such as he had heard others use before. In other words, the child "composes" his halting speeches. This type of creativeness can be illustrated on a larger scale by observing that the originality in composition grows in culturally ever more highly placed classes of individuals until we come to the magnificent oration of a Demosthenes or an Edmund Burke. Moreover, the child may care to give, according to circumstances, a shorter or a longer account of an event and here, too, age and training may lead to great perfection in this respect. Nor are his accounts necessarily objective or unoriginal. He may wildly exaggerate; he may lamentably understate; he may deliberately concoct a story; he may generalise; he may draw conclusions; and he may tell white and black lies. All these deviations from bare imitation argue in favour of more or less decided originality.

What is true of children is, of course, truer of adults. The countless "penny dreadfuls," "shilling shockers," and comparatively and actually superior novels, imply throughout originality and between the flimsiest and the most famous of these there is an almost continuous series of intermediates. The daily and the periodical press belong essentially to the same literary category. In serious books, this gradation in originality is too obvious to need stressing. In commerce and in industry it is the same, for adaptation to indeterminate circumstances requires far more than mere imitation. To take purposely a lower-grade example, window dressers are almost always original and at times highly original. Of teachers, lawyers, artists, preachers, administrators, and the scientific professions, this may be taken for granted. Even in domestic life the entirely unoriginal person is non-existent. Everywhere we meet with more or less far-reaching adaptations to what is given and few men borrow all their opinions from others.

Wholesale originality seems thus universal among mankind.

The contribution of a neglected child of three cannot naturally be compared with that of a highly favoured young university man or woman who has been interested in original research and generally encouraged to think for himself or herself. However, between the one and the other, and beyond the latter to the President of the Royal Society, innumerable gradations of originality may be intercalated. But, as we shall learn in Appendix A., it should be remembered that those esteemed superlatively great are necessarily distinguished for their relative *un*originality.

In speaking of the "traditional stock of knowledge and morality" Prof. McDougall says that "every *least* new addition to it" is due "to some spontaneous variation of some individual's mental structure from the ancestral type of mental structure." The actual story of the origin of the traditional stock appears to be quite different. Everything we have learnt from our parents and grandparents is part of this stock. The British Museum Library, with its millions of books, pamphlets, and periodicals, some super-excellent and some super-imbecile, is part of this stock. The newspaper's law court reports and society gossip are part of this stock. The child's drawings in the school magazine are part of this stock. Accidental discoveries are part of this stock. And gross error, atrocious art, and revolting immorality are also part of this stock. In short, the traditional stock comprises everything that survives of man's expression of his thought and work, including casual individual experiences.

Nor should we forget how haphazard is the formation of the traditional stock. Hundreds of lecturers and writers, for instance, may express suggestive ideas; but most of these ideas are doomed to perish because it is a matter of chance what survives in an imperfectly organised age. Superior ideas have therefore sometimes to be discovered many times over before they become part of the more lasting and more integrated traditional stock. Religious, political, nationalist, and economic groups have in such conditions often succeeded in preventing the emergence of new truths for centuries. It should not be imagined, consequently, that every novel and desirable contribution of an individual is automatically incorporated in the traditional stock and that there are no formidable social obstacles to the growth of truth.

However, much is radically altered if we take a long view. To recur to our typical example of the science of numbers. Given a sufficiently long lapse of time and an almost ideally perfect science of numbers may be imagined to have developed out of zero beginnings. The most elementary facts are slowly discovered; new facts are added to the existing store of facts; methods are constantly improved; errors and imperfections are repeatedly tracked and eliminated; and everything tends to be progressively transformed, simplified, and synthetised.

Probably in the future a duo-decimal system, simpler figures and symbols, improved and new processes, and more efficient methods of learning will be adopted, to say nothing of extensive improvements in the higher mathematics. In a word, as greater perfection is attained in a subject, so the inferior traditions are neglected and forgotten and consequently the latest traditions reflect only the very best of the earlier and earliest traditions plus the most recent additions and changes which are ephemeral in the mass. However, the earlier, like the later, traditions are moulded by the same factors that we have analysed above and it happens hence that even comparatively perfect types of products are superseded by other more perfect types of products, as candles by oil lamps, these by gas light, and this by electric illumination, or open hearths by grates and grates by radiators, or drifting balloons by dirigibles and airplanes.

Of course, it might be argued that those responsible for important scientific discoveries belong to a physiological stock superior to that of the average person who blunders along or discovers extremely little of any consequence for mankind. The truth seems to be that there are cultural explanations for the difference. The man of science has learnt that he must be exceedingly well-informed in all aspects of his subject; that he must search earnestly, widely, incessantly, and systematically; that he must reinforce his senses and intelligence by instruments; that he must be keenly alert so as to discover and disentangle novel truths and factors; that the truth is most difficult to strike; that he must not be ambitious but seek to improve modestly on what is given; that he must place the discovery of truth above the satisfaction of preconceived notions; and that he must beware indulging in speculative flights where the facts are not solidly established. A historically developed methodology leads him thus, in favourable circumstances, to one valuable discovery after another. On the other hand, the cultural position of the average man leaves him a prey to ignorance, prejudice, and superficiality, whilst his economic position deprives him of adequate leisure for serious study. Indeed, it follows from the absence of an accepted methodology of the above character to-day that most thinkers are satisfied with being indifferently informed in their subject; with handing over the reins to the imagination rather than searching earnestly, widely, incessantly, and systematically; with believing in the sufficiency of their unassisted senses and intelligence; with resorting to no special measures to discover and disentangle novel truths and factors; with accepting error readily because it is far more easily found than truth; with being ambitious to produce a system rather than be resigned to improve modestly on what is given; with letting prejudice blind them to the truth; and with feverishly building on spurious traditions. A clear awareness of the method of solid discovery should, accordingly,

induce those favourably situated socially to follow the best scientific traditions and others to aim at comparatively unostentatious contributions in their own sphere of activity. Nothing is plainer than that it is infinitely easy to discover imaginary or highly diluted truths and that such truths parade sometimes for ages as eternal verities. At all events, the question of extensive, superior, and specialised originality concerns the traditional and not the biological "stock," inasmuch as such originality is conditioned by socio-historically and not by individually developed methods.

Nor should we overlook the more strictly social factor. Let us cite a few examples. A scientific atmosphere pervading physics and biology has an irresistible tendency to permeate the religious, moral, political, economic, and educational domains and to transform them radically. A love of art may for some reason develop socially and introduce the art factor everywhere, leading almost necessarily, through constructive popular criticisms, to countless æsthetic improvements in many departments of life. The evolution of the different languages, except for quite recent times, owes practically nothing to deliberate individual efforts and language as such, with its age-long and marvellous development, has been moulded by social forces. An insistent general public demand frequently determines the direction taken by political, economic, and humanitarian movements. The lessons of general experience tend to establish higher modes of conduct and general experience also tends to discover facts and to sift the false from the true. Customs, usages, manners, grow up as the result of complex social interactions. And so on.

A minute examination of concrete realities hence confirms our conclusion in the last Chapter that all men are more or less original according as to whether historical, social, and individual circumstances are favourable or unfavourable to their manifesting originality. Hence any attempt to prove that only some men are original or that originality argues a "spontaneous variation of some individual's mental structure from the ancestral type of mental structure," must ignominiously fail. The originality necessary for ensuring a boundless accumulation and perfecting of human knowledge, art, and morality exists therefore to an unlimited extent in human nature as such and in the consequent cultural heritage.

A word now as to the approximate magnitude of the individual's innate originality. We desire only to touch here on one aspect of this problem, a problem which, in general, has been already dealt with in earlier parts of this Section and in the last Chapter. If the individual's strictly unaided contribution is necessarily only ultra-microscopic and if learning from his fellows may indefinitely raise this contribution, we can understand how it is that in an imperfectly civilised community there may be some who are very highly and others

who are very poorly cultivated; that peoples should differ to-day as much, say, as do the Australian aborigines and the French; that eolithic times should have been almost destitute of culture; and that the cultural heritage, by means of the cumulative method, should tend to grow from a virtual zero to a virtual infinity. That is, if the individual cannot, unaided, raise himself above the animal stage, but can rise indefinitely high with the cultural help of his fellows, it follows that he will be readily adapted to any culture however low or high. On the contrary, if "men of genius" and "men of talent" were born to act as they do and men generally differed by nature as much as they do by culture,—that is, if men were born great, eminent, able, tolerable, indifferent, and incapable painters, chefs, physicians, architects, statesmen, generals, and what not,—then societies and history would be a welter of self-contradictions. Why, for instance, this exceedingly humble state in paleolithic times, among modern primitive tribes, or among obscure peoples, without a shadow of a suggestion of all that the natural-superiority-and-inferiority theory connotes? If this theory were correct, the dead level and the low level among the groups would be wholly unintelligible. And to clinch the matter, we find the youth of primitive tribes fully adaptable to the highest civilisations and manifesting then all the enormous individual differences observable in such civilisations. This proves that cultural and not racial barriers divide low and unstratified from high and stratified civilisations.

The inexorable logic of fact is therefore only satisfied with the view that the possible unaided mental contribution of the individual is to be fixed on the basis of the originality found in individuals during, say, the mid-paleolithic period approximately (after as far as possible discounting the then existing cultural heritage) when modern man is said to have come into existence, everything above that level being due to what is learnt from others. This virtually fixed innate capacity thus signifies, it seems, a capacity so small that any but the humblest individual originality ought to be regarded as a social product.

Theoretically, it is, of course, vaguely conceivable that repressive measures account for the dead low level in primitive times and within existing primitive and obscure groups. In reality, however, this view of the matter is untenable since, on the one hand, genius is popularly held to be irrepressible and since, on the other, it is inconceivable that the facts should absolutely and invariably contradict the current theory of man and absolutely and invariably confirm what appears to be the scientific theory. Besides, it may be added, there is not a shred of evidence that elaborate repressive conditions prevail universally in lowly civilised societies.

By nature, then, all men alike may be regarded as being for all intents ultra-microscopically original, which conclusion naturally and

necessarily accords with the conclusions reached in our analysis of the process of learning freely from others. Why men's native originality is so restricted, we shall examine in the next Section.

We have stated that, as a matter of fact, all human beings are more or less original by nature. This view can be defended on fundamental grounds. Intelligence involves adaptation to varying circumstances and therefore necessarily originality. In the most intelligent animals, such as monkeys and apes, striking examples of originality are hence encountered. Accordingly, we conclude that man, who is the most intelligent of living beings, is of necessity original. Indeed, if men were incapable of originality, except when born with a particular modification of their mental nature, they would not possess the intelligence of a rabbit, let alone of a monkey or ape.

Although it has been useful to analyse the problem of originality, the notion that we could imagine some one fully capable of learning freely from others and yet wholly deficient in originality, involves a contradiction in thought, for granted that some one is able to learn freely from others and it follows that he must be more or less original. We have seen this abundantly illustrated in our analysis of the process of learning from others. This exacts originality at well-nigh every turn. Indeed, given that some one is capable of learning freely from others, he will be, by definition, capable of acquiring the methods teaching him effectively enterprise, initiative, tact, resourcefulness, and the ways generally whereby he may become a first-rate inventor and discoverer, as well as capable of learning to be ethical, æsthetic, characterful, humorous, and practical. Moreover, since to learn freely from others is to acquire their abilities, sentiments, knowledge, and character traits, these latter cannot be said to imply factors not presupposed in the learning process. The ability to originate should be therefore considered as involved in the ability to learn freely from others. It is only if we conceived the learning process as purely imitative—*i.e.*, as for all intents aimless and useless—that we should have to regard it as unintelligent and therefore as void of originality and complexity.

(b) *Human Gregariousness.*—Superficially viewed, men might be capable of learning freely from their fellows, but be congenitally opposed to exercising this capacity. We know, as a matter of fact, that adherents of a particular religion cling often tenaciously to its tenets, are wholly unimpressed by other religions, and resent the very suggestion of change in any of the doctrines they assent to. This does not only hold true of illiterates and the poorly educated, but of highly cultivated clergymen, bishops, cardinals, and popes. A similar narrow-mindedness is often noticeable in political parties, whilst hot-headed "nationalists" despise the customs and attainments of other peoples. And there are many individuals who remain from early

manhood onwards smugly content with their own petty ways and ideas. Thus it actually happens that because of such factors a people stagnates for centuries. Indeed, but for comparatively widespread unsociability, we should be civilisationally far more advanced than we are at present.

It is imaginable, then, that man might be entirely ungregarious. In that case, he would be doomed to remain for ever an animal, for mentally men only rise above the animal stage in proportion as they exercise their ability to assimilate the substance of the thoughts of their whole kind.

Since, however, modern man is far from being an animal, it follows that man is unmistakably gregarious. Thus even those whom we have described as ungregarious are without exception examples of arrested cultural development rather than of persons devoid of all pan-human culture. We know human beings to-day only as living in social groups and history and prehistory point to the same fact. Indeed, as we shall learn in Chapter X., and as we might theoretically anticipate, not only do human beings live in social groups, but even in prehistoric times there must have been close contact between these groups, for many an age appears to have exhibited then the same stage of culture everywhere. There is therefore fair presumption in favour of the existence of an innate human gregariousness not confined in any way to families, to smaller or larger groups, or to races.

If, consequently, individual men and groups are reluctant to learn freely from their fellows, it is because of stultifying habits or because of ignorance of their own nature. It is most improbable that the possibility should exist of human beings expanding their being almost infinitely and that, in the light of such knowledge, they should yet be content to remain virtual nonentities. We hence conclude that since all men are by nature gregarious beings, they may fully profit by their fundamentally distinctive capacity to learn freely from their fellows.

But here again, as in the case of originality, there is an unjustified assumption. As we shall see in the next Section, the very existence of the capacity to learn freely from others entails the existence of inborn human gregariousness. It was the advantage experienced in learning freely from others that led to the elimination or drastic weakening of instincts permitting and compelling individual independence. Hence we cannot conceive human beings shut off from others by instincts and yet ready to act as non-instinctive beings. The two attitudes are incompatible. An individuo-psychic being cannot be specio-psychic and a specio-psychic being cannot be individuo-psychic.

We have examined in detail the meaning and the immediate implications of men's capacity to learn freely from their fellows. We shall now seek to ascertain the factor which explains the emergence of this capacity.

5. Specio-Psychism the Final Outcome of Individuo-Psychic Evolution.

With a principle so fruitful in far-reaching consequences as is that of specio-psychism, the problem irresistibly presents itself : Is it not inherently improbable that specio-psychism should have appeared suddenly ? Is it not conceivable that more diligent research should reveal a gradual metamorphosis of individuo-psychism into specio-psychism ? On the general question, the weight of facts obliges us to assert that what we call human culture—language, scientific method, legislature, conscious devotion to the good of mankind, machinery, etc.—is only to an ultra-microscopic extent approached by even the highest animals. Between the unfashioned stone or other natural object sometimes employed as a tool by a handful of animal species and the complexity, say, of a fully equipped physiological laboratory there lies such an immense chasm that it would be wholly inappropriate to speak of gradation. And if we compare an ant hill to a city like Paris, the distance dividing them dangerously approaches that of a unit to infinity. It is as if one force were capable of producing mole hills and another Mount Everests. For practical purposes, that is, pike and ape[1] should be placed in the same category in this connection. The suggestion of a graded advance from individuo-psychism to specio-psychism we are therefore compelled, however reluctantly, to dismiss. Cultural evolution, which follows of necessity from the nature of man, is, as we have pointed out more than once, entirely and utterly absent among all animal species alike.

We must hence invoke another mode of explanation. The hypothesis we submit is this : Specio-psychism is the natural and inevitable final outcome of evolving individuo-psychism and of necessity makes a sudden appearance.

We saw in Chapter II. how the principle of integral locomobility necessarily gave rise to developed senses, then to developed instincts, and, finally, to developed individual intelligence. The advance in these directions was incomputably great. Compare, for instance, the bare differential sensibility to light through pigmented spots among the lowest living beings to the intricate human eye revealing light, shade, numerous colours, the immediate surroundings in vivid detail, and enormous, highly complicated, three-dimensioned forms at an appreciable distance. The elaborate sensory outfit of the higher animals contrasts signally with the poverty-stricken means at the disposal of plants to enter into contact with the world surrounding them. Still, to know, without being able to react, is a luxury which natural selection is not likely to evolve. Hence wonderful organs and

[1] " In the case of man we can trace a constant progression, from the rudest form of palæolithic chipped stones up to the steam-engine and electric telegraph ; but in the ape we can discern no signs of progress, or of a capacity for progress." (Samuel Laing, *Problems of the Future,* London, 1905, p. 75.)

instincts are simultaneously developed, such as those of the bee or the mole. These organs and instincts allow for close adaptation to particular circumstances. But adaptability was also of moment, and so intelligence, too, evolved. In a primitive form we see this intelligence exhibited even in uni-cellular beings ; but a steady development is observable as we rise to the higher mammals, such as lion, elephant, and dog. It culminates, however, in the Anthropomorpha whose type of mind remarkably approaches man's.

From the volume and the weight of his brain, we may justly infer that by nature man is greatly superior to the apes. Indeed, reasoning from analogy, we may readily conclude that by nature man is probably as superior mentally to the ape as the ape is to the monkey. Chapter III. familiarised us with the idea that the semi-erect posture of the apes represents a transitional stage between a type of creature possessing a strictly quadrupedal mode of progression and man who is strictly bipedal. However, it is even more significant to note that the mentality of monkeys, and particularly of the apes, bridges to a large extent the native mentalities of animals and man. Thorndike's statement regarding the marked mental superiority of monkeys when compared to other animals renders this patent. For this reason we suggest to the reader to turn again to Thorndike's summary in Chapter II. (Section 6). Most noteworthy is his comparison between the dog, on the one hand, and the monkey, on the other. Everything appeals to the latter and he likes to be active for the sake of being active. Here, therefore, is the avenue leading by a short and direct route to specio-psychism. If we assume the considerably more advanced and less unstable minds of the Anthropomorpha, as Köhler graphically describes them and also as illustrated by us in Chapter III. (B4), and if we suppose that mentally proto-men excelled the higher apes as these do the higher monkeys in that respect, *we seem to be confronted with a species having a mentality just sufficiently developed for its members to be able to profit freely by the thoughts and experiences of their fellows near and far in space and time.*

Once this position is reached, a new equilibrium is established in nature and human evolution comes to be necessarily determined by favourable cultural, instead of by favourable germinal, variations. Diverse influences no doubt contributed to this result, such as perhaps a forced change from an arboreal to a terrestrial mode of life and the advantages to be derived by an ape-like creature from running in an upright position, skilfully manipulating objects, and living permanently, or at least periodically, in more or less extensive and more or less closely connected groups ; but of these influences we are still ignorant.

The suddenness of the emergence of the human type of intelligence thus only implies that animals evolved steadily through countless epochs and stages until the mental powers had reached that degree

of development which permitted of mental cooperation. Such intelligence must have been manifestly somewhat higher than that of apes who do not, presumably because they cannot, cooperate mentally. Accordingly, man who decidedly surpasses the most intelligent animals, the Anthropomorpha, in brain capacity, and therefore mentally, is of necessity the one and only being capable of profiting freely by others' experiences and cogitations. Consequently, no gradations from individuo-psychism to specio-psychism are conceivable, save in so far as growth in the mental powers of animals naturally and inevitably culminated in a mentality just sufficiently developed to allow of collective thought. *He who follows the growth of mind in the animal series and notes the remarkably high and semi-human mental level of the greater apes who represent the upper limit of individuo-psychic development among animals, should experience little difficulty in recognising that but a step ahead, if circumstances favoured such a step, specio-psychic man was bound to see the light of day.* At first, most probably, fettering impulses and instincts placed serious obstacles in the way, but the struggle which must have hence ensued between the advantage of learning from one's fellowmen and rigid inborn tendencies, evidently terminated in the degradation or elimination of anti-specio-psychic impulses and instincts and the evolution in the young, of certain impulses and instincts which directly encourage the possibility of benefiting by the thoughts and sentiments of one's fellows.[1] Indeed, this same advantage may have also led to struggles eventuating in the evolution of an effective speech apparatus.

The origin of man's specio-psychic nature is accordingly not as enigmatic as it might appear on cursory reflection.[2]

[1] "It would occupy too much space to enumerate all the movements which, instinctive in the animal, have ceased to be hereditary in man. Even where instinct enters, its force is reduced and the will can more easily master it." (Emile Durkheim, *op. cit.*, p. 311.)

It is significant, too, that the higher apes have also scarcely any definite instincts. As to pro-specio-psychic impulses and instincts, see Chapter VI., Section 2.

[2] Because of the non-recognition of the distinctive nature of man, not a few authors seek to explain men's propensities and actions by means of an imposing array of special impulses and instincts. In Chapter III. (B2), we have already adverted to this theory. Here, however, we cannot resist quoting certain passages from Trotter's *Instincts of the Herd,* as he, unwittingly, states the case both for and against. "The endowment of instinct that man possesses is in every detail cognate with that of other animals, provides no element that is not fully represented elsewhere, and above all—however little the individual man may be inclined to admit it—is in no degree less vigorous and intense or less important in relation to feeling and activity than it is in related animals." (p. 243.) "If we extend the word stimulation to include the impulses arising from instinct, and grant that the delaying and deflecting influence of the intellect may be indefinitely enlarged, we have an animal in which instinct is as vigorous as in any of its primitive ancestors, but which is superficially scarcely an instinctive animal at all." (pp. 243-244.) Here, again, is toxin and anti-toxin: "No understanding of the causes of stability and instability in human society is possible until the undiminished vigour of instinct in man is fully recognised." (p. 244.) "The only way in which society can be made safe from disruption or decay is by the intervention of the conscious and instructed intellect as a factor among the forces ruling its development." (p. 255.)

Up to this point we have persistently, perhaps monotonously, assumed that, on the whole, man's mentality surpasses that of the apes as much as the mentality of the apes transcends that of the monkeys. We shall now endeavour to be more definite, even though this might make us trench on the field of speculation.

The singularly high position occupied by the monkeys and apes as regards intelligence should be capable of explanation. We would venture to submit here the not very novel hypothesis that the ground of superiority of these Primates lies in their highly developed prehensile organs. One is the more disposed to hazard this hypothesis because the most noted "performers" among wild animals are monkeys, apes, and the elephant, the latter's trunk, as we know, constituting an effective prehensile organ within limits. This, too, would explain how the tool-employing animals, leaving aside insects, are practically confined to these three categories. As a matter of fact, so far as extra-organismal tools are in question, man could not produce or use any if he were in the predicament of the quadrupedal cat or dog. Since, then, material tools play a paramount part in human life, it is inevitable that man should be descended from the Primates, from the animals with the most highly developed prehensile organs, animals which, to a certain extent, can, and sometimes do, employ tools.

There is a virtual consensus of opinion that man is not descended from any existing ape and that on the tree of life he branched off about the same time as the apes. Attempts have been made, however, to dissociate him utterly from the apes by arguing in favour of a much earlier divergence; but seeing the countless special resemblances between him and the apes—especially bearing in mind Neanderthal man and still earlier fossil men as well as the strikingly similar type of mentality of man and apes—this is improbable. In any case we leave to biologists the task of tracing man's exact physical ancestry, for we are primarily concerned in demonstrating the specio-psychic nature of man, in defining this nature, and in furnishing an account of the probable origin of inter-learning, and therefore of man as we know him. How man developed from a quadrupedal and horizontal to a bipedal and vertical creature; how he came to live entirely on the ground; how he rid himself of anti-specio-psychic instincts; how he acquired his enormous brain; whether or not there were several species of pre-men; how he learnt to speak; why progress was infinitesimal at first; how earliest man lived and regarded his fellows—these are absorbingly interesting questions to which only speculative answers can be given at present. Perhaps a closer comparative study of the early paleolithic tools, of the later paleolithic art, of languages, of young children, of the most primitive tribes extant, even of the higher apes, and more extensive archeological discoveries, may eventually throw reliable light on man's emergence from animality and on his early gropings towards language, tools, and social organisation. The discoverer of the Stone Ages, Boucher de Perthes, well grasped this problem. (*De l'homme,* &c., Paris, 1860.)

A comprehensive survey of the question of man's descent will be found in a paper by Gerritt S. Miller, Jr., on "Conflicting Views on the Problem of Man's Ancestry," in the *American Journal of Physical Anthropology,* 1920. Vernon Kellogg (*Human Life, as the Biologist Sees it,* New York, 1922, pp. 13-14) thus sums up the present state of opinion on the question: "The biologist does not claim that we are directly descended from the chimpanzee or any other particular anthropoid or particular lower kind of monkey that we know, either living or extinct. Some biologists favour an origin from a generalised Lemurine type, others from a Tarsius type, and others venture to claim a breaking away from the quadrumanous group much higher up in its series, seeing in the anthropoids and man the latest and highest two diverging branches in the tall genealogical tree of human ancestry." Arthur Keith writes: "The evidence as it stands, imperfect as it is, points to man's departure from an anthropoid status early in the Miocene period,

certainly 1,000,000 years ago, perhaps more; that in the Miocene and Pliocene periods his body and limbs became adapted to a plantigrade posture; that his brain underwent expansion in the Pliocene, and particularly in the earlier part of the Pleistocene period, and that as the brain reached a full human status the coarser outward appearances of the ape were shed." (Article "Man, Evolution of," in *Encyclopædia Britannica,* 14th edition, 1929, p. 767.) It should be remembered that if man widely differs physically from the apes, these latter differ widely among themselves, and that accordingly we need not be surprised that man has an individuality of his own. See also G. Elliot Smith, *The Evolution of Man,* London, 1924; Giuseppe Sergi, *Le Origini Umane,* 1913, and *L'Evoluzione Organica et le Origini Umane,* 1914; Etienne Rabaud, "L'homme dans la série animale," in *Journal de Psychologie,* April-June 1915; H. Klaatsch, *Der Werdegang der Menschheit,* Berlin, 1920; Gustav Schwalbe, "Die Abstammung des Menschen und die ältesten Menschenformen," in G. Schwalbe and E. Fischer, *Anthropologie,* Berlin, 1923; Frederic Wood-Jones, *The Problem of Man's Ancestry,* London, 1918; and H. J. Fleure, "The Regional Balance of Racial Evolution," in *British Association Report for 1926.*

The semi-upright position, freeing as it does the fore-limbs to some extent, would, on this hypothesis, naturally imply a considerable increase in intelligence. This we find to be the case. The monkey is very excitable; the higher ape much less so. The latter, therefore, is alone, comparatively speaking, capable of sustained attention, of deliberation, and of measurably learning by experience. Our notes in Chapter III. on the orang-utan suggest his possessing a far higher mentality than we observe among monkeys. His examining the object which hurt him; his resorting experimentally to four different means—hand, foot, teeth, and head—for overcoming difficulties in the transportation of a coverless and empty basket; his seeking to fix by a variety of movements on his part a piece of straw in the palm of a spectator's hand; and in his generally observant and reflective behaviour—focusing a locality he desired to move to, for example,—are tokens of an intelligence markedly more developed than that of monkeys.[1]

Now when we pass to man, we find that the fore-limb has been transmuted into a manipulative organ pure and simple and has therefore entirely ceased to be specialised or utilised for locomotion (save by infants). Carefully examining this change from a semi-erect posture to a completely erect one and from a fore-limb partly used for terrestrial progression and largely for arboreal locomotion to one wholly manipulative in intent, we appear justified in reaching certain radical conclusions. The ape, owing to his frequently employing his fore-limbs for locomotion and having that fore-limb in part specialised for climbing, is still largely in the position of the monkey. Man, being entirely erect[2] and having strictly specialised hands and feet—hands for manipulating and feet for locomotion,—is therefore actually much

[1] The present author's random observations have now been more than confirmed by Köhler's systematic and masterly study; but he is inclined to believe that orang-utans are more intelligent than chimpanzees.

[2] It is easy to exaggerate the importance of the occasionally erect attitude. The gibbon, for example, has recourse to bipedal progression not only on the ground but frequently on trees, and yet his intelligence appears to be less developed than that of the larger apes who far less often resort to walking.

further removed from the apes than these are from the monkeys. The physical departure of ape from monkey is, in a sense, more fundamental, but the ape forms merely a tentative beginning of a new type, whilst man represents its consummation. The hand ever free for grasping objects and the thumb sufficiently lengthened to permit of easy and delicate manipulation, form a gigantic advance on the ape. To be a true tool-using and tool-producing being, man's specialised hand, with its longer, stronger, and more mobile thumb, and his sole dependence on his hind-limbs for locomotion, are indispensable.

We may therefore surmise that man's intelligence exceeds that of the ape roughly as much as his powers of manipulation exceed those of the ape.[1] And if the mental advance of the ape over the monkey seemed to place the former in a distinctly higher category, man's mental advance beyond the ape implies an even greater and more vital transformation.

Reasoning from the ape's mentality, we may detect diverse possible avenues of mental advance in proto-man. He will be intensely interested in sounds and sights. He will listen attentively and note both the pitch and some of the different qualities of sounds. He will be fascinated—especially if a movement on the part of the object takes place—by light, by colour, by movement, and by size and shape. He will dearly love to manipulate objects, since this will afford him an opportunity of exercising his delicate tactile sense. From being interested in a single object, he will come to be interested in many objects and classes of objects. He will raptly observe and manipulate many times in succession various objects new to him and, fascinated, return to them repeatedly until he knows them well and in some particularity. Similarly with properties. Subsequently, this will lead to his passing by and crudely comparing objects and properties and classes of objects and properties. Being interested in certain properties, properties as such—being blue or blueness—will also appeal to him. In a manner he will be thus able to generalise, to compare, and to abstract. But these mental powers are readily applied to manipulation, and hence he will manifest not a little ingenuity in his dealings with objects. This indefatigable mental labour tends, in its turn, to the accumulation in the mind of clearly focused facts and accordingly many definite images are formed and the mental sorting of memories develops and becomes well-nigh a passion. This leads to imagination, on the one side—partly through dreaming, love of imitation, mental exercise, and play—and to thought and forethought, on the other. Moreover, as soon as he is fairly acquainted with the *what* of things, he becomes deeply absorbed in their *howness* and *whyness,* thus greatly reinforcing his knowledge and mastery of the world.

[1]The development of the erect posture and the evolution of a higher intelligence, once started, may have favourably reacted on each other and led eventually to the emergence of man with his human physique and human mind.

One class of objects, however, appeals to proto-man more than any other, if only because of its close resemblance and relation to himself, namely, his fellow human beings. He studies these as he does other objects, delights in imitating them, equalling them, and excelling them. He profits by their experience and thus mightily augments his scanty material and mental resources. Being in such intimate contact with his fellows, he exhausts his wits in order to communicate with them. Finding, later, some means of communication developed by the race, he utilises this indirectly for putting questions and for steadying and solidifying his thought. However, not only does he learn from his fellows and is taught by them ; he deems it useful to cooperate with them, to act in concert, for enjoyment or for utilitarian purposes.

The above statements appear legitimate inferences from the advance implied in apehood growing into manhood. As a matter of fact, they are not as speculative as they seem. *They actually portray the life of the human infant*[1] until he reaches about the age of three and certain slightly later phases. They show us a human being in the earliest stages when the collective store of thought, as in infant life, was negligible ; when man was an almost completely unrealised potentiality. On some such mental foundations specio-psychism gradually built the imposing and superb edifice of the highest modern morality, science, hygiene, and art. Man, therefore, is not an educated ape, any more than the ape is an educated monkey. Man is innately far superior to the ape, even more superior than the ape is to the monkey, although—as the Stone Ages show—man's superiority is not such as to allow the individual man to invent even the simplest tool by himself. Man's inborn mental status, however, since it measurably transcends that of the apes who represent the upper limit of conceivable individuo-psychic development, opened up to men the possibility of

[1]It would be interesting to ascertain how far the earliest development of the child among primitive peoples follows, on the mental plane, the same line as that of the European child. As " the child is father of the man," its mentality may throw some light on the condition of adult minds in a primitive community, should they be different from European adult minds. Four recent works on the child mind are: Curt Koffka, *The Growth of the Mind,* London, 1924 ; Karl Bühler, *Die geistige Entwicklung des Kindes,* Jena, 1922 ; William Stern, *Psychology of Early Childhood,* London, 1924 ; and H. L. Hollingworth, *Mental Growth and Decline,* New York, 1927. See also Louis Robinson, " The Primitive Child," in *The North American Review,* October 1894, and the profusely illustrated work by Hermann H. Ploss, *Das Kind in Brauch und Sitte der Völker,* 2 vols., Leipzig, 1911, 1912.

On the other hand, careful examination may reveal identity of development, as the following passage from Buckle suggests : " Nor have we any decisive ground for saying that [the moral and intellectual] faculties are likely to be greater in an infant born in the most civilised part of Europe, than in one born in the wildest regions of a barbarous country." (*Op. cit.,* p. 177.) But Buckle was only a liberal-minded theorist.

The author has not been able to discover a single monograph on the child mind, nor indeed on the adult mind, of any primitive people. The study of customs and material cultures is not the same thing.

profiting by the experiences of their fellows near and far in space and time and led in this manner to achievements almost incalculably superior to those of apes or other animals, because these, by reason of their inferior mental outfit, are necessarily individuo-psychic. A perfect manipulative organ and a mind sufficiently developed to be innately capable of freely profiting by the thoughts of others, appear to be interdependent and indissoluble realities. The privileged place of pre-man in the animal series enabled him to develop both these and man alone is therefore a specio-psychic being.

Theoretically we might surmise that apes are sufficiently developed mentally to learn freely from others, but that native impulses and instincts, and perhaps a deficient social sense, prevent them from doing so. Thus man's unique ability to learn freely from others would not be essentially due, as we have alleged in this Section, to man's intellectual superiority over apes. The theoretical surmise is, however, unjustified, for our analysis of the magnitude of man's innate mental capacity renders it manifest that his far higher innate intelligence—as suggested by the size of his brain and by the observation of infants—*just* reaches the level permitting him to learn freely from others, and no more. Consequently, if the apes, who are less intelligent, were as free and as social as man, they would still be unequal to the task of learning freely from others.

But what do we mean by more or less intelligent ? Manifestly, a definite answer should be given to this question. Unfortunately, however, psychological science does not as yet warrant us taking that course. Thorndike hints, as we saw, at greater powers of association and so does Darwin in a way (*The Descent of Man*, p. 77). Romanes—followed by Hobhouse and others—wrote a substantial volume on the assumption that man is capable of conceptual thought and animals only of perceptual and receptual thought. And other scholars offer other explanations, as the next Section will show. In the circumstances, until comparative psychologists have made further progress, we must remain satisfied with applying provisionally the universally accepted empirical standard which leads us to associate lesser and greater intelligence with certain species of animals, placing the dog higher than the rabbit and the ape higher than the dog. Conceivably, the term "intelligence" may be expressive of numerous physical and mental factors in subtle combination.

6. *Other Explanations of Man's Distinctive Nature.*

Are there any other explanations of man's distinctive nature besides those offered by Darwin's doctrine of a sheer enormous mental advance, on the one side, and by the inter-learning theory, on the other ? There are, of course, many ; but here we have only space to examine in detail the most remarkable one, which identifies man's

greatness with the possession of articulate speech. In this connection the following extract from Huxley is noteworthy for several reasons, the principal one being perhaps the tacit ignoring of the specio-psychic origin of man's remarkable achievements. His statement as such would lead us to infer that man, like animals generally, is individuo-psychic.

These are his words:

"I by no means believe that it was any original difference of cerebral quality, or quantity, which caused that divergence between the human and the pithecoid stirpes, which has ended in the present enormous gulf between them. It is no doubt perfectly true, in a certain sense, that all difference of function is a result of difference of structure; or, in other words, of difference in the combination of the primary molecular forces of living substance; and, starting from this undeniable axiom, objectors occasionally, and with much seeming plausibility, argue that the vast intellectual chasm between the Ape and Man implies a corresponding structural chasm in the organs of the intellectual functions; so that, it is said, the non-discovery of such vast differences proves, not that they are absent, but that Science is incompetent to detect them. A very little consideration, however, will, I think, show the fallacy of this reasoning. Its validity hangs upon the assumption that intellectual power depends altogether on the brain—whereas the brain is only one condition out of many on which intellectual manifestations depend; the others being, chiefly, the organs of the senses and the motor apparatuses, especially those which are concerned in prehension and in the production of articulate speech.

"A man born dumb, notwithstanding his great cerebral mass and his inheritance of strong intellectual instincts, would be capable of few higher intellectual manifestations than an Orang or a Chimpanzee, if he were confined to the society of dumb associates. And yet there might not be the slightest discernible difference between his brain and that of a highly intelligent and cultivated person. The dumbness might be the result of a defective structure of the mouth, or of the tongue, or a mere defective innervation of these parts; or it might result from congenital deafness, caused by some minute defect of the internal ear, which only a careful anatomist could discover.

"The argument, that because there is an immense difference between a Man's intelligence and an Ape's, therefore, there must be an equally immense difference between their brains, appears to me about as well based as the reasoning by which one should endeavour to prove that, because there is a 'great gulf' between a watch that keeps accurate time and another that will not go at all, there is therefore a great structural hiatus between the two watches. A hair in the balance-wheel, a little rust on a pinion, a bend in a tooth of the escapement, a something so slight that only the practised eye of the watchmaker can discover it, may be the source of all the difference.

"And believing, as I do, with Cuvier, that the possession of articulate speech is the grand distinctive character of man (whether it be absolutely peculiar to him or not), I find it very easy to comprehend, that some equally inconspicuous structural difference may have been the primary cause of the immeasurable and practically infinite divergence of the Human from the Simian Stirps."[1] (*Man's Place in Nature,* pp. 142-143.)

Huxley's two illustrations, of the dumb individual and of the watch that will not go at all, appear to be somewhat unfortunate. The first illustration is not conclusive, since among the dumb there are those who are highly cultured, and since even among the deaf, dumb, and blind, a Helen Keller can be found who is an author of distinction.[2] According to Huxley, if we understand him aright, speech and not language is fundamental, a proposition which is

[1]Descartes had already dwelt on the supremacy of speech as distinguishing man from animals (*Discours de la Méthode,* cinquième partie), and Aristotle contended that man is the only animal which enjoys speech (*A Treatise on Government,* bk. 1, ch. 2), in which he had the authority of Socrates (Xenophon's *Memorabilia,* bk. 1, ch. 4, 10).

[2]Helen A. Keller, *The Story of My Life,* London, 1923.

certainly not true if applied to any individual or set of individuals in particular. Indeed, an island may be imagined where every inhabitant is dumb and yet highly cultured and another where every inhabitant is capable of articulate speech and is yet entirely uncultured. (It is an interesting speculation whether, other things being equal, man would not have evolved some finger or other language if he had been incapable of articulate speech.)

Again, the analogy of the watch seems misleading, for a mere destructive agency can scarcely be included among positive biological factors. The evolution of life from the amœba to the ape rather suggests a gigantic increase in complexity: compare the alimentary system of the former with that of the latter. To us it appears that the search of the explanation of the "practically infinite" divergence in "some inconspicuous structural difference" is repugnant to scientific experience, especially in natural history, where profound divergences are explained by equally profound causes, *e.g.*, the nature of the difference between plants and animals. Still, even if some inconspicuous structural difference should offer the explanation of man's uniqueness, would not that structural difference, if established, assuredly place man utterly by himself—as the possession of vertebræ, or mammæ, or of a placenta, determines zoological classification and relationship ?

Huxley's illustrations are intended to show that articulate speech, involving a trivial morphological modification, is the grand characteristic of man. The theory, however, appears to suffer from various defects. Strictly speaking, it should imply that man alone is capable of articulate speech (for otherwise man's pre-eminence remains unexplained) and that perfection in articulate speech and perfection in culture are synonymous and interchangeable expressions. Neither of these inferences is easily justified. The parrot, for example, possesses to such a degree the power of uttering articulate sounds that for all practical purposes he may be classed with man in this respect, and yet his intellectual achievements do not exceed those of the lower creation generally. Ranke writes on this point: "The organs which subserve speech and song in man, exist in the anthropoid apes, as in all higher mammals, in such a degree of development that a human being using them, would be able to speak and sing in a very perfect manner.[1] Differences exist, but in part they favour the anthropoid apes." (*Der Mensch,* vol. 1, Leipzig, 1886, p. 608.)

[1]This is not so certain now. A. Smith Woodward, referring to the man-like apes, writes: "The sharp retreat of the bony chin, the arrangement of the front teeth, and the narrowness of the lower jaw, make real articulate speech impossible." (*Fossil Remains of Man,* London, 1922, pp. 6-7.) This view counts at present many supporters and is made more plausible by the fact that animal trainers have not succeeded thus far in drilling apes into imitating human speech. However, the argument in the text is not invalidated, for a constitutionally deaf and dumb child may be educated.

Darwin also definitely ranged himself with those who regard man's vocal organs as substantially identical with the vocal organs possessed by apes. "The fact," he writes, "of the higher apes not using their vocal organs for speech, no doubt depends on their intelligence not having been sufficiently advanced." (*Descent of Man,* p. 89.) And Edward B. Tylor echoes this: "It is not merely that the highest anthropoid apes have no speech; they have not the brain-organisation enabling them to acquire even its rudiments." (*Anthropology,* London, 1895, p. 54.) That is to say, articulate speech is, according to Darwin, an effect and not a cause, the differentia lying apparently somewhere further back; or, in other words, the power of uttering articulate sounds is *not* the grand distinctive character of man. Secondly, articulate speech represents a totally inadequate criterion of intellectual achievements. The most primitive races possess perfect articulate speech and yet their culture is vastly surpassed by the highest Western culture to-day. In truth, the mere fact of being able to pronounce words faultlessly is quite consistent with abysmal stupidity and bottomless ignorance. Actual speech should be therefore regarded as a momentous outcome of specio-psychism and not as its explanation, language, vocal or other, creating an almost infinite difference between man and ape because by its means an almost infinite number of panhumanly elaborated thoughts may be retained, compressed, and placed at the disposal of the individual.[1]

Ludwig Büchner (*Kraft und Stoff,* Leipzig, 1883, p. 269) declares that "man is destined to be the ruler of the earth owing to the greater powers of his highly developed nervous system," whilst H. Taine (*De l'intelligence,* vol. 1, 1892, p. 395) states that "the psychological conditions of man's superiority will be found to lie in a greater aptitude for general ideas." Bristol quotes various authors on this subject: "Darwin stresses erect posture and prehensible thumb; Heineman holds that the mutation which made erect posture possible was in the ento-cuneiform bone and position of the *foramen magnum,* and that this change, forcing man from the tree life of his ancestors, left him at so great a disadvantage in the struggle for existence that success was possible only by the use of the little intelligence he possessed to outwit his rivals, this necessity and use determining the whole succeeding order of his evolution; others, on the contrary, hold that the development of the intellect came first and led to a new mode of life in a new environment and that this furnished the occasion for physiological variations and the selection of those that were especially serviceable. Delay in the closing of the sutures of the skull was an important factor; so too, were the development of the apparatus

[1] The notion obtains widely that articulate speech, or rather language, is the most distinctive characteristic of man. Darwin repeatedly lays emphasis on the importance of speech. (*Descent of Man,* pp. 85-86, 87-88, 89, *inter alia.*) Haeckel writes: "Genuine men developed out of the ape-like men of the preceding stage by the gradual development of the animal language of sounds into a connected or articulate language of words." (*The History of Creation,* vol. 2, 1892, p. 399.) And again: "Those processes of development which led to the origin of the most ape-like men out of the most man-like apes must be looked for in the two adaptational changes which, above all others, contributed to the making of man, namely, upright walk and articulate speech." (*Ibid.,* p. 405.) Henry Drummond observes that "the enormous distance travelled by the mind of man beyond the utmost limit of intelligence reached by any animal is a puzzling circumstance, a circumstance only equalled in strangeness by another—the suddenness with which that rise took place," and explains this by the development of language. (*The Ascent of Man,* London, 1894, p. 190.) And George B. Cutten writes: "It is not unlikely that the power of articulate speech was one of the chief factors in the rise of man to his human status." (*Mind, Its Origin and Goal,* New Haven, 1925, p. 52.)

of speech, the organ of speech located by Broca in the third frontal convolution of the brain, the nervous connection between the organ and the apparatus, the development of the cerebrum, and the free use of the forearms made possible by erect posture and terrestrial life." (*Social Adaptation,* Cambridge (U.S.A.), 1915, p. 210.)

Here are some other opinions:

Romanes writes: "This power of introspection it is that goes to constitute the one and only distinction between the human mind and mind of lower animals, whether we call this distinction the faculty of Self-consciousness, of Abstraction, of Reason, of *Logos,* or by any of the other terms which are habitually used to signify this unique power of a mind to turn in upon its own self and examine its own ideas." (*Essays by George John Romanes,* London, 1897, p. 89.) He also refers to "the high powers of abstraction that are the only distinctive features of the human mind" (*ibid.,* p. 76), and imagines language (which is a *product* of collective human thought) to have been the cause of man's self-consciousness. And, again, "The whole distinction between man and brute resides in the presence or absence of conceptual thought, which, in turn, is but an expression of the presence or absence of self-consciousness." (*Mental Evolution in Man,* London, 1888, p. 430.)

His opponent, St. George Mivart (*The Origin of Human Reason,* London, 1889, p. 301), claims that "language *is* the 'rubicon of mind,'" or as he expresses it in another place (*On Truth,* London, 1889, p. 524): "Man's distinctive prerogative—the power of rational speech. . . ."

"The enormous development of the brain constitutes the chief distinction between man and all other animals," says Hermann Klaatsch, in his "Die Stellung des Menschen im Naturganzen." (*Die Abstammungslehre,* Jena, 1911, p. 373.)

Julian S. Huxley (*The Individual in the Animal Kingdom,* Cambridge, 1912, pp. 6-7, 13, and 64-65) stresses the high development of man's brain.

Irwin Edman (*Human Traits and their Social Significance,* 1922, p. 15) writes: "Man's uniqueness as the exclusive user and maker of tools is made possible by two things. The first is his hand, which with its four fingers and a thumb, as contrasted with the monkey's five fingers, enables him to pick up objects. The second is his capacity for reflection . . . which enables him to foresee the consequences of the things he does."

Carveth Read (*The Origin of Man,* Cambridge, 1925) is emphatic as to the origin of man's special characteristics: "Of the addiction of some ancestral ape to animal food, and to the life of a hunter in order to obtain it, the special characteristics of Man seem to be a natural consequence." (p. 39.) Again, "Sociability in ape-life would in no way account for our present character as men, nor for the structure of our societies; nothing accounts for these things, except the early formation of the hunting pack." (p. 54.) And yet somehow the sociable wolf of the hunting-pack is no more specio-psychic than the proud carnivorous tiger who disdains to hunt in company.

In his *System of Animate Nature,* 1920, J. Arthur Thomson states: "There is little that we can regard as decisive [in relation to the difference between animals and man] save the size and complexity of the brain, of the cerebral cortex in particular." (p. 553.) The specio-psychic factor is not entirely forgotten. "Of vast importance as well is the extra-organismal heritage, the social heritage of literature and art, the folk-ways of customs and tradition, the external registrations which we call institutions." (p. 562.)

Ludwig Stein (*op. cit.,* p. 125) says: "Without social life, no language; without language, no thought; without abstract thought, no dividing line between man and animal."

Paul Alsberg (*Das Menschheitsrätsel,* 1922) claims that what differentiates man from animals is his primary dependence on extra-organismal instead of on organismal tools. (p. 192.) Otherwise expressed, the principle of animal development is that of the adaptation of the body; of man, that of the elimination of the body. (p. 205.)

L. T. Hobhouse (*Mind in Evolution,* 1926, p. 336) states: "The 'world of ideas' or of universals, is generally, and I believe rightly, taken as the distinctive property of humanity."

Grafton Elliot Smith (*The Evolution of Man,* 1924, p. 36) directs particular attention to man's specialised brain: "It is the steady growth and specialisation of the brain that has been the fundamental factor in leading Man's ancestors step by step upward from the lowly Insectivore status, and through every earlier phase in the evolution of Mammals—for Man's brain represents the consummation of precisely those factors which throughout the Vertebrata have brought their possessors to the crest of the wave of progress."

George G. McCurdy (*Human Origins*, vol. 1, New York, 1924, p. 431) offers this explanation: "At least three physical factors are requisite [to constitute man] —the hand, a brain that is fairly well balanced on a spinal column normally approximately erect, and stereoscopic vision. . . . Given this physical complex, a culture that we may call human would as surely follow as does the day the night."

See also Maurice Parmelee, *The Science of Human Behaviour*, New York, 1913.

It is highly significant that but for A. J. Thomson, none of the above authors appear to be aware of the specio-cultural factor, without which, as we have seen, we should have no language, no tools, no sustained thought, and no refinement.

To conclude. There are two main aspects to the general problem of man's fundamentally distinctive nature. The first of these, that of his culture being or not being a specio-psychic product and the immediate implications of the process of being able to learn freely from one's fellows, we have already discussed in some detail. In regard to the second—assimilative and, more especially, creative—aspect which scholars have been almost exclusively concerned to account for, as is manifest from the quotations which precede this paragraph, we have not omitted to grapple with it. We have stressed more particularly a measurable increase in intelligence beyond the ape (who had reached the mental stage where he could all but learn freely from others), man's liberation from the straightjacket of individuo-psychic instincts, and his later acquisition of specio-psychic inclinations. However, on the problem of the precise explanation of man's inborn assimilative and creative powers,—whether, for instance, they are due to a larger and finer brain or to the emergence of conceptual thought,—there is ample room for discussion, seeing that there is no consensus of opinion as to what constitutes intelligence. In fact, we are anxious not to appear to have offered a circumstantial explanation on this point, since that might lead to futile argumentation and thus divert attention from the pivotal fact that man is primarily a specio-psychic being and that he is this because an intelligence appreciably exceeding that of the higher apes, who in the animal series had reached the upper limit of individuo-psychism, must naturally issue in the mental interdependence and consequent limitless cultural evolution of mankind. Hence for us the specio-psychic factor—primarily the ability to learn freely from others near and far in space and time—is of paramount importance, because without it, it seems, man would never have emerged from the earliest eolithic stage.[1]

[1]Voltaire expresses the same idea of man's complete dependence on pan-human culture: "Any one living an absolutely solitary life would soon lose the power of thinking and speaking; and would end in becoming metamorphosed into an animal." (*Dictionnaire philosophique*, édition Touquet, Paris, 1822, vol. 5, article "Homme," p. 484.) Jean-Jacques Rousseau places uncultivated man even below the beasts, as he rightly surmises that man is largely destitute of instincts. In the course of a discussion relating to the differences existing between man and animals, he writes: "Why is man alone subject to being converted into an imbecile? Is it not because he returns thus to his primitive condition and that whilst the brute, which has acquired nothing and can be therefore deprived of nothing, retains always its instincts, a man, losing through senility or other accidents all that he acquired through his perfectibility, falls as a result to a lower level even than the brute?" (*Discours sur l'origine et les fondements de l'inégalité parmi les hommes*, Amsterdam, 1755, p. 33.)

CHAPTER VI.

MAN'S PLACE AMONG LIVING BEINGS.

1. *The Cultural Aspect.*

WE have thus far deliberately refrained from formulating any definite conclusions in respect of the systematic position of specio-psychic man. The moment has, however, arrived to treat the subject with the gravity it deserves. Up to this point, except for incidental remarks, it would have been feasible to surmise that however novel freely learning from others' experience may be, it has, from the systematist's point of view, perhaps only a species value. On the other hand, it remained an open question whether this character was not possibly so important that its possession ranked a species right above the animal world into a separate kingdom.

In order to secure a judicial verdict, we shall first let Darwin speak.[1] The reader will be thus able to supply a scientific touchstone to the critical and constructive remarks which are to follow.

" Some naturalists, from being deeply impressed with the mental and spiritual powers of man, have divided the whole organic world into three kingdoms, the Human, the Animal, and the Vegetable, thus giving to man a separate kingdom. Spiritual powers cannot be compared or classed by the naturalist: but he may endeavour to shew, as I have done, that the mental faculties of man and the lower animals do not differ in kind, although immensely in degree.[2] A difference in degree, however great, does not justify us in placing man in a distinct kingdom, as will perhaps be best illustrated by comparing the mental powers of two insects, namely, a coccus or scale-insect and an ant, which undoubtedly belong to the same class. The difference is here greater than, though of a somewhat different kind from, that between man and the highest mammal. The female coccus, whilst young, attaches itself by its proboscis to a plant ; sucks the sap, but never moves again ; is fertilised and lays eggs ; and this is its whole history. On the other hand, to describe the habits and mental powers of worker-ants, would require, as Pierre Huber has shewn, a large volume. I may, however, briefly specify a few points. Ants certainly communicate information to each other, and several unite for the same work, or for games of play. They recognise their fellow-ants after months of absence, and feel sympathy for each other. They build great edifices, keep them clean, close the doors in the evening, and post sentries. They make roads as well as tunnels under rivers, and temporary bridges over them by clinging together. They collect food for the community, and when an object, too large for entrance,

[1] Although Darwin's broad identification of cultural status with natural status (and all that this implies) is ostensibly combated in this work, all more modern views involving noticeable differences in inborn mental capacity in individuals, peoples, or races are tacitly comprehended in the criticism. Indeed, this criticism covers all the theories which do not recognise that, owing to the individual's microscopic innate powers, every stateable cultural achievement is a comprehensively collective product—that is, that in such an achievement the strictly unassisted contribution of any one given contributor is so small that it may be safely ignored in a general estimate.

[2] [It is probably true that up to man all mental differences are a matter of degree, and this because sensibility, instincts, and intelligence are at the very foundation of animal life as such. In reality, it is the replacement of individuo-psychism by specio-psychism, of individual thought by pan-collective thought, and not any amazing difference of degree in native capacity, which introduces a new factor in the world of mind.]

is brought to the nest, they enlarge the door, and afterwards build it up again. They store up seeds, of which they prevent the germination, and which, if damp, are brought up to the surface to dry. They keep aphides and other insects as milch-cows. They go out to battle in regular bands, and freely sacrifice their lives for the common weal. They emigrate according to a preconcerted plan. They capture slaves. They move the eggs of their aphides, as well as their own eggs and cocoons, into warm parts of the nest, in order that they may be quickly hatched; and endless similar facts could be given. On the whole, the difference in mental power between an ant and a coccus is immense; yet no one has ever dreamed of placing these insects in distinct classes, much less in distinct kingdoms. No doubt the difference is bridged over by other insects; and this is not the case with man and the higher apes. But we have every reason to believe that the breaks in the series are simply the results of many forms having become extinct." (*The Descent of Man*, pp. 146-148.)

Again:

"The greater number of naturalists who have taken into consideration the whole structure of man, including his mental faculties, have followed Blumenbach and Cuvier, and have placed man in a separate Order, under the title of the Bimana, and therefore on an equality with the orders of the Quadrumana, Carnivora, &c. Recently many of our best naturalists have recurred to the view first propounded by Linnæus, so remarkable for his sagacity, and have placed man in the same Order with the Quadrumana, under the title of the Primates. The justice of this conclusion will be admitted: for in the first place, we must bear in mind the comparative insignificance for classification of the great development of the brain in man, and that the strongly-marked differences between the skulls of man and the Quadrumana (lately insisted upon by Bischoff, Aeby, and others) apparently follow from their differently developed brains. In the second place, we must remember that nearly all the other and more important differences between man and the Quadrumana are manifestly adaptive in their nature, and relate chiefly to the erect position of man; such as the structure of his hand, foot, and pelvis, the curvature of his spine, and the position of his head. The family of Seals offers a good illustration of the small importance of adaptive characters for classification. These animals differ from all other Carnivora in the form of their bodies and in the structure of their limbs, far more than does man from the higher apes; yet in most systems, from that of Cuvier to the most recent one by Mr. Flower, seals are ranked as a mere family in the Order of the Carnivora. If man had not been his own classifier, he would never have thought of founding a separate order for his own reception." (pp. 149-150.)

Lastly:

"Although, as we have now seen, man has no just right to form a separate Order for his own reception, he may perhaps claim a distinct Sub-order or Family. Prof. Huxley, in his last work [*An Introduction to the Classification of Animals*, 1869, p. 99] divides the Primates into three Sub-orders; namely, the Anthropidæ with man alone, the Simiadæ including monkeys of all kinds, and the Lemuridæ with the diversified genera of lemurs. As far as differences in certain important points of structure are concerned, man may no doubt rightly claim the rank of a Sub-order; and this rank is too low, if we look chiefly to his mental faculties. Nevertheless, from a genealogical point of view it appears that this rank is too high, and that man ought to form merely a Family, or possibly even only a Sub-family."[1] (*Ibid.*, p. 152.)

Here is an up-to-date authoritative classification: "In that part of the living animal kingdom to which man belongs, there are five families—the human family, that of the great anthropoids, that of the small anthropoids, the family of catarhine or Old World monkeys and the family of platyrhine or New World monkeys. These families are separated by structural gaps of about equal magnitude. From the platyrhine monkeys upwards, these families form an ascending series in the sense that each succeeding family marks a further departure from the ancestral tarsioid type, the point of highest differentiation being reached in the human family." (Arthur Keith, article "Man, Evolution of," in *Encyclopædia Britannica*, 14th edition, 1929, p. 760.)

[1] Isidore Geoffroy Saint-Hilaire's *Histoire naturelle générale des règnes organiques* (3 vols., Paris, 1854, 1856, 1862), contains a chapter dealing with classifications relating to man. He himself regards man as forming, physically considered, a family and, spiritually considered, a separate kingdom. The latter may be taken to be a sop thrown to Cerberus.

In our Chapter on Characters Common to Animals and Man we endeavoured to make it clear that, so far as man's general bodily structure is concerned, we accept substantially Darwin's and Huxley's estimate of man's place in nature. We also adopt unhesitatingly the latest classification of the Primates which, omitting here the Lemuroidea and the two American families of monkeys, comprise the Old World Monkeys or *Cercopithecidæ,* the Anthropomorpha or *Simiidæ,* and, if and in so far as man is to be classed among animals, man himself or the *Hominidæ.*[1]

As Darwin, however, repeatedly expressed it, the pivotal genealogical problem is that relating to man's mind. In regard to this point Darwin contends that "the mental faculties of man and the lower animals do not differ in kind, although immensely in degree." (*Descent of Man,* p. 147.) On our attitude towards this hypothesis it hinges what place we shall assign to man.

Now, as we are aware from the numerous passages we have quoted, for Darwin the cultural status of a human being approximately indicates his congenital mental capacity.[2] If for a moment we place ourselves on such a platform, we shall readily concur in the statement that the degree of the difference between animals and man is immense.[3] What meaning shall we attach to the term "immense"? Comparing any specimen of the higher apes with some one like Sir Fullman Lovetruth —and there are thousands resembling him,—we should be obliged to argue that some highly cultivated human beings are mentally millions of times, maybe hundreds of millions of times, superior to any ape. Now we would submit that for any being so closely akin to the apes as man is, to transcend their native intelligence almost incomputably, suggests nothing less than a miracle. From the amœba to the ape, the minds of animals evolve with unconscionable slowness, and yet we are invited to imagine that suddenly intelligence makes a leap covering a distance as great as that from the amœba to the ape. We are the more loth to accept this view because, according to Huxley— and his conclusions express broadly the attitude of modern biologic

[1] A. E. Shipley and E. W. MacBride, *Zoology,* Cambridge, 1920; T. Jeffrey Parker and William Haswell, *A Text-Book of Zoology,* 2 vols., London, 1921; J. Arthur Thomson, *Outlines of Zoology,* London, 1921. Adam Sedgwick (*A Student's Text-Book of Zoology,* vol. 2, London, 1905) agrees with the above classification, save that he includes man among the *Simiidæ;* so does Harris H. Wilder (*The Pedigree of the Human Race,* New York, 1926). H. L. Wieman writes: "Man belongs to the Class *Mammalia,* Order *Primates,* Sub-order *Anthropoidea,* Family *Hominidæ,* Genus *Homo,* of which there is one living Species, *sapiens.*" (*General Zoology,* New York, 1927, p. 209.)

[2] Darwin confuses "the mental equipment which we receive from the civilisation to which we belong, with the mental capacity with which nature has endowed us." (Benjamin Kidd, *Social Evolution,* London, 1920, p. 275.)

[3] To be exact, we should say "the degree of the difference between animals and certain men is immense," for, *e.g.,* the difference which divided man and ape in eolithic times can scarcely be regarded as "immense," inasmuch as it was about as great as that between monkey and ape.

science generally—a comparative study of the human brain appears to suggest no "immeasurable and practically infinite divergence of the human from the Simian Stirps." Neither in Darwin, nor in Huxley, nor in any other exponent of biology, do we find evidence of man being in brain capacity vastly superior to the apes. On the one side, then, we are invited to note such an incalculably great space between the mentality of man and apes as entirely passes beyond anything we have a right to anticipate and, on the other, no evidence is forthcoming to show that man's brain differs immensely from that of his nearest animal relations. In Chapter III. we quoted a passage from Huxley graphically illustrating the course of the evolution of the brain and from that illustration we should be irresistibly inclined to infer that if mentally man differed immensely from apes in degree, the clearest traces would present themselves to the neurologist. Yet according to Huxley and the generality of anatomists no such evidence is on record.

However, Darwin bids us not to regard great mental differences as exceptional in the animal kingdom. He compares for this purpose, as we have seen, a coccus or scale-insect with an ant. The cogency of this argument may be impugned on more than one ground. Darwin, for example, does not suggest that the ant and the scale-insect are closely related. They belong, it is true, to the same class. Since, however, a class, as the *Mammalia* or the *Insecta,* contains innumerable forms exemplifying stages of development immensely removed from each other and since, on the other hand, according to Darwin, the apes are man's near relatives, man belonging, according to him, to the same Order and even to the same Family, the comparison scarcely appears a close one. As a matter of fact, whilst the degenerated female coccus and the ant differ enormously in organisation, the difference in structure between man and the highest apes is, by comparison, trivial. Besides, instead of comparing the coccus with a given ant species, Darwin stresses what are really the attributes of *several* of the most remarkable ant species. Moreover, the example chosen is an unfortunate one for another reason. Animals, like the female coccus, which permanently attach themselves to some object, are invariably degraded to a plant-like existence. They have a minimal need for a mind and their body tends to lose much of its complexity. By coming to be motionless, they forfeit the higher mental attributes which are only developed through integral locomobility. Senses, instincts, intelligence, reach in these cases their lowest level. A fixed animal is an anomaly, a virtual, though not a biological, contradiction. Mind develops with integral locomobility and shrivels into mindlessness in its absence.[1] Finally,

[1]Parasitism among plants has a like revolutionary effect on the parasite: "The Dodder (*Cuscuta*), which grows with such deadly success on the Clover and Furze, appears to have lost all differentiation of stem, root, and leaves, and has become a mere tangle of fine pinkish fibres, which attach themselves to the

whilst inherited dispositions explain almost completely the manifold activities of ants, non-inherited pan-species thought explains almost completely the manifold activities of man. Thus, speaking of ants, Auguste Forel, in his *Mensch und Ameise* (Vienna, 1922, p. 17), writes: "Their in greatest part only seeming intelligence is almost exclusively determined by species instincts. Very little is left to the memory and to the individual judgment under doubtful and exceptional circumstances."[1] In other words, in principle the mentality of man is as far removed from that of the ant as it is from that of the scale-insect, since both these latter are individuo-psychic.

Moreover, the doctrine that all actual mental differences represent degrees in innate mental capacity, drives us into another morass from which we find it difficult to extricate ourselves. According to this conception, whilst the ape is immensely inferior to the "savage," the "savage" is immensely inferior to the average educated European, and the latter immensely inferior to the illustrious scholar. Hence, just as in comparing man with his nearest animal relations the Darwinian unintentionally does violence to all that we know concerning nearly related kinds, so we place ourselves in fatal contradiction with all that we know of any animal species by positing that degrees of actual mental differences in men are due to degrees in innate mental capacity. Remaining within the great verities of biology, we must assume that men's innate intelligence is only slightly higher than that of apes and that men, as the members of animal species generally, differ only slightly from one another in native mental capacity.

The fallacy involved in comparing men and men, on the one hand, and men and animals, on the other, without regard to the educability of man was already effectively exposed a hundred years ago. John B. Sumner (later, Archbishop), in his *Treatise on the Records of the Creation* (vol. 2, 1825), wrote thus on this subject: "It has been sometimes alleged, and may be founded on fact, that there is less difference between the highest brute animal and the lowest savage, than between the savage and the most improved man. But in order to warrant the pretended analogy, it ought to be also true that this lowest savage is no more capable of improvement than the chimpanzee or orang-outang. . . . Animals, in short, are born, with no material exception, what they are intended to remain, and bring their instincts with them into the world. . . . But man must be taught, either by precept or example, to direct his bow, to climb his tree, to construct his hut:

stems of other plants and draw all nourishment from them. . . . One of the most interesting examples of a reduced structure is the plant body of the giant-flowered Rafflesia. This has the largest flower in the world, and it appears to have no vegetative body at all! That is because it is so completely parasitic that it gets the whole of its nourishment from a host on which it preys, so that it can afford to reduce its own vegetative body to a minimum, *viz.*, a series of white fungus-like threads which are enclosed in the body of the host. In this plant roots, stems, and leaves are all gone except for the modified leaves of the flower." (Marie Stopes, *Botany*, 1919, pp. 25-26.) On the subject of parasitism consult the suggestive little volume *Parasitism, Organic and Social*, by Jean Massart and Emile Vandervelde, London, 1895, and also M. Caullery, *Le parasitisme et la symbiose*, Paris, 1921.

[1] W. M. Wheeler (*Ants:* Their Structure, Development, and Behaviour, New York, 1913) reasons to the same effect. See also the same author's *Social Life among the Insects*, London, 1923; G. H. Carpenter, *Insects:* Their Structure and Life, London, 1924; and E. L. Bouvier, *The Psychic Life of Insects*, New York, 1922.

the rudest savage is only stimulated by instinct, and not instructed." (pp. 21-22.) Sumner makes his comparison plain as regards men's educability: "The rudest savage who may be compelled, as it has been pathetically said, to shelter himself beneath a heap of stones from the wind and rain, is 'born with all those faculties which culture refines and education expands.'" (pp. 22-23.) Our author's conclusion is irresistible: "There is nothing philosophical in the comparison of a being possessed of improvable reason, with one that is governed by natural instinct, because there is no just analogy between the talents which are compared." (p. 23.) Yet a hundred years after Sumner this incontrovertible fact has not been recognised by numerous thinkers who naïvely account for varying degrees in cultural attainments by corresponding variations in innate mental capacity.

Indeed, two centuries before Sumner, Francis Bacon (*Novum Organum*, Spalding's translation, bk. 1, aphorism cxxix) wrote: "Let a man only consider what a difference there is between the life of men in the most civilised province of Europe, and in the wildest and most barbarous districts of New India; he will feel it be great enough to justify the saying that 'man is a god to man,' not only in regard of aid and benefit, but also by a comparison of condition. *And this difference comes not from soil, not from climate, not from race, but from the arts.*" (Italics ours.)

Shall we assert, then, that men's minds are of different quality to those of animals? In the common acceptation of the expression we should reject the implication, for the several powers of men's minds are virtually identical with those of the higher animals, as we learnt in Chapter III. But if we ascribe to the words "kind" and "quality" a more elastic meaning, it is incontestable that a special factor accounts for the prodigious mental achievements of mankind. In speaking of such a special factor or "spiritual power," we are not advancing a theory, but are directing attention to a *vera causa*. No educated person questions for a moment the fact that the language he speaks has been slowly evolved and has been acquired by him from others post-natally. Similarly, the material and mental tools he employs are indubitably the product of the labours of countless minds through countless ages. Accordingly, without entering into details in this place, we may confidently state that man's august cultural status is due primarily and quintessentially to his distinctive power of being able to profit almost infinitely by the mental labours of his fellows near and far in space and time. This novel and special specio-psychic factor, itself due to a slight but critical increase in the inborn mental capacity of man beyond that of his progenitor who belonged to the most intelligent family of animals, offers therefore a simple and natural explanation of some men's almost limitless superiority over other men and the almost limitless potential superiority of man over animals.

Furthermore, approaching the matter from the opposite direction, it can be shown—and we shall endeavour to attempt this in subsequent Chapters—that intrinsically the individual's unaided achievements are exceedingly modest and that the presumed eminence of certain individuals admits of a social explanation. We have learnt, for instance, that for long ages man used partially flaked and then chipped flints, later ground and polished ones, and subsequently tools and objects made of various metals and of many other natural and artificial substances. Earliest man, therefore, almost completely lacked what we comprehend to-day by the name civilisation or culture. In the

course of the ages, however, collective thought produced more and more substantial results—although, according to anthropologists, these were, from Aurignacian times onward, in no way due to growth in innate mental capacity—until we reach our century with its wild cultural luxuriance. No enormous mental differences between men, on the one hand, and between men and apes, on the other, could have been explicitly traceable at first, for the earliest human culture fell far below that possessed by the most untutored primitives to-day. In fact, as we have also seen, since for all but the last few thousand years of man's history no single individual seems to have been able, without the aid of the cultural heritage, to invent a single tool or even considerably to improve one, it is manifest that any one's strictly individual contribution to-day is probably microscopic and that there has been in historic, as in later prehistoric, times no visible growth or variation in the innate mental capacity of human beings. Besides, the crania of those early men—omitting the earliest men—roughly equalled and frequently surpassed ours,[1] so that there are no adequate grounds for assuming considerable organic progress from those days to our own and certainly not from earliest neolithic times when the present races of men were all in existence and when, nevertheless, the foundations of modern civilisation were only on the point of being laid. Moreover, in speaking in Chapter IXa. of the method of progress, we shall learn that to-day also the strictly individual contributions are infinitesimal, whilst ample evidence has been submitted to suggest the like indefinite educability of the members of all human races. In the latter connection we have found, for instance, that the Australian aborigines, whose cultural status is about the lowest extant, respond to all appearance equally well as the white races to specio-psychic tests, as expressed primarily by school experiences. Hence every reason exists for holding that, in conformity with a fundamental law in biology, men differ as little congenitally from one another in mentality as do the members of animal species generally and that the striking cultural diversity observable historically, geographically, communally, and individually, is to be explained first and foremost by cultural causes. Accepting this view of men's nearness innately to their fellows and to their nearest animal relations in respect of mental constitution, man ceases to be a monstrosity and becomes a species like any other as regards affinities within and without his kind.[2] To the naturalist such a conception should afford a welcome relief.

[1] "Of all the skulls of that species [*i.e.*, Neanderthal man], there is scarcely one but what measures more than 200 mm. in length, a figure seldom attained by the modern species." (H. H. Wilders, *The Pedigree of the Human Race*, New York, 1926, p. 145.) On this race, see Ales. Hedlicka, "The Neanderthal Phase of Man," in *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 1927.

[2] On the problem of man's and men's innate mental capacity, see especially Chapter IV. (Section 9), Chapter V. (Section 4), and this Chapter (Section 3).

Seeing, therefore, that the apparent mental differences between man and animals, on the one side, and between men, on the other, are accounted for by a special factor—human beings alone being able to learn freely from their fellows—man may be said to differ in kind and not in degree only from animals.

From this, however, we cannot logically conclude—certain biologists argue—that man occupies a particularly distinct place in the world of life. Darwin has lucidly illustrated this : "The family of Seals," he writes, "offers a good illustration of the small importance of adaptive characters for classification. These animals differ from all other Carnivora in the form of their bodies and in the structure of their limbs, far more than does man from the higher apes ; yet in most systems, from that of Cuvier to the most recent one by Mr. Flower, seals are ranked as a mere family in the Order of the Carnivora." (*Descent of Man,* p. 150.) A casual survey of the animal kingdom reinforces this lesson. The trunk of the elephant, the horn of the rhinoceros, the neck of the giraffe, the web of the spider, the tentacles of the octopus, and flying fishes, flying squirrels, and bats, warn us against drawing hasty conclusions from exceptional characters. In truth, reduced to its simplest term, the possession of a certain unique character by a species affords of itself no proof of exceptional status in the hierarchy of species. Other things being equal, speciopsychism may have no great value from the systematist's point of view. It may represent a peculiar adaptive character and no more. Only if it involved a novel character replacing a character present in all species of plants and animals alike, should we be justified in placing man in a separate kingdom. If such were the case, Darwin's illustration would not be apposite, and this is our contention. Seals, as a matter of fact, have more or less adapted themselves to a mode of life common to a whole class of animate beings, the fishes, and exhibit no novel character replacing an attribute present in all species of plants and animals alike.

Now integral locomobility is the prime differentiating character of the animal kingdom, as we have seen. As soon as parasitism had developed in the first stage of plant existence,[1] the possibility appears to have been given of the parasite improving its position by freely moving from place to place in order primarily to secure more abundant and more suitable sustenance and the most desirable mate. Consequently, the evolutionary process soon produced living beings which proceeded integrally from locality to locality. Once this character was established, the potentialities involved therein began to realise themselves through the agency of natural selection. Animals, to consider

[1]An alternative theory holds that non-living organic substances existed during the first period of organic evolution and that the first animal organisms subsisted on these. (E. J. Allen, "The Progression of Life in the Sea," in *British Association Report for 1922.*)

only the higher ones, evolved fins and peopled the waters; they evolved wings and sailed through the air; they evolved limbs and roamed over the earth; and they evolved diverse other means of integral locomotion. Increased activity required more heat and swifter metabolism, and thus an elaborate respiratory and vascular system with the lungs and the heart for their respective centres and a no less elaborate alimentary system, with mouth, stomach, intestines, liver, kidneys, lymphatic system, etc., came into existence. Stimulated by the same central cause, a muscular and nervous system evolved. The development of the senses became likewise imperative right from the commencement. Special impulses, organs, and instincts came into being on the active side and a central nervous system and an intelligence of an ever higher order completed the grand fabric.

If parasitism was the starting point of animal life, its evolution was remarkably accelerated by the development of parasitism of the second degree. This will be evident when we contemplate the amount and kind of activity evoked by finding pasture, on the one side, and by hunting and being hunted, on the other. The latter activities favoured all variations of a germinal character which led to great somatic and mental complexity and efficiency.

Whilst at the lower terminus of the series it is sometimes difficult for the systematist to state whether a particular living being is plant or animal, at the upper terminus the differences are abysmal.

Biological classifications are not invalidated by exceptions, for owing to the gradual evolution of living forms and to peculiar environmental circumstances, exceptions are regarded as natural. To cite a few examples. It is the virtually invariable rule for species to derive their oxygen from the atmosphere and their nitrogen from nitrogenous compounds. Yet some bacteria procure their oxygen through decomposing oxygen-containing compounds and their nitrogen directly from the air. Similarly, whilst it is regarded as a distinctive feature of plants to possess chlorophyll, a few lowly animal forms have it,[1] and whilst plants are supposed to derive their nutriment from non-living sources, there are, besides plant parasites, hundreds of insectivorous plant species. Cases of a different kind are the links which connect different classes of living forms—*e.g.*, the Amphyoxus foreshadowing the Vertebrata, the Amphibians illustrating the development of land animals from aquatic animals, the Monotremata which are at once oviparous and mammalian, and the apes which connect upright *Homo* with the monkeys. Sometimes, indeed, classification is determined by genealogical considerations: "A particular living being is reckoned as animal or plant according to the general characteristics of the group to which it belongs, even should its own individual peculiarities be in some respects irreconcilable with the general definitions of animal or plant." (E. W. MacBride, *Zoology*, London, 1922, p. 10.) *Accordingly, we need not look for a definition of man which shall divide him absolutely and utterly from animals and plants.*

The comparatively naked simplicity in structure and function of all plants is due to the absence in them of the factor of integral locomobility, for the needs of a stationary being are decidedly primitive and can be accordingly satisfied without a complicated somatic and mental outfit. Indeed, as we have seen, where stationariness marks an animal species, the animality of that species is at, or falls to, the

[1]See Frederick W. Keeble, *Plant-Animals*, Cambridge, 1910.

lowest level and where there is relative complexity in plants, as in the colours and contrivances of wild flowers, it is mainly due to the influence of locomobile insects. Likewise, whilst there are numerous carnivorous plants, their possibilities of physical and mental development remain inappreciable because integral locomobility alone can call forth extensive physical and mental complexity.

The systematist is hence amply justified in placing animals in a separate kingdom, for integral locomobility, which is the principle of animality, represents not only a novel principle involving the absence of a factor which is present in all plants alike, but it engenders the most far-reaching effects.

Now can man claim to possess an equally novel and sweeping attribute, one that not only involves the absence of a factor which is present in all plants and animals alike, but that opens the gates to a vast and new world ? This should reveal itself by an appraisement of the nature and of the effects of pan-human thought. Specio-psychism has introduced into the life of the globe a factor which has the tendency to surpass the achievements of animal species as far as these surpass the achievements of plant species. On a higher plane—that of the intelligence—the process which we perceive to be in operation in integral locomobility appears to be repeated in specio-psychism.[1] Here also we commence with a kind of parasitism—*i.e.*, taking advantage of the inventions and discoveries of our fellows. Here also we begin with trifling deviations : with barely flaked flints and with a wholly rudimentary language. Here, too, the cumulative factor enters and in the course of time develops a mode of life which almost infinitely transcends in complexity and significance that of individual species of ants and other animals. Here likewise there is a single and unique influence—in this case, the need and capacity to profit by the mental endeavours of our fellows near and far in space and time.

However, two apparent contradictions emerge as the enquiry proceeds. First, man begins as a full-blown animal, whilst animals begin as plants or quasi-plants of the most primitive type. Manifestly, this distinction is a matter of circumstance. Integral locomobility became practicable in perhaps the earliest phases of life, whilst, as shown in the last Chapter, species thought only became possible when animals had reached the upper limit of their mental development. Secondly, the principle of specio-psychism, although it gives rise in time to a mode of life excelling as much that of animals as that of animals excels that of plants, fails to give birth to an endless variety of species as integral locomobility does. This latter objection brings us to the veritably vital correspondence as to far-reaching consequences

[1]The analogy becomes closer still if we regard the animal mind as guided by instincts (which are necessarily fixed) and the human mind as guided by thought (which is necessarily mobile).

which subsists between the two fundamental principles which we are comparing.

Integral locomobility, as was implied in the first Chapter, left in undisputed sway the laws of organic evolution which controlled the plant world. It was by means of these—congenital variability and natural selection—that ever higher grades of animals evolved. Specio-psychism, on the contrary, challenges and supersedes these laws and proves therefore to be immensely more radical. It reduces germinal variations in man to practical indifference, since cultural variations come to be of superior value for adaptation, and it equally reduces to virtual impotence the factor of natural selection in man through replacing it by cultural selection. Specio-psychism enables man, as Alfred Russel Wallace expresses it, "to keep with an unchanged body" and unchanged mind "in harmony with the changing universe." Whilst the lower animals, as Darwin states, "must have their bodily structure modified in order to survive under greatly changed conditions," man adapts himself to almost any set of conditions through cultural modifications. The new principle of evolution renders obsolete in this way the older principles and achieves *within the species,* as we shall soon see, what the older principles could only compass by *creating new species.* Dispassionately considered, it behoves us to ask ourselves whether in the principle of specio-psychism we do not encounter a principle as fundamental and as revolutionary in its effects as the principle of integral locomobility, and if this is so, we have no option but to place man in a separate kingdom.[1]

Man has already had an incalculable influence in transforming the surface of the earth and in domesticating and extirpating many species of plants and animals. With the lapse of the ages he will inhabit the whole earth and probably all larger wild animals not amenable to being tamed will experience the sad fate of their exterminated fellows in many Western countries, a few only being preserved in reserves, as now in the United States and elsewhere. The total surface of the globe, including soil, plants, and animals, will accordingly fall under his supreme mastery and control. This is assuredly a dominant position utterly without parallel in the long annals of the world.

Man's enormous superiority reveals itself in other significant ways. In Chapter II. we noted the amazing disparity in complexity which would become apparent if we compared a vertical middle section of an oak tree with a horizontal middle section of a lion. Now when we compare the outward appearance of the lion with the outward appearance of Sir Fullman Lovetruth, the disparity is even greater. We are

[1]Specio-psychism thus explains the bare fact we noted at the commencement of Chapter III. that the otherwise universal principles of evolution and over-reproduction do not of necessity apply to man.

tempted to dwell on this for a moment, since it graphically illustrates our thesis. The lion is permanently in the condition of Sir Fullman when he issues from his cold bath in the morning. Look now at Sir Fullman when on the way to his University on a winter's morning. (Of course, different seasons and occasions will find him differently attired.) He wears warm socks, over these boots, and over these gaiters. He wears trousers and underneath pants. He wears next to his body a woollen vest, then a shirt, then a waistcoat, then a jumper, then a coat, and then a winter overcoat. His shirt is topped by a collar, a tie with tie pin is attached to the collar, and a warm scarf covers these. He wears a hat; he has eye-glasses; he carries an umbrella in his hand and a summer rose in his button hole. In his pockets we shall probably find a watch, a purse containing metallic money, a bunch of keys, a pocket knife, handkerchiefs, a spectacle case, a nail cleaner with file, a small comb, hair-brush, and mirror, a tooth-pick, spare studs and spare bootlaces, a pencil, a fountain pen, a diary, a booklet of postage stamps, a note book, a visiting card case and a bank note case, some letters and documents, a cheque book, a box of matches, ordinary and safety pins, needles, cotton, and scissors, a first-aid outfit, and several other useful articles.[1]

The minds of the two vary as much, although more profoundly. The one is conversant with scores of far-reaching subjects, endeavours to comprehend the solar and stellar universes, follows what is occurring in the more important centres of the world, is saturated with the lore of the ages and with men's hopes for the future, systematically meditates for hours together on a given theme, and commands several vocabularies of several thousand words in each; whilst the lion's acquaintance with the chief departments of knowledge is unspeakably meager, the solar and stellar universes as such do not exist for him, his contact with the world is limited to a small part of a small region, the past and the future have never made their appeal to him, his reflections are of the most desultory and intermittent kind, and a score or so of inarticulate sounds constitute his lingual treasury.

Sir Fullman's home, too, as our description in Chapter IV. has demonstrated, surpasses in complexity almost infinitely that of the lion's. Moreover, the city which Sir Fullman inhabits and the university he serves, have not even a counterpart in the leonine environment.

[1]The following were the contents of the handbag of a young lady student studying abroad: a handkerchief, a silver netted purse containing money, a bunch of six keys, a lip-stick, an india rubber, a small tube of face cream, a small bottle of Eau-de-Cologne, a miniature manicure set consisting of five instruments, a box of vaseline, a tiny sewing set, a bottle of smelling salts, a comb, a looking glass, an eversharp pencil, a fountain pen, a Vichy pastille, and the following papers: a student's identification card, a student's association card, a bicycle permit, twelve visiting cards, three lately received letters, two letters ready to be posted, six visiting cards of friends and acquaintances, a diary, a note book, and a photograph with negative.

In fine, when we consider that the lion is individuo-psychic and Sir Fullman specio-psychic, we shall concede at once that the one can be millions of times the superior of the other. As a matter of fact, just as the highest plants show of necessity scarcely the faintest trace of the structural and functional complexity of the highest animals, so the highest animals show of necessity scarcely the faintest trace of the mental complexity of the most cultivated men. Future ages will marvel that the far-reaching and distinctive nature of the specio-psychic principle should ever have been overlooked or questioned.

However, it is not only a fact that man is destined to be, in the literal sense, the ruler of the earth, and that his general cultural outfit proves him to be a colossus among tom-o'-thumbs; but it is equally a fact that his cultural evolution, as we shall now show, has followed the broad lines of general animal evolution, only on a different and higher plane.

Proto-man was as poorly equipped culturally as the simplest type of animal is equipped organically. By degrees, however, cultural adaptations evolved, homologously corresponding to the main organic adaptations of the various types of animals up to the highest. In short, the history of the *single species Man,* on the cultural side, closely and necessarily parallels the history of the *myriad-specied animal world,* on the evolutionary side.

Let us examine the facts germane to this subject, at least in respect of the final results.

So far as the *senses* are concerned, the microscope and the telescope outrival the eyes of animals in regard to the perception of small or distant objects and artificial lighting makes us feel at home in the darkness of the night and in the bowels of the earth. Through the telephone and the wireless we may hear voices thousands of miles away and the microphone aids us in detecting exceedingly faint sounds. The sense of touch may be greatly refined, not only through education, but through apparatus, and the various meteorological and other instruments, together with mathematical calculation, render us altogether more sensitive than animals.

From feeble uni-cellular organisms there evolved gradually *powerful* animals, such as elephants. However, the engines on a great ocean liner or a monster crane at the docks exhibit an amplitude of force only distantly approached by the strongest animals. The same may be asserted of *swiftness.* The fastest railway expresses, and more especially the racing motorist and aviator, outdistance all animals.

Animals have evolved the capacity of moving on the ground, of burrowing, of climbing, of swimming, and of flying—of *moving,* in brief, through every type of physical medium. Man is well able to compass all this through cultural aids, and, as time passes, will inevitably much excel animals in these respects.

Different species of animals are adapted for living in different *climates,* from hottest to coldest. Man, too, thus adapts himself, but possibly not quite so well as yet. Still, within less extreme climatic variations, his power of adaptation through clothing, heated shelters, electric fans, and other means, is already unapproached. Similarly with low and high *altitudes.* Furthermore, against the recurring *inclemencies of the weather and the seasons*—rain, snow, tempest, great heat and great cold, even floods and lightning—he alone can make adequate provision, whilst in a variety of ways he also battles more successfully than any animal against *scarcity* of water or food.

Many devices exist among animals to enable them to *escape* their enemies or *attack* their prey. Man is undoubtedly their superior in this respect. We may also observe man's advance over any animal as regards *communicating and cooperating with his kind* and thus being in touch with the whole of his species past and present.

Against *illness, injuries, accident, old age, and being left orphans,* animals are well-nigh impotent. The cure of illness and injuries is left to good fortune. Serious accidents mostly entail fatal consequences. A quiet retirement in old age does not exist and the orphan almost invariably perishes. In respect of these eventualities man tends to be far more happily placed.

For the sheer *continuance of the race* animals provide normally as adequately as human beings, although they are generally unable, unlike man, to *resist extinction* or *transformation* in the course of the ages. The physical *care of the young* and their *protection* and *education* can be much more perfectly ensured by the human species.

Animals commence early to *fend for themselves* and must continue this, without interruption, to the end of their life, which is not inevitable in man, whilst their possibilities as to *leisure* and *play* are often pronounced, but never so great and varied as in man. *Comforts and luxuries,* such as are afforded by a beautiful home, and *extensive and systematised knowledge, memory, reasoning, and imagination,* man alone practically enjoys. The senses of *beauty, goodness, humour, and sociality* are also by far the most highly developed in man.

Many animal species are clothed in distinctive *beauty.* The human species corresponds in this respect to millions of species thrown into one, for beautiful dresses are without number.

Animal species have their distinctive *song, taste, skill, ability, bravery, industry, thrift,* etc. In the single human species there have been myriads of specialists—an interminable variety of scientists, artists, craftsmen, workers, leaders, teachers, thinkers, men of action, and the like.

Lastly, man almost infinitely transcends animals in the power both of adapting to himself, and adapting himself to, his environment.

Certain broad conclusions follow from the above comparison. The cultural evolution of the *single species Man* necessarily parallels the infinitely diversified scheme of *general animal evolution,* and this it does in order to achieve the same natural end of becoming lord of circumstance. Moreover, whilst man greatly excels already in his adaptations most animals in most respects, the general inferiority of the animal world, as cultural evolution proceeds, will become strikingly accentuated, most especially in that the whole of mankind may reach a virtually ideal level of development while the animal world is bound to remain indefinitely varied in developmental levels.

Seeing, then, that man departs from all species of animals and plants alike in the fundamental respect of being specio-psychic instead of being, as they *all* are, individuo-psychic ; seeing, besides, that in its possibilities, for the above reason, human life transcends animal life to an even greater degree than animal life transcends plant life ; and seeing that the principle of cultural evolution in man supersedes the principle of biological evolution operating in animals and plants, we cannot help concluding that man forms a kingdom by himself.[1]

2. *The Biological Aspect.*

We will re-state the general conclusion we have arrived at, with especial reference to the legitimate scruples of the biologist.

The conception of man which, we saw, emerged from our investigation places man completely apart from, and above, all animals. From the general somatic viewpoint, it is true, man appears no doubt an animal species closely resembling in innumerable respects certain other species. Inasmuch, however, as he differs from animals in perhaps the most fundamental respect of being primarily guided by a vast miscellany of specio-psychically developed reflections and

[1] "Man forms a new departure in the gradual unfolding of Nature's predestined scheme." (E. Ray Lankester, *The Kingdom of Man,* London, 1912, p. 14.) Paul Alsberg (*Das Menschheitsrätsel,* Dresden, 1922, p. 425) reasons similarly, claiming that since man is not an animal, he should not be classed with animals and ought to be placed therefore in a separate kingdom.

For our final summing up regarding the systematic position of man, see the last Section of this Chapter.

traditions, instead of by a complex of special inborn impulses, instincts, organs, and individual intelligence, as they all are, and inasmuch as this difference lifts him as far above the animal kingdom as integral locomobility raises the animal kingdom above the plant kingdom, man, we are justified in concluding, may be considered as forming a separate and third kingdom. The first kingdom, plant life, might well be regarded as typifying *changeability* in species structure *without* free movement of organism and *without* freedom in response ; the second, animal life, *changeability* in species structure *with* free movement of organism and *without* freedom in response ; and the third, human life, *change*LESSNESS in species structure *with* free movement of organism and *with* freedom in response. Or, stated in a somewhat different and schematic form:—

(a) *Mineral Kingdom*—determinateness of species structure, of space position, and of relation to environment.

(b) *Vegetable Kingdom*—indeterminateness of species structure, and determinateness of space position and of relation to environment.

(c) *Animal Kingdom*—indeterminateness of species structure and of space position, and determinateness of relation to environment.

(d) *Human Kingdom*—determinateness of species structure, and indeterminateness of space position and of relation to environment.[1]

If man were in this manner separated from the three other kingdoms, a reconciliation could be effected between the older and conservative view which, not without some excellent reasons, classes man altogether apart and the current evolutionary view which, ignoring an essential unlikeness due itself to evolution, ranges man as just one animal species among many.

Considering the magnitude of the issue and for the sake of clearly fixing in the biologist's mind the focal distinction between the human and the sub-human world, we shall place in parallel columns a passage from Darwin (*Descent of Man,* p. 127) and the identical passage with the wording appropriately altered to express the fundamentally distinctive nature of man—his adaptability through specio-cultural, instead of through natural, selection:—

[1] A threefold classification of life is also adopted by Alfred Korzybski, in his *Manhood of Humanity,* 1921. Plants are chemistry-binding, animals space-binding, and human beings time-binding classes of life. (p. 260.) Korzybski's classification, however, fails to suggest that men depend on the thoughts of their fellows near and far in time and *space.*

St. George Mivart (*The Origin of Human Reason,* London, 1889) insists on absolute breaks between inorganic nature, plants, animals, and man.

"The lower animals must have their bodily structure modified in order to survive under greatly changed conditions. They must be rendered stronger, or acquire more effective teeth or claws, for defence against new enemies; or they must be reduced in size, so as to escape detection and danger. When they migrate into a colder climate, they must become clothed with thicker fur, or have their constitutions altered. If they fail to be thus modified, they will cease to exist."[1]	Man need *not* have his bodily structure modified in order to survive under greatly changed conditions. He need *not* be rendered stronger, or acquire more effective teeth or claws, for defence against new enemies; *nor* need he be reduced in size, so as to escape detection and danger. When he migrates into a colder climate, he need *not* become clothed with thicker fur, or have his constitution altered. If he fails to be thus modified, he will *not* cease to exist.

On Darwin's own showing, therefore, man diverges in a basic property—the most fundamental and the most far-reaching conceivable—from all animals (and plants) alike, lowest and highest, namely that of attaining new ends not by biological but by cultural adaptation. Hence by all the rules of the systematist, man cannot be classed with plants and animals.

To a reader steeped in biological conceptions our general conclusion may appear bewildering. He may ask himself not only how man can escape the law of natural selection, but how there can be such a law at all if man escapes it. And yet a reassuring answer to his question is attainable. First, however, his attention should be directed to the relative stability and uniformity of species, for if we paid heed to some of the present-day biological arguments concerning the alleged immense inborn differences between men geographically and historically, we should be inferentially compelled to assume that, in conformity with what is stated to be the case with man, animal species rapidly advance in the power of intellect through the selection of their most intelligent members by the pressure of an exacting environment and, also inferentially, we could not help believing that most animal species existing now rival man at his best in intelligence. Nay more, the logic

[1] This view of Darwin's is developed suggestively in Ray Lankester's *The Kingdom of Man* (London, 1912, pp. 14-15). Vernon L. Kellogg (*op. cit.*, p. 135) says on this point: "Human evolution has been turned over to humankind itself to direct."

Here is Darwin's suggestive passage in full: "Mr. Wallace, in an admirable paper before referred to, argues that man, after he had partially acquired those intellectual and moral faculties which distinguish him from the lower animals, would have been but little liable to bodily modifications through natural selection or any other means. For man is enabled through his mental faculties 'to keep with an unchanged body in harmony with the changing universe.' He has great power of adapting his habits to new conditions of life. He invents weapons, tools, and various stratagems to procure food and to defend himself. When he migrates into a colder climate he uses clothes, builds sheds, and makes fires; and by the aid of fire cooks food otherwise indigestible. . . . Even at a remote period he practised some division of labour.

"The lower animals, on the other hand, must have their bodily structure modified in order to survive under greatly changed conditions. They must be rendered stronger, or acquire more effective teeth or claws, for defence against new enemies; or they must be reduced in size, so as to escape detection and danger. When they migrate into a colder climate, they must become clothed with thicker fur, or have their constitutions altered. If they fail to be thus modified, they will cease to exist." (p. 127.)

of the Darwinian view, as here revealed, excludes the existence of what biologists call species and postulates such a rapid succession of noticeable variations among animals as to reduce all species to insignificant and perpetually varying groups, somewhat like the civilised social groups within the human species and within human societies.[1]

We know, however, that such is emphatically not the case ; that mental progress in the animal world is almost infinitely slow and that the innate mental differences between the members of any species are unimportant. Conformably to this statement our biologist reader must posit an equal degree of relative congenital stability and uniformity in man. Else he will find himself ascribing to man a rate and manner of organic change which is in flagrant contradiction with what he otherwise knows to be true of the entire living world past and present. On biological grounds, therefore, we are driven to assume that the marvellous development of mental and material tools and their products within human history can on no account be dependent on profound modifications and variations of an organic order. The specio-psychic theory proves in this way alone consistent with biological first principles, for it alone insists that congenitally the human species as a whole has remained relatively stable within later paleolithic and historic times and that the innate adaptational divergences in man between individuals, groups, and periods are as negligible as in animal and plant species.

Why, then, is the biologist reluctant to acquiesce in this reasonable and reasoned view ? It is because he desires to account for man's and men's mental status, and because he can only account for it, he believes, as he accounts for all other biological developments, that is, by diversity of native outfit due to natural selection. Should he, however, attempt this, he does it, as we have seen, at the risk of denying the fundamental law of the relative stability of species and the relative uniformity of their members. He should be, therefore, open to the suggestion that man forms a radical departure as to native outfit ; that owing to his perceptibly greater intelligence (due to his position

[1] In his *Origin of Species,* Darwin assumed throughout that thousands of generations were required to transmute one species into another. He explained in this manner the relative or seeming stability of species found in nature. Yet when he discusses the origin of man and his civilisations, he reasons on the opposite principle that immense changes are produced by natural selection and inherited habit within brief periods of time. These views are manifestly irreconcilable and the embarrassing disagreement can only be removed by recognising that the salient cultural differences observable between human periods, peoples, and persons come into being post-natally and are due to pan-species thought irregularly distributed. Mankind comes thus to be aligned with organic nature generally both in regard to the relative stability of its species characters and to the relative equality of the individuals and groups whereof it is composed. Theoretically, no doubt, the rapid modifications in man assumed by Darwin are conceivable. This, however, begs the question, seeing that it equally applies to all species. Indeed, even where enormous (superficial) bodily changes are effected in animals by artificial selection, the adaptive outfit and the mental status are only minimally altered. (See Chapter IV., Section 9.)

in the series of living beings) permitting him to learn freely from others, native adaptation has been superseded in him by the method of inventing and discovering pan-collectively means and modes of procedure which are stored in language, customs, traditions, records, and physical objects such as tools and buildings.

As a matter of fact, the specio-psychic theory well explains how man's process of advance is independent of natural selection in native outfits. Is it a question of the senses ? Then, for the mariner, the meteorologist, the cytologist, the astronomer, pan-collective intelligence provides such a wealth of aids that the value of the senses is tremendously enhanced. Is it a question of food supply and protection against other species ? Then the cultivation of the soil and the breeding of certain animals, on the one hand, and fire arms and other weapons, on the other, most effectively attain this end. Is it certain beliefs and modes of behaviour which are socially useful ? Collectively imposed customs fix them so thoroughly that we find it difficult to imagine that we are not face to face with organic functions.[1] Biological adaptation becomes hence superfluous, even if it were possible to attain thereto within brief periods of time. What is more, the fixity being psychic, it can be more readily altered or removed, enabling the enlightened individual and group speedily to meet new contingencies. In this way the specio-psychic method—through pan-socially reached habits, customs, convictions, ideas, ideals, and social influences generally—effects more for man than native outfits due to natural selection accomplish for plants and animals, and this with remarkably greater rapidity both as to acquisition and relinquishment. The former method constitutes hence an incalculably great advance on the latter. Thus specio-psychism for all intents replaces in man the innate adaptive outfit in animals, but this on condition of acting as the faithful deputy of natural selection and promoting life and not death. In fact, on an infinitesimal scale the biologist can observe in any animal employing its intelligence this supersession of inborn adaptive outfits and of natural selection.

Let us now come to closer grips with the problem of the essential biological difference between man and animals. In the native structure of every class of animal systematic arrangements will be found whereby definiteness of response to certain impulses and environmental stimuli is secured. Save for these arrangements, the animal world would needs have to learn by pan-species experience (which it is incapable of, as has been shown in Chapters IV. and V.), unless its innate

[1] This explains the age-long persistence of certain lowly civilisations and the virtual inadaptability of so many primitive peoples to-day.

Here is another way of expressing the new thought: "If it is necessary for us to go to sea, we do not take the myriads of years necessary to adjust our bodies to a marine life, as the whale has had to do, but we use our minds to build boats." (George B. Cutten, *Mind, its Origin and Goal,* New Haven, 1925, p. 10.)

intelligence were assumed to be millions of times greater than that of man.[1] Now these arrangements must, as a whole, be absent or rudimentary in man who has come to be primarily guided by pan-species culture and his inborn adaptive outfit must be as a consequence different in a basic respect from that of any animal.[2] Accordingly, we suggest that the anatomists of the future, quite irrespective of pan-cultural considerations, would, as a matter of course, class man entirely by himself because of the fundamental departure of his adaptive organisation from that common to all plants and animals. If the difficulties encountered in tracing the motor arcs in animals have not yet been overcome because of the minuteness and complexity of the nervous structures, this does not affect the point that these inborn dispositions exist. No biologist doubts it and every biologist should be therefore inclined to admit that man presents a biological type diverging from the animal type in a crucial respect. The one has freed itself from bondage to the soil, the other also from bondage to instincts or innately determined modes of conduct. (It need scarcely be added that plants, even more than animals, have their relations to their environment determined by innate arrangements and that therefore what we have stated regarding man and animals applies *a fortiori* to man and plants.)

We should not allow ourselves to be misled in this matter by surface considerations. The problem of the systematist is, of course, to allow for both similarities *and differences* and to classify a living form with

[1]This suggests two points. First, no degree of individual superiority in matters of mind can compensate for absence of cooperation, for the most important ends can only be realised cooperatively. A high intelligence, without cooperation, would be therefore almost as ineffectual as fully developed senses in an immobile plant. As Bishop Butler, in his *Analogy of Religion* (Ch. III.) writes: "Union is of such efficacy, that ten men, united, might be able to accomplish what ten thousand of the same natural strength and understanding, wholly ununited, could not." The second point is not so clear. Granted native intelligence equal to the acquired intelligence of our leading thinkers, could one individual help learning from another? Religious and political particularisms suggest that a limitation of cooperative thought is possible, although the story of mankind shows that barriers between men tend to be removed eventually. Customs and habits, it is true, restrict the free expansion of thought; but, on the other hand, so far as there is high and pure intelligence, thought appears to be necessarily universal and therefore pan-human. Among animals, however, as with the songs of birds, the tradition may be organically attached to particular instincts, reducing variability to zero point.

[2]The human infant, being individuo-psychic, is guided first and foremost by impulses and instincts. It is also characterised by various other primitive traits: "In the human infant the great toe stands out and the foot is almost prehensile; the abdomen protrudes; the arms are longer in proportion than the legs, the grip of the hand is so great that a three-weeks old infant can grip a stick with sufficient strength to support its own weight." (H. L. Wieman, *General Zoology*, New York, 1927, p. 209.) Man may be therefore regarded as an animal in the first few months after birth, just as a frog may be considered a fish at a certain early stage of its development. Indeed, during the first few years of their existence, children are so much alike and so different from adults that their basic mental development should be regarded as largely independent of their particular physical and cultural environments.

punctilious regard to both. Animals, as we learnt in Chapter I., agree with plants in diverse respects—cellular nature, nutrition, sensibility and impressibility, growth and development, adaptation and regeneration, decline and death, reproduction and over-reproduction, heredity and variation, and evolution through the natural selection of germinal variations favourable to species survival. Nevertheless they are separated from plants because of certain divergences. The different phyla of animals agree in numerous characters, and yet are treated as separate. Fishes, amphibians, reptiles, birds, and mammals, resemble each other closely in sundry ways—all being vertebrates, possessing senses, nerves, muscles, etc.,—but nonetheless they are classed in distinct categories for adequate reasons. The lion, for example, belongs to the Carnivora, and the orang-utan to the Primates—a different Order; and still the lion and the orang-utan agree in countless features, many of the highest moment. Certain strictly limited divergences place, for instance, the Monotremata in an Order by themselves. The systematist is consequently always guided by both convergences and divergences, each having a separate and distinct value. That is, however multitudinous the resemblances may be, the dissimilarities are yet taken into account in fixing the systematic position of a particular plant or animal. Save for the latter fact, there would be no classificatory arrangement at all. Hence we are theoretically justified in assigning only relative importance to the regiments of resemblances between man and ape; also, in regarding some differences between them as having only a subsidiary adaptational value, others as only designating differences between individuals and between groups, and one as placing man in a kingdom by himself.

We have stated already what is the nature of this last difference, but seeing the importance of the subject, we will express this difference in other terms, from the viewpoint of effect rather than of cause. The species of the whole lower creation, including all living and extinct species below man, have each, but for trivial divergences grouped round a mean, a definite and uniform life-history. This is true of a worm as much as of an ape, of a pansy as much as of a palm tree. That definite and uniform life-history must necessarily have its cause in certain innate structural and functional arrangements. Now when we meet with a type of living being which radically departs from all other living beings in this respect by having no definite or uniform life-history; where the members of the new type may, according to circumstances, vary almost infinitely from one another in this respect and are potentially adjusted to almost infinitely varying life-histories; where each generation may exhibit countless new life-histories, perhaps most members of one generation being perceptibly different from those of the preceding or succeeding one; and, *above all,* where there is a

characteristic tendency, wholly absent in animal species, of life-histories to change tremendously and in a certain direction as the ages pass, it follows that the native constitution of this type departs basally from the native constitution of the other type. Confronted by this aspect of the matter, the systematist has again no option but to class man apart from plants and animals, recognising, however, man's relationship to living beings generally, to animals more particularly, and to the Primates and the Anthropomorpha most especially. We repeat, for the systematist *no number of similarities however great cancel dissimilarities* and, according to their departure from characters common to a group, he judges the latter as denoting a variety, a species, a genus, etc. When, then, a dissimilarity relates to a character common to all plants and animals without exception and one having the most far-reaching effects, its systematic value should be manifestly regarded as the highest conceivable within the domain of biology.

Nor need the biologist be apprehensive lest in admitting dependence on collective thought, he admits an entirely new cause which has not its roots in the animal past. On the contrary, comparative psychologists allow for the existence of tradition[1] and specio-psychism is but animal tradition carried to the *n*th degree—that is, almost infinitely beyond anything observable in animal life. What is also of vital moment, comparative psychologists agree with us in assuming that traditions have no necessary tendency to develop into inborn attitudes and actions. The only new fact the biologist has to consider is the virtual substitution of specio-psychic for innate ends, means, and modes of procedure, in the service, of course, of basic biological needs. This also expresses itself naturally on biological grounds, for the fluidity and diversity involved in specio-psychism excludes the fixity and homogeneity of inborn individual impulses and modes of procedure.

However, if the systematist should argue that we have only directed attention to a difference of degree and that a difference of degree, because of its indefiniteness, does not furnish a suitable basis for

[1]Some naturalists hold that the nests and songs of certain birds are at least in part determined by traditional influences. If this should prove to be the case, we are face to face with a type of tradition practically indistinguishable from instinct so far as uniformity is concerned. Human traditions, ever liable to be lost or modified, possess no such resemblance to instincts. Compare, for instance, how languages change, and how, on the contrary, the songs of the different species of birds appear to be almost, and perhaps necessarily, as fixed as their main physical characters. However, this traditionary interpretation has been questioned. (See R. S. Lull, *Organic Evolution*, New York, 1917, p. 170.) Fr. Alverdes writes on this subject: " It has been proved that birds which have never watched the building of a nest, nor inhabited one in their youth, will yet build after the manner of their species." (*Social Life in the Animal World*, London, 1927, p. 184.) On induced fear among animals, and the like, see the interesting remarks in Benjamin Kidd's *Science of Power*, London, 1918, pp. 275-288, as well as the chapter " Education," in P. Chalmers Mitchell's *The Childhood of Animals*, London, 1912.

classification,[1] our reply must be that specio-psychism argues a difference of kind. In this respect our primary contention is that it is a universally admitted fact that the adaptive outfit of all animals is inborn. From that it follows that any departure from such an individuo-psychic condition represents necessarily not a difference of degree but of kind, the more so as this departure in man involves an altogether *novel factor*—that of freely learning from others near and far in space and time. This contention of ours is proved by the existence of a sharp and profound cleavage between man and the whole lower creation—namely, that whilst specio-psychism in man leads in the course of the ages and apart from biological change to for all intents *limitlessly diversified* and *limitlessly progressing* modes of life, individuo-psychism in plants and animals—lowest and highest alike—fails to lead in the course of the ages and apart from biological change to *in any degree diversified* or *in any degree progressing* modes of life.

To explain. With the passage of time, human life-histories have undergone systematic changes in certain directions, as is illustrated by the history of implements. The few rough flint tools *gradually,* very gradually, became highly diversified and perfected; these were followed by metal tools showing a similar history; and these, again, by increasingly more complicated tools—compare a Chellean flint tool with the engines of an airship. In animal species, on the contrary, there is nothing, *absolutely nothing,* to correspond to this gradual development. It is not here a question of degree, of more or less; but of the simple presence and absence of a character. The monkey's stick and stone of a hundred thousand years ago is the monkey's stick and stone of to-day, without any difference whatever wrought by time, and this holds of all animal "culture." The systematic changes historically in the life-history of mankind are therefore unparalleled in the life-histories of animal species. From this point of view the life-histories of animals remain, through the course of the ages and apart from biological change, *absolutely* undiversified and *absolutely* unascending. The difference, then, between animal species and man is not one of *degree,* but strictly one of *kind.* And this difference relates to a fundamental character present in all plants and animals without exception.

[1]When the degree of a difference is small, it is difficult to make it a basis for classification. When, however, the difference between two categories is, say, as 1 to 100,000,000 without there being intermediates, there is no difficulty at all. As we have had previously occasion to state, the evolutionary process frequently reveals some overlapping and seldom allows of water-tight definitions. Even, therefore, if specio-psychism, conceived as an active principle, were not something novel but as 1 to 100,000,000 compared to individuo-psychism,—it is ultimately much more than that,—it would be fastidious not to recognise and register the enormousness of the difference and the practical incommensurability of the two. However, if, say, the chimpanzee's material culture is as 1 to 100,000,000 compared to man's culture to-day, it is fantastically improbable that this gigantic difference should not be due to a difference of kind.

Further noteworthy considerations in support of this conclusion are: (a) whilst roughly the whole human species—man past, present, and future—forms a cultural unity, outside man there exist only species with individuals or groups entirely unaffected by distant or dead individuals or groups; (b) whilst man depends almost completely on plastic language and tool-made tools, such language and tools are wholly unknown among animals; (c) whilst mental superiority among the members of a given species of animals may vary somewhere between 1 and 5, say, it may vary among men between 1 and 500,000,000, say; (d) whilst men's life-histories tend to vary almost infinitely in the course of the ages, those of animals, apart from biological change, show not a trace of such a tendency; (e) whilst animals progress through natural selection, men progress through cultural selection; (f) whilst men's modes of dealing with their environment are almost infinite, those of the members of any given animal species are infinitely limited; (g) whilst humanity's powers are incalculably great, those of any particular animal species are incalculably small by comparison; and (h) whilst man's organism is incomplete by itself and requires pan-species culture to give it meaning, animal organisms are complete in themselves.[1] These momentous facts cannot be brushed aside on the plea that they betoken merely a difference of degree; they point rather to a divergence between man and animals more radical and more far-reaching than that existing between animals and plants, a divergence which leads, in fact, to cultural variation, selection, and evolution effecting far more for man than natural variation, selection, and evolution have effected for the plant and animal worlds.

In the preceding pages we assumed that man's slightly, but critically, higher intelligence is the sole and sufficient positive basis of specio-psychism; that granted this higher intelligence and his

[1]The statement that man's organism alone is incomplete requires amplifying, as superficially it might appear vulnerable. A uni-cellular organism is an independent being *par excellence*. Already, however, in bisexual propagation we have complementary incompleteness. A new-born infant is in this position in regard to securing food and as to much else. A herd of deer depends on the vigilance of its members for protection against foes and a herd of bisons has a leader. Incompleteness in the animal kingdom reaches its limits in certain insects. Thus we have neuter bees, drones whose food is supplied to them, a queen bee who is dependent on the neuter workers for various services, and an interdependent community. Nevertheless in the above and all other similar cases among animals what is lacking in one creature is, barring accidents, furnished inevitably by another creature complementary to it. The incompleteness is therefore cancelled. In man, on the contrary, the innate deficiencies of one man are not compensated by certain innate arrangements in other men; but all men exhibit the same innate deficiencies. We are consequently justified in considering man alone as an incomplete living being physically. The infinite variability of cultured man and the infinitesimal variability of all plants and animals bear out our contention. Man's completeness depends on cultural development in the course of endless ages; the plant's or animal's completeness is normally and equally assured in every generation. As regards certain animals which learn from others nearby to an infinitesimal degree, the consequent modifying effect historically may be regarded as literally zero.

inborn needs, man's infinitely multifarious activities are accounted for. However, inasmuch as the biological systematist experiences the utmost difficulty in abandoning the material plane, we may suggest a tentative solution of a material order. First, observation of infants leaves little doubt that their innately induced babbling—covering, it is said, all our consonants and vowels—is a preparation for articulate speech. Moreover, this innate tendency is probably connected with an innate striving to learn to speak. Now language does not consist only of articulate utterance, but underlying this utterance are articulate meanings. These meanings, again, embody the thoughts and sentiments of men and women near and far in space and time.[1] If we are correct in these surmises, it follows that an innate tendency exists in the young child whereby it comes to assimilate the expressed thoughts and sentiments of numberless other persons. Furthermore, when a little older, perhaps all children pass through a stage when they bombard their seniors with an interminable series of questions as to the *what, how,* and *why* of things. Possibly this is the result, not only of the opening out of the intelligence but of a special specio-psychic instinct whose object it is to ensure that the individual appropriates the racial heritage. And the passionate interest in "stories" has probably the same cause and end. We may proceed one step further and conjecture that the fact of men so closely adapting themselves to the society they live in and becoming practically facsimiles of their fellows is due also to an innate specio-psychic urge.

If the above deductions are sound, we are faced by a number of innate tendencies inducing men to assimilate the thoughts and experiences of their fellows near and far in space and time. Now since these innate dispositions, by leading to the indefinite augmentation of the individual's own mental powers, ensure the creation of a life as superior to that of the animal kingdom as that of the animal kingdom (at its highest) is to that of the plant kingdom, the biological systematist is bound to place man in a separate and higher kingdom. That is, these novel arrangements (which break with the animal and plant past by encouraging specio-psychism) must be judged to possess a differential value as great as that of integral locomobility. Perhaps this view of man's native outfit is correct, as nature appears invariably to operate through such outfits and as this might have been indispensable particularly for early man and perhaps is necessary also for modern man. Possibly, too, that the conception which dispenses with innate specio-psychic dispositions is crude and would mean ethical chaos. Biologists may therefore have good grounds for adopting this view and bringing man hence into line on the material plane with other

[1] "A word is a vehicle, a boat floating down from the past, laden with the thought of men we never saw; and in coming to understand it we enter not only into the minds of our contemporaries, but into the general mind of humanity continuous through time." (Charles H. Cooley, *Social Organisation,* New York, 1912, p. 69.)

living forms who all have native outfits, the only difference being that theirs are invariably individuo-psychic and that his outfit is specio-psychic. For us, however, in this volume the outstanding fact is that man is a being adapted for the specio-psychic mode of life and that owing to this, *and to nothing else,* he for all intents infinitely transcends potentially all other living species. That is, since save for his freely learning from others, a man would be brute-like and mindless (without language, tool-made tools, or refinement), specio-psychism alone must be taken to explain the fact that man rises at all, and can rise almost infinitely, above plant and animal. Again, whilst this alacrity to learn from their fellows may be innate in men, it is the actual accumulation of pan-human inventions and discoveries which accounts for man's lofty status to-day and the loftier status he will presumably exhibit to-morrow. Furthermore, the trend of men's actual thoughts, sentiments, and actions in any country and age is primarily explicable only by this external heritage. The precise biological interpretation of this all-important truth, we leave of necessity to competent biologists.

3. *The Current Biological View of Human Nature Examined.*

We have thus far refrained from subjecting the natural-superiority-and-inferiority theory to a detailed examination. Such an examination is, however, desirable, as it will emphasise, by contrast, the scientific nature of the specio-psychic conception of human life.

To the man of science the current biological view of human nature can make but an indifferent emotional appeal. He is accustomed to battle with his subject, to examine it critically from all angles, to study it historically and in the works of his contemporaries, to grapple with its special problems, and to elaborate carefully constructed hypotheses to be tested in subsequent investigations. According to the current biological view, as generally interpreted, this is entirely superfluous with regard to man. The veriest tyro is here as great an authority as the most distinguished inductive thinker. This follows from the fact that the view we are examining quietly assumes that any definite character trait we observe in an individual is inborn. If men are energetic or indolent, cowardly or courageous, mean or generous, gentlemanly or boorish, quick or slow, observant or unobservant, intelligent or stupid, sympathetic or callous, imaginative or matter-of-fact, dull or bright, sociable or unsociable, original or habit-ridden, enterprising or unenterprising, gentle or brutal, true or false, æsthetic or unæsthetic, selfish or altruistic, characterful or characterless, and so on interminably, it is just because they are born such. There is nothing whatever to examine, to understand, or to explain. It is so, and there the matter ends. Every man is here truly his own biologist and " everyman " proceeds on this supposition.

Yet the biologist may answer that destitute of interest as human nature may be to the actively-minded scientist, facts remain facts and that if the natural-superiority-and-inferiority view is proven, this has to be cheerfully accepted.

To this we may agree. But is it proven ? What is offered are the barest assertions—put forward so emphatically that one suspects an attempt to overawe an uneasy intellectual conscience. The numerous illustrations on this subject we have cited in these pages, and which we might have indefinitely multiplied, are strictly true to type. It is not a question of a slip here or there, but of an all but universal mode of procedure. Here, at random, we have a scholarly economist-eugenist writing : "*Nobody will deny* that some desirable and undesirable characters, physical and mental, are transmitted by heredity. *Everyone knows* certain families whose physical and mental make-up, as attested by several generations, is markedly above the average, while other families exhibit consistently infirm qualities of body and mind, though nurtured in similar physical and social environments." (p. 359.) "*Nor can one seriously doubt* that the superior capacity to assimilate the common stock of knowledge and to use the instruments of the intellectual life depends upon the inheritance of a sound physical brain, and nervous, nutritive, and circulatory systems able to give it effective support." (p. 360.) "We ought not to rule out such rational selection of stocks as may preserve as far as possible the qualities of energy, enterprise, initiative, and coöperation which are the prime conditions of social progress." (p. 361.) (Italics ours.) (J. A. Hobson, *Wealth and Life,* London, 1929.)

And here is a distinguished eugenist basing his case, not on exhaustively studied facts, but on crude surmises, a few of which we venture to reproduce : "This is in accordance with what is after all *common knowledge.* A man is born an athlete ; he does not become one by training, however assiduous. A man born with a good brain whose early education has been curtailed or neglected finds that his brain power at the age, say, of twenty-five or thirty, is no less than it would have been." (p. 94.) "Take orphanages, for example. The social environment is much the same for all. The observed differences between the inmates *must be due* in the main to inherited differences." (p. 102.) "If we compare a farm labourer and a clerk as 'men,' we conclude that one is, perhaps, assertive, pugnacious, inquisitive, or intelligent compared with the other. These judgments, there is *good reason to believe,* are judgments of their characteristics little moulded by differences in social acquirements. Intellectual and emotional characters so estimated are thus in the main the product of inheritance and the physical environment." (p. 111.) And he concludes, "To the individual as a 'man' inheritance is thus of far more importance than environment." (pp. 111-112.) "Modern investigations combine

to emphasise the vast range of these inherited differences between members of the same community. It is *an indisputable fact* and one of the first importance." (p. 112.) (A. M. Carr-Saunders, *Eugenics*, London, 1926.) (Italics ours.) Could self-assurance go further ?

Literally, tomes might be filled with such pronouncements.[1]

Still, it might be argued that it does not follow that these unsupported statements could not be substantiated. Possibly the facts are so self-evident that any attempt to advance full proofs in their favour would be stigmatised as pedantic and as gross waste of time. Who would seek elaborately to prove that we see with our eyes and not with our toes, that there are smaller and larger towns, or that adulthood is preceded by childhood ? Thus the emphatic nature of the declarations would explain itself and would merely signify that intelligent persons are exasperated by the absurd views promulgated by " culturists." As a eugenist once wrote to the author : " Mankind in general—democracy, etc.—contributes nothing to progress. Progress depends on the appointed few who *ob*tain for mankind what the majority just *main*tain—if so much. Was Carlyle all wrong ? Is every day's obvious experience of the *natural* [italics ours] differences between men wrong ? " In brief, why labour the obvious ? as the earliest opponents of Copernicus would have said.

A close examination of the facts, as we shall now see, does not in any way warrant this attitude of mind.

If in every age there had been approximately the same types of human beings evenly distributed, the view that it is all a matter of haphazard biological variability and heredity might be plausibly entertained. But from paleolithic times onward the types have vastly changed, to some extent radically (as expressed in the different forms of civilisation) and to some extent numerically (in that in one age multitudes are constituted of some types and in other ages of quite other types). It cannot therefore be a question of haphazard variability and heredity.

This conclusion is reinforced by a more intimate survey of history. In the Middle Ages the feudal system, with all it implied as to mentality, prevailed universally in Europe. Gradually absolutist rulers emerged. These were followed by constitutional monarchs. And now we have for all intents democracies and plutocracies. The evolution of language, tools, arts, sciences, nations, moral refinement, tells the same tale of far-reaching transformations in mentality. Haphazard variability or heredity cannot account for these orderly changes. If great masses are consecutively feudalistic, monarchistic, and republican,

[1]The four volumes of papers, &c., published in connection with the two International Eugenics Congresses, held respectively in 1912 and 1921, cannot be said to furnish a single serious scientific attempt to prove that there are considerable differences in native mentality among non-pathological individuals.

manifesting sharply different character traits, there must be general causes explaining this. Theoretically it might be assumed that individuals are by nature plastic as soft clay and quickly change, developing readily from feudalistic into monarchistic and democratic creatures. Anthropologists, however, are agreed that modern man dates some forty thousand years back and is practically the same innately now as he was then. The prodigious cultural changes, progressive and qualitative, remain therefore inexplicable on the current biological view, particularly as the civilisational changes are sometimes very rapid and sometimes very slow, proceeding here and not there, marked in one place and not in another. Sheer variability or sheer growth (like to the growth of the body) leaves the facts unexplained.

But the current biological theory has not only grave, but fatal, defects. The author remembers a relieving officer of the poor telling him that, within his official recollection, the last quarter of a century had seen a revolution in the attitude of applicants for relief. In his junior days, physical assaults were an ever present contingency ; now the suggestion of violence raised a smile. And, later, at a meeting of the London relieving officers which the present author addressed, the same contention was expressed in a diversity of ways. Or take the astounding change recently in the habits and dress of factory girls and the class they belong to. Or note the virtual passing of hooliganism during recent years and the practical and almost sudden disappearance from the streets of drunken people. Or consider the startling advance in religious conceptions to-day. Scores of similar instances could be adduced, attesting that *within* a generation profound social changes may occur, changes which, *ex hypothesi,* cannot be explained by *inborn* changes in human nature.

We may go further. According to the natural-superiority-and-inferiority theory, we see a rather stupid person and we at once label him stupid by nature. Yet the author remembers a striking case of this character where a new motive removed the obtuseness and the individual became a university lecturer, a principal of a college, and an examiner for a number of universities. Or we may observe a child's " nature " change as one nurse succeeds another. Countless cognate cases might be quoted from history and general experience showing that individuals frequently undergo a sea-change and this as regards every aspect of mentality. This represents a kind of *experimentum crucis,* for it proves conclusively that the current biological theory is inadequate. If it be retorted that the university lecturer and others in similar circumstances are by nature really what they become later (individuals, however, may change more than once during a lifetime)—which begs the question,—the theory breaks down nevertheless, since the criterion of observed human nature indicating inborn human

nature must be dropped and since the facts imply the existence of an alternative factor accounting for what is observed.

Moreover. The last fifty years, and especially the last few years, have shown extensive civilisational changes in the Far East. Here, once more, gigantic transformations have taken place *within* the life-times of millions of individuals, attesting that non-biological factors may determine to a decisive degree the mental make-up of human beings.

But all these examples of changes *within* a generation are only casual illustrations of the more comprehensive fact that in progressive epochs a large proportion of the older people in any one generation has vitally changed its attitude towards a number of the greater problems of life in conformity with the general advance that has occurred. In fact, many of the older people are the champions and the builders of the "new" order which in their earlier years they treated with contempt or vehemently combated. Historical changes and historical progress—and therefore individual changes and individual progress—are hence independent of biological changes and biological progress.

Again. The same non-biological factor presents itself most strikingly in the fact we have dwelt on in the last two Chapters, namely that children of all races, including apparently the so-called lowest, readily pass through Western schools and may become Westerners in every respect—as to intellect, emotions, character traits, and purposes. That is, children who, in one environment, would have manifested certain characteristics, transferred to a different environment, manifest instead the characteristics distinctive of the new environment. Leaving aside imponderables (which may be, however, interpreted culturally), this removes the ground completely from under the current biological view, for he who would have been a "savage" with certain pronounced character traits, may become a civilised man of the twentieth century with certain different pronounced character traits. The "born" Western teacher, artist, business man, scientific worker, or philosopher may hence come to be matched by individuals who, but for cultural accident, would have been "born" to radically different types of careers. (Think of the widely removed ways of living and thinking of the average Frenchman, Albanian, Arab, Persian, Hindoo, Chinese, Zulu, and Australian aboriginal.) Consequently, the biologist who would predict the new-born aboriginal's mental outfit on the basis of the observed mentality of his people would be fundamentally mistaken in the interpretation of the fact, and we suggest that this involves that he is as fundamentally mistaken when he interprets in this fashion the qualities of individuals in the West—qualities, for example, such as "energy, enterprise, initiative, coöperation," or scientific, artistic, ethical, financial, and philosophical ability. All, or

virtually all, the mental differences and character traits (above the minimal plane) observable historically, racially, nationally, among classes, and among individuals generally, must be therefore primarily explicable on a non-biological basis if we are to do justice to the facts.

Oddly enough, Galton, the founder of the Eugenics movement, drew attention in one passage to the broad facts ; but if these be admitted we are scientifically precluded from arguing from observed to inborn human nature, as Bateson, Frazer, McDougall, Hobson, Carr-Saunders, Thomson, and a host of other eugenists, do. Here is his remarkable statement : " Different aspects of the multifarious character of man respond to different calls from without, so that the same individual, and, much more, the same race, may behave very differently at different epochs. There may have been no fundamental change of character, but a different phase or mood of it may have been evoked by special circumstances, or those persons in whom that mood is naturally dominant may through some accident have the opportunity of acting for the time as representatives of the race. The same nation may be seized by a military fervour at one period, and by a commercial one at another ; they may be humbly submissive to a monarch, or become outrageous republicans. The love of art, gaiety, adventure, science, religion may be severally paramount at different times. One of the most notable changes that can come over a nation is from a state corresponding to that of our past dark ages into one like that of the Renaissance. In the first case the minds of men are wholly taken up with routine work, and in copying what their predecessors have done ; they degrade into servile imitators and submissive slaves to the past. In the second case, some circumstance or idea has finally discredited the authorities that impeded intellectual growth, and has unexpectedly revealed new possibilities. Then the mind of the nation is set free, a direction of research is given to it, and all the exploratory and hunting instincts are awakened. These sudden eras of great intellectual progress cannot be due to any alteration in the natural faculties of the race, because there has not been time for that, but to their being directed in productive channels. Most of the leisure of the men of every nation is spent in rounds of reiterated actions ; if it could be spent in continuous advance along new lines of research in unexplored regions, vast progress would be sure to be made." (*Inquiries into Human Faculty,* London, 1907, pp. 128-129.)

An intimate study of individual, social, and historical circumstances will thus demonstrate that the current biological theory of human nature painfully over-simplifies the problem. Where it postulates innate variation or heredity, there the investigator finds numberless cultural causes at work. Here is an illuminating illustration, the far-reaching implications of which must excuse its length :—

[The French boy] "is watched both at home and at school far more closely than boys are watched in England. The treatment which English boys receive, the confidence, the trust which is placed in them, has no counterpart on the other side of the Channel. The English ideal is that of a frank, open, manly lad, who can go anywhere and do anything, and manage his own affairs, and be trusted all the time. But in France a boy is expected to be silent, obedient, to do nothing without the word of command.

The vast majority of French boys whose parents do not belong to the labouring classes are educated in the lycée, the French public school. But it is a school very unlike an English public school. The lycée is a huge building like a barrack, and the discipline is that of the barrack-room. The pupils wear a sort of uniform, and are kept under constant and severe control. The lesson hours are long, and play hours few. And where do they play? The answer is that, until very recently, they did not play. The lycée had no playing fields, no football or cricket ground, no fives or tennis courts. The only ground for recreation is the *cour,* a large bare yard.

'How do you amuse yourselves during recreation hours?' asked an English visitor of the inmate of a large lycée. 'We walk up and down and talk,' was the reply. In many French schools of the present day that still remains the chief amusement, to walk up and down and talk; but in others English ideas are being introduced, and the boys are taking gaily to cricket and football.

Even in the playground the French boy does not enjoy freedom. One of the ushers is present all the time watching the boys, and charged to report on all that he sees or can overhear. This is the much-hated pion, whom the boys regard as a spy. He is feared as much as he is disliked, for a bad report from him will often get a boy into serious trouble.

The spirit of the discipline in a lycée is well shown in the following illustration given by a well-known French writer: 'One half-holiday I had brought back a rose, and, wishing to keep it as long as possible, I put it in a glass of water inside my desk. I could not help looking from time to time at my treasure—a crime, I admit. For roses speak, but not in Latin. They say all sorts of forbidden things, they invite little boys to run about in country lanes, they incite to rebellion. You never see an usher sniff a flower. Flowers do not bloom on the schoolmaster's ruler. Well, I harboured my rose, just as an anarchist harbours his bomb. When I opened my desk to give the poor flower air, a ray of sunshine bathed it, seemed to kiss it. A dark shadow suddenly blotted out the beam, a big hand seized my splendid rose; in another second it lay in the courtyard below. Justice was satisfied!'

This treatment tends to make French boys silent, reserved, and subdued in nature. 'No romantic and daring idea ever forms itself in a French boy's head to run away to sea, to descend from his bedroom by the rain-pipe, or anything of that kind. One never sees him with torn knickerbockers, scratched legs, or a dirty face. He doesn't risk his life twenty times a day with the same reckless joy that a British boy does, and on the whole he is not so brave or so plucky. He is shut up in a school like a barrack, dressed in a shapeless uniform. Knowledge is crammed into his unwilling head all day. He has no games, no football, scarcely any holidays, and grows up sallow, unmuscular, mischievous, but extremely clever. If he can't hold his own with a small Britisher in the playground, he certainly makes up for it in the schoolroom.'

The last sentence of the above extract puts clearly the strong point of the lycée. In books and thought the French boy is, as a rule, far ahead of the British boy of the same age. The English lad of seventeen or eighteen has very often little to say for himself, and can take but a small share in a conversation on general subjects. His French comrade will talk freely, express clear and intelligent opinions, and reason ably upon disputed points. Much of this power is owing, without doubt, to the walks and talks and unending tasks of the lycée.

Well, the barrack life of the lycée passes, and the young Frenchman then has to enter the real barracks and don the uniform of the conscript. This experience, too, passes, and, with a great sigh of relief, he steps out into the world again, a free man, with his life before him.

And what is he like, this Frenchman, who has now finished his training of school and army? In the first place, he is not in the least like the idea commonly formed of him in English minds. There is a general belief among us that the Frenchman is a gay, laughter-loving person, who whistles all care down the wind, and lets trouble slide from his shoulders as water slides from the feathers of a duck. This is not so. There is no more serious nation in the world than the French. A Frenchman, it is true, is far more lively in speech and in action than an Englishman. He uses a thousand gestures where an Englishman would not use one at all. But this is on the surface, and of the surface; the mind below remains that of his nature and training —very reserved, opening itself rarely to friends, almost never to a stranger.

But for all that, the stranger will find him most delightful company, for from childhood he has been trained to please. He has the greatest horror of being thought impolite or unamiable. You may break out upon him with the most fearful and wonderful French, but he will never laugh, never permit himself even the faintest smile, at your blunders. He will not allow himself to use a word which would hurt your feelings, and to be blunt and uncourteous appears to him little less than a crime." (John Finnemore, *France*, London, 1927, pp. 33-37.)

Subjected to such discipline, which no doubt varies with the centuries, the English boy in France becomes a "French" boy and the French boy in England an "English" boy. And similar disciplines shape and mould the lives of all human beings, making them what they are.

So far, it might appear as if it were a case of the author of this work *contra mundum*; but this is not so at all. Appendix A. and Chapter IXa. (Section 5) will show that specialists as a class do not indulge in direct inferences from observed to inborn human nature. On the contrary, they find it highly profitable to follow to its sources the cultural genesis of what surface observation offers. Almost everything that seems characteristic in an individual—as in Raphael, Leonardo da Vinci, and Michael Angelo (see Appendix A.)—is traced to the environment and thus a historic, evolutionary whole comes to replace a series of ostensibly unrelated events. Encyclopedias and scientific monographs are large-scale exemplifications of this almost universal trend in modern times of explaining individual achievements in socio-historic terms. Apart, therefore, from any arguments we have advanced, biographical and historical studies unmistakably intimate that the facile eugenic method of interpretation is in flagrant contradiction with what is disclosed by the laborious scientific method of research. From this viewpoint direct inference from observed to inborn human nature is to be severely discountenanced.

We reach now the second line of our argument. If no cause of human character traits and mental abilities were known other than that of inborn capacity, the situation would be perplexing. As in numerous kindred instances, we should have in this instance to suspend judgment and search and ponder until we discovered a solution. But, admittedly, this is not the case. There is another cause universally acknowledged. Biologists and non-biologists agree that men may and do learn freely from their fellows. L. T. Hobhouse, after a long series of special experiments, remained to some extent dubious as to whether animals can learn from others. However, if his observations had had relation to man, he could have entertained no manner of doubt concerning men possessing this ability. The common school symbolises this unique human capacity. Nor is it merely on the lower levels that we learn from our fellowmen. The man of science exhaustively studies both what other men in the same line of research have accomplished and the methods they applied. Indeed, in science,

as in practically all other domains, thought and endeavour are quintessentially collective.

It is, then, a fact that men not only learn freely from their fellows, but that they do this to an enormous extent, whatever their station in life. But if this is so, then it is illegitimate to argue directly from observed to inborn human nature. Learning from others is a factor in human life and it is therefore our scientific duty to ascertain whether this factor enters in a given case. It may or may not do so, but only circumspect examination can settle the matter.

Eugenists contend, as we have just learnt from Hobson and Carr-Saunders, that the influence of the cultural heritage and of collective thought is narrowly circumscribed. To which there are two replies. Even if circumscribed, we ought to discover the limits scientifically and not place them wherever our capricious fancy may direct. And, furthermore, until the limits are discovered, we may not, in any given case, commit ourselves dogmatically as to the causal relation subsisting between observed and inborn human nature.

But is culture, or learning from others near and far in space and time, a limited or secondary factor ? Eugenists assume this generally as a matter of course. Here we reach the crux of the matter. Now this treatise, by a comprehensive and well-nigh exhaustive survey, endeavours to prove that the inter-learning factor plays an all-important part in the life of humanity and that it alone raises men above the animal stage. Especially in Section 4 of the preceding Chapter, we saw that what we call science, art, ethics, philosophy, and civilisation generally, do not in the least degree exist outside the slowly developing cultural heritage and that hence any corresponding abilities and predilections are of necessity (and, as we learnt, actually) post-natally acquired and cannot be in any way or to any extent inborn or inherited, *e.g.*, no one living to-day would be likely, apart from his cultural equipment, to surpass the science, art, etc., of the most primitive tribes we know. All assumptions to the contrary are the result of overlooking the fact that man, so far as he is not a mere beast, depends exclusively on the cumulative cultural acquirements of mankind. The known socio-historic growth of every civilisational quality—in each case from the most rudimentary beginnings—abundantly testifies to this, as does equally the existence in all races and peoples, whatever their antecedents, of the capacity to acquire these civilisational qualities. Thus recent experience—in flat contradiction to earlier and to current biological theory—compels us to believe that all super-animal capacities and aptitudes are post-natally acquired and that the members of no race or people are congenitally debarred from attaining to what the members of any other race or people can attain. On the other hand, the actual inborn mental differences between men relate to their non-civilisational nature and,

as in animals, group themselves rather closely round a highly efficient species norm. (Feeblemindedness, like insanity, should be treated as an acquired or inherited disease and not as a lower form of normal human mentality.) Accordingly, we shall not be surprised to find that the current biological view of human nature is sustained either by a multitude of confident but unproved asseverations (such as those we have quoted) or by statistical studies (such as those by Galton or Pearson) that make no attempt at rigorously excluding or evaluating the cultural factor but blandly suppose that cultural resemblances between relatives cannot be due to cultural causes.[1] So far, then, from the cultural factor being of secondary or limited importance, it is the sole factor which accounts for every attribute of a civilisational kind in man. In fact, save for it, men would for ever exhibit only brute passions and brute intelligence.

As we have repeatedly stated, the current biological conception of the enormous variability of inborn human nature is in violent contradiction with the leading facts of biology. No such fantastic variability is even faintly traceable in any other species. Imagine parents who manifestly belong to the "common herd," giving birth to a son biologically destined to become a leading figure in history. On the biological plane this would be equivalent to a worm giving birth to a rabbit or a rabbit to an ape or ape parents to an ape who obtains the degree of Master of Arts in a European university. But granting the appearance in man of the capacity of learning freely from his fellows and granted our recognition that, effectively, in him cultural definitely supersede biological variation, selection, and progress, and the whole

[1]The very nature of the mental traits examined is as a rule most vaguely conceived.

In a closely reasoned paper on "The Inheritance of Mental Characters," in *The Rationalist Annual* for 1930, Prof. Morris Ginsberg arrives at the following conclusions: "There would appear to be no satisfactory evidence of the inheritance of special abilities when they have been investigated by modern methods." (p. 52.) "For the claims of those who pretend to measure with precision the relative rôle of inborn and environmental factors in mental development there appears to be no scientific warrant whatever." (Final sentence.) And Raymond Pearl (*The Present Status of Eugenics*, Hanover, U.S.A., 1928), the Director of the Institute for Biological Research of the John Hopkins University, writes: "In preaching as they do, that 'like produces like,' and that therefore superior people will necessarily have superior children, and inferior people inferior children, the orthodox eugenists are going contrary to the best established facts of genetical science. . . . A new *ad hoc* investigation of the breeding of great men shows that the facts are in full accord with the expectation from established genetic principles" (p. 20), *i.e.*, that the parents of virtually all great men have parents of no noteworthy standing. Even as to the few exceptions, "there is a possibility, to put it no more strongly, that to be brought up in the atmosphere and circumstances which surround a highly superior and distinguished man helps a son to make a career of distinction and achieve a position of eminence." (p. 19.)

We are tempted to supplement Prof. Raymond Pearl's statistics. The greatest early nineteenth century British poets were: Wordsworth, Shelley, and Keats. The greatest British poets of the later nineteenth century were: Mr. and Mrs. Browning, Tennyson, Swinburne, and Matthew Arnold. The greatest British novelists of the nineteenth century were: Scott, Dickens, Thackeray, and George Eliot. In all of these cases, study of their parents would have yielded no warrant whatever for anticipating their greatness.

course and trend of human life and human history become clear. Cultural adaptation having replaced biological adaptation in man, we can comprehend the otherwise mysterious and inexplicable fact—elicited recently by comparative psychologists, by school experiences, and by the League of Nations' Assemblies—that in the human race all mental adaptation has been invariably, everywhere, and in all ages cultural and not biological.

To conclude. Heredity and variability being quite universal facts, it was reasonably—almost necessarily—supposed that, roughly, observed human nature was an outward expression of inborn human nature. Learning freely from others, since it is a process altogether non-existent in the animal kingdom, was regarded, just as naturally, as an accidental human character and therefore of no serious import.[1] Somehow or other, it was felt, observed human nature must be explained biologically, at least with regard to things that mattered. As a working hypothesis such an assumption was feasible, but unfortunately it was conceived as an established law. Even so, however, uncritical assertions should have been ruled out inasmuch as the factor of experience counts even among animals, *e.g.*, a dog may have been cowed into timidity or lashed into ferocity, or untoward experiences may have made a cat reserved or happy experiences confiding. To this has to be added the possible influence of the cultural factor, the existence of which in mankind is universally acknowledged. In these circumstances uncritical assertions appear unpardonable and critical examination becomes an imperative duty, for in a given case or series of cases at least three factors may have to be taken account of, separately or jointly. Now in the immediately preceding pages it has transpired, on the one hand, that the natural-superiority-and-inferiority theory is beset with insurmountable obstacles and that, on the other, the cultural or specio-psychic theory fits the facts closely. The current biological interpretation of observed human mentality thus breaks down under the stress of a searching examination and the specio-psychic theory, which was initially considered of secondary, if of any, importance, reveals itself as representing a new line of development in living nature, one which replaces biological by cultural selection and adaptation and lifts man out of the animal kingdom into a kingdom of his own.

Men of science are ever ready to challenge even axioms established with the utmost care. How natural should it be, then, for biologists to question a merely specious theory, like that of eugenics, for which no strong proofs have been advanced. Indeed, what we find historically is this. Darwin believed that, compared with civilised peoples, the more primitive tribes had, by nature, keener senses and different temperaments; that our emergence from savagery and barbarism

[1]As a general rule, this factor is ignored altogether in biological works purporting to deal with the origin and nature of man.

signified a purging and refining of our inborn nature in the course of the ages ; that primitive groups were primitive by nature and therefore not educable to civilised standards ; that peoples and social classes broadly reflected their innate mental outfits ; that great men and men of talent are such by virtue of native endowment ; that, generally, individuals are by nature what they seem ; that acquired characters are inherited ; and that animals, too, learn more or less freely from their fellows' experiences. Now, as we have seen, impartial investigation and modern experience have ruthlessly swept aside these legends and cleared the way, accordingly, for the acceptance of the speciopsychic theory in all its breadth and depth. It follows hence that the exaltation of "nature" and the belittling of "nurture," so much in vogue to-day both as regards lesser and greater problems, betoken a disastrous misreading of the facts and render thus impossible a fair understanding of man's place in nature and men's place among their fellows.

4. *Man's Place in Nature Defined.*

Our final conclusion is, then, that the difference between the species *Homo* (whose members can freely learn from their fellows living and dead and can therefore multiply their powers almost infinitely) and all species of animals and plants (whose members cannot freely learn from their fellows living and dead and for all intents cannot therefore multiply their powers at all) is so radical and so far-reaching in nature that we have no alternative but to separate man from plants and animals and constitute for him a new and third kingdom of life, the Human Kingdom.

In Section 2 of this Chapter we saw strong reasons for believing that the difference between man and animals is strictly and absolutely one of kind and not of degree since, as we learnt, there is nothing in the history of any animal species to compare in any way with the *gradual* evolution in mankind of increasingly complicated and superior life-histories or modes of living. However, even if no sharp line could be drawn between man and animals, this would not prevent us from placing man in a separate kingdom, for the same is true of the border line between plants and animals and yet no one would speak of horses as plants or of oak trees as animals, or be in doubt as to which kingdom the one and the other belonged. Indeed, on evolutionary grounds we should expect that animals at their very highest, as in the use of sticks or stones, should be virtually indistinguishable from man at his very lowest, as in pre-eolithic times. But as an ape could not be mistaken for an elm, so a scholar, or indeed a primitive Tasmanian, could not be mistaken for an ape. In other words, in all but wholly exceptional circumstances (as in the case of infants and idiots), the question of the uniqueness of man is outside the limit of doubt and there is therefore no difficulty in speaking of man as forming a separate kingdom. Finally, the fact that the human kingdom consists of a single species is paralleled by single species of animals frequently forming a Genus, a Family, or an Order by themselves.[1]

[1] A recent writer, Horace J. Bridges, in *Aspects of Ethical Religion* (New York, 1926), has made the startling suggestion that the fundamentalist movement in the United States gains its prodigious strength from the conviction that the biologist's account of man's status must be false, as it outrages common sense and the plainest dictates of experience, and that this teaching is immoral, as it suggests to man that he is an animal when man knows that he is infinitely more. The fundamentalists have here to no small extent truth on their side. Is it not time that our biologists should be in quest of an explanation of a sun-clear fact instead of blindly ignoring or denying it ?

Chapter VII.

DEFINITIONS AND IMPLICATIONS.

(A) Definitions.

According to John Stuart Mill "the definition of a name . . . is the sum total of all the essential propositions which can be framed with that name for their subject. All propositions the truth of which is implied in the name, all those which we are made aware of by merely hearing the name, are included in the definition, if complete, and may be evolved from it without the aid of any other premises." (*A System of Logic,* London, 1884, book 1, ch. 8, §1.) In short, as Bain declares, when dealing with the nature of a definition, "it exhausts the meaning of a word." (*Logic,* London, 1870, Part 1, p. 71.) Before we apply these severe tests to our definition, we shall briefly examine, in the spirit of these injunctions, some proposed definitions of man.

Such a facetious definition of man as that of "the featherless biped" lacks, of course, all serious suggestiveness. Similarly, to speak of man as "the laughing animal" does not lead us any further, even if the definition should transpire to be based on fact, since man exhibits sundry other distinctive characters of greater moment. Somewhat more suggestive is the conception of man as "the religious animal," although it implies, unjustifiably, that all human beings are religious in a certain sense and that no animal is religious in any sense, which Darwin laboured to disprove. Since, however, man possesses other such distinctive attributes, the definition should be regarded as in any case gravely incomplete.

It argued perspicacity for naturalists to place the human species in a separate Order and name it *Bimana,* in contrast to the Order designated by them *Quadrumana.* Unfortunately, neither description is found to be correct when closely examined. Monkeys and apes, it is true, can grasp with both lower and upper extremities; but the bare fact of grasping does not transform a foot into a hand, otherwise some human beings might be classed with the *Quadrumana* because their feet possess to a certain extent the power of prehension.[1] As our quotations from Huxley have shown (Chapter III.), feet are anatomically distinct organs from hands and monkeys and apes exhibit a pair of each. The appellation *Quadrumana* fails therefore to describe monkeys and apes. Similarly, with the presumed *Bimana,* constituted of man alone. If man has two hands, so have monkeys

[1]See Hermann Klaatsch, *Der Werdegang der Menschheit,* Berlin, 1920.

and apes. It is no doubt true that man's hands are superior hands, hands that are nothing but hands, used for manipulation only and never normally for locomotion,[1] and that similarly his feet are strictly specialised for locomotion. Nevertheless, it is incontestable that the difference is only one of measurable degree and that such measurable differences do not lend themselves to lucid definition. In fact, man, with equal cogency, might be distinguished from his nearest relatives as a *Biped,* seeing that he uses his feet only for progression. Higher as man stands because of his specialised extremities—the upper confined to manipulation and the lower to locomotion,—these do not afford a sound classificatory basis.

More appropriate would appear to be the appellation *Homo erectus,* for, as Darwin and others have pointed out, the development of man's erect posture has entailed many far-reaching bodily modifications—non-prehensile toes, stronger calves, longer legs, a broader pelvis, concavely curved spine, longer neck, orthognathous features, a heavier brain, shorter arms, specialised hands, and the like.[2] Were the man-like apes figments of the human imagination, the description of man as *Homo erectus* would appeal strongly to many a naturalist; but he who has observed the semi-erect or completely erect posture assumed occasionally by some apes and the completely erect position frequently noticeable among gibbons, would feel that the description does not ring true, *i.e.,* that it does not adequately differentiate. With only this definition as a guide, we should be perplexed when seeing a gibbon erectly walking up a sloping branch of a tree and generally moving on trees with hands only, the lower limbs vertically suspended. Even so, however, in view of the many adaptational characters involved in the permanently erect posture, the description might hold, if we deliberately allowed for the man-like apes as a transitional stage and if we overlooked the fathomlessly deeper distinctive character of speciopsychism.

A favourite description of man is that of "the tool-using animal." Here we meet with a truly important differentia, for both at the lowest and the highest stages of development, man is inconceivable without implements. Bergson contends that we should speak of man as *Homo faber,* rather than as *Homo sapiens,* the primary purpose of the intellect being, according to him, to produce artificial objects, in particular tools with which to make tools. (*L'évolution créatrice,* Paris, 1911, p. 151.) Given no detailed interpretation of the word tool, the definition provides a meager account of man. The tools used, as with monkeys and elephants, might be sticks or stones found in nature, not artifacts at all. The definition, however, could be amended to indicate this. Yet it leaves it an open question whether

[1]Save by many infants before they can walk.

[2]On this subject, see G. G. McCurdy, *Human Origins,* New York, 1924.

man can, by nature, make any tool or needs to learn this and whether tools are products of one mind or of many. The word tool, undefined, is further ambiguous in that it neither suggests the place of language or of thought nor of moral or æsthetic sentiment and seems to refer to a means only, regardless of the equally fundamental distinction of human adaptability in relation to ends. As an auxiliary definition, especially if guardedly developed, the phrase "the tools-employing animal" or, say, "the tools-fashioning animal," is admirable; but not as a comprehensive definition of man. However, since the tools themselves are a direct consequence of man's specio-psychic nature, a true definition of man should have primarily regard to the latter.

Homo sapiens, again, is the precursor of *Homo faber*—the former the product of classicism, the latter of industrialism—and has its own defects. Some animals, particularly the anthropoid apes, reason unmistakably, at least when compared to other animals; and, given limited interests, reasoning may well exist in conjunction with solitariness or it may be conceived to develop naturally in every human being. The definition suggests that the individual's reason is self-sufficing when, without others' aid, it does not much exceed that of the ape, nor does the definition allow for the important place occupied by habits and sentiments. The emphasis on the preponderating weight of the human brain, which is approximately twice that of the gorilla, should be corrected by the reflection that the average brain weight of members of some of the lowest and some of the highest civilisations differs inappreciably. Ancient as the definition is, it has never done more than to call attention to a salient human character in relatively developed civilisations and cannot therefore be regarded as satisfactory. This definition is sometimes elaborated, as when J. Arthur Thomson writes: "The large and complex brain of man is correlated with those differences which everyone admits to be most distinctive: (1) That he has a power of working with abstract ideas, making 'conceptual inferences,' exercising reason; (2) that he has the habit of guiding his conduct in reference to certain ideals, exerting, when he will, a power of ethical choice, 'thinking the ought'; and (3) that he has a language in the true sense, a power of expressing his judgments in a manner intelligible to others, which is something more than having words, being, in short, a *logos.*" (*Harmsworth Natural History,* London, vol. 1, 1910, pp. 147-148.)[1] Its very diffuseness turns this definition into a serviceable but nevertheless inadequate description, particularly as the all-important inter-learning factor receives here no recognition. We should do fuller justice to the facts if we stated that reason is the product of the pan-human mind and humanity in the aggregate the true rational unit or thinker.

[1]See, to the same effect, Patrick Geddes and J. Arthur Thomson, *Evolution,* London, 1911, pp. 99-100, and J. Arthur Thomson, *The Study of Animal Life,* London, 1917, pp. 360-361.

Emile Waxweiler appears to allow for the specio-psychic element whereon we have laid such stress. He expresses this in various ways: "Man has become the animal which is developed by the other members of his species." "Man has become the animal whose primary and unique instinct is the tendency to learn." (*Esquisse d'une sociologie,* Brussels, 1906, pp. 76-78.)

Alfred Korzybski, in his *Manhood of Humanity* (New York, 1921), defines man as "*the time-binder.*" He says: "Because humanity is just this magnificent natural agency by which the past lives in the present and the present for the future, I define humanity, in the universal tongue of mathematics and mechanics, to be the time-binding class of life." (pp. 59-60.) The idea embedded in this definition possesses superior value, but the definition is too vague and incomplete (in that it omits mentioning that men are also bound together spatially and in that it is not causal). In any case, "race-binder" would have harmonised better with the data.

According to many, man is pre-eminently an animal which lives, moves, and has its being in society. *Sociality* or sociability is thus stated to be one of man's chief characteristics.[1] Full of meaning as this is to him who has put meaning into it, of itself it is disappointing, for it scarcely tells us more than that man is by nature social. As no distinctively human signification can be attached to the term "social," it is not fertile in suggestions. Nevertheless this conception of man has provided the present writer with one of the longest bridges to bring him to his own definition, since it was an examination of the social nature of man which suggested man's measureless adaptability and his dependence on the mass of pan-human inventions and discoveries which we call civilisation for satisfying his nature. This examination made it also clear to him that man was not social in the sense that, like gregarious animals, he lived in independent and short-lived groups, but that he was super-social or specio-social, in the sense that his sociality, spatially and chronologically considered, was co-extensive with humanity past, present, and future.

In his *Sociétés animales* (Paris, 1878), Espinas, by an exhaustive examination of the nature of animal societies, demonstrated that the aims and methods of human societies exactly correspond to the aims and methods of animal societies and that therefore those theories which assume that human societies are artificial, unnatural, or based on arbitrary principles, are without a solid foundation.[2]

Still, when we analyse the expression "social being" more closely, difficulties arise. Animal "societies" differ greatly. Frequently there is mere sociability, as with birds of a feather that just flock together without cooperating in any way. Sometimes this is varied by collectively attacking an enemy, as sparrows a hawk. At other

[1] For an exposition of this viewpoint, see Francis S. Chapin, *An Introduction to the Study of Social Evolution,* New York, 1913, chapter 4.

[2] Numerous writers have stressed the organismal nature of society. For a recent statement of this view see Oscar Hertwig, *Der Staat als Organismus,* Jena 1922. The relation of the individual to society is interestingly discussed by Georg Simmel, *Grundfragen der Soziologie* (Individuum und Gesellschaft), Berlin, 1920. See also P. Deegener, *Die Formen der Vergesellschaftung im Tierreiche,* Leipzig, 1918.

times, as with buffalos and wild horses, definite measures are taken for protecting the herd against a sighted enemy, or sentinels stampede the group on the approach of danger. When wolves, in certain circumstances, hunt in packs, we have common action of a more intimate character. Still, the instances where there is elaborate cooperation between the members of an animal group are rare. In "villages" of beavers cooperation is occasionally displayed to a remarkable degree. However, leaving aside the termites, practically ants and bees alone form true societies with systematic division of labour, and man, so far as social, can be only compared with these insects.

Nevertheless, human groups diverge in two fundamental respects from ant and bee groups. The latter are so completely and uniformly organised that each specialised member of the group is, for all intents, the exact counterpart of every other similarly specialised member of the group and that group resembles group and generation resembles generation just as closely. Ants and bees are "to the manner born"; they have nothing to learn; they perform their duties punctiliously and unquestioningly, as the poet's stars do. Innate dispositions, in fact, dominate and guide the members of these groups. Now human groups present a radically different picture. The specialised members of these groups differ widely in their performances and nothing can be predicted with any certainty regarding what any member does or will do. Indeed, the members may not only decline to promote the common good, but may actively pursue their own designs at the expense of the community. As with the individual members, so with the individual groups and the individual generations: they may extensively differ from one another.

Secondly. Each ant or bee group lives its own life apart from that of other groups and its members remain, save for accidents, loyal to that group. Moreover, since the relation of one ant or bee generation to another is purely one of physical heredity, the separate generations are independent of each other as are the separate groups. Ants and bees are thus, in the narrowest sense, group beings. This is different with man. Men, it is true, invariably live in groups, but they frequently leave one group for another; the groups of the whole species often communicate and cooperate; the groups themselves may consist of a complex of widely scattered groups; and the activities of any one generation are crucially influenced by the activities of earlier and even the earliest generations. Men are thus, by contrast, primarily species beings and only secondarily group beings.

The facts render it manifest, accordingly, that whilst man is not a solitary being and this necessarily so since he depends on his fellows near and far in space and time, he differs from all social animals in two crucial respects: his sociality is not primarily based on virtually unerring impulses, but on imperfectly apprehended cultural needs, as his "selfishness" and even ignorance of his place and work in the community indicates, and with him the individual group—which is often a congeries of groups, as in a nation with its villages, towns, districts, and provinces—is essentially subordinated to the species as a whole, both through space and through time. These two differences range man entirely apart and he should be therefore called a pan-species, a specio-social, or a pan-social, being, to distinguish him from social animals which, but for negligible exceptions, are necessarily and completely social in their lives and which have their being entirely within a given existing and narrowly localised group.[1]

Homo socialis represents therefore too broad a definition of man. *Homo civicus* evidently narrows the connotation in the right direction. A civilised being is a social being and a civilisation involves a society. A civilisation at once suggests conditions distinctive of man. Civilisation implies civilisations varying along numerous lines, both spatially and historically, and betokens a state of society—whether

[1]Aristotle (*A Treatise on Government*, book 1, chapter 2) says: "Man is naturally a political animal, and whosoever is naturally and not accidentally unfit for society, must be either inferior or superior to man." So in his *Ethics* (book 9, chapter 9): "Man is a social being, and formed by nature to associate." Epictetus writes: "Do you not know that as a foot is no longer a foot if it is detached from the body, so you are no longer a man if you are detached from other men?" (*Discourses*, book 2, chapter 5.) And Marcus Aurelius: "My nature is rational and social; and my city and country, so far as I am Antoninus, is Rome, but so far as I am a man, it is the world." (*Thoughts*, book 6, 44.) Julian Huxley ("Progress: Biological and Other," in *The Hibbert Journal*, April 1923, p. 447) admirably differentiates mankind from the rest of living beings and groups as "an aggregation of minds."

styled primitive, barbaric, or civilised—where material and mental tools of an extra-organismal character form the substance of the common bond. It is sufficient here to note that we properly speak of man alone as civilised and that if the concept is circumspectly analysed it reveals those specio-psychic characters which so radically divide man from what is called "the lower creation." In addition, *Homo civicus* would present a valuable description of man, inasmuch as it at once suggests what is the concretest and most systematic outcome of specio-psychism.

Yet whilst the preceding designation has its advantages, a more scientific one, that of *Homo specio-psychensis*, appears more appropriate. Man, after all, is not born civilised, but is only adapted for the civilised state and he is adapted for that state *because of* his specio-psychism. Moreover, if civilisations have developed at all,—to however modest a degree,—this is entirely and altogether due to the same factor. If we define, therefore, as we should, by causes, *Homo specio-psychensis* (the inter-learning animal) is to be preferred to *Homo civicus*.

We have proceeded sufficiently far in our analysis to justify an attempt to express the results obtained in the form of a definition. Seeing the stupendous culture which the specio-psychically determined mode of life has built up in the course of the ages; seeing that but for this mode of life no culture at all and no human being in any way cultured or above the animal stage would exist; seeing that the almost infinite cultural differences and gradations among human individuals, groups, and periods are fully and solely accounted for by cultural causes and cultural opportunities; seeing that man can only satisfy his nature through pan-species culture and that, for this reason, probably not a single cultureless human being exists; and seeing also that man is strictly unique among living things in this crucially important respect of being specio-psychic instead of individuo-psychic, we may say that *Man is the living being adapted for the specio-psychically determined mode of life.*[1] More fully, man is

[1]Human nature, in its fulness, comprehends, of course, man's whole being: (a) animal inheritance; (b) general, racial, and individual physical modifications; (c) human qualities or instincts of distinct importance; and (d) the central fact embodied in the definition and explained more particularly in the preceding three chapters. Already Marcus Aurelius was clear on the point that a definition of man should be distinctive of man. His whole ethics was based on this. "When thou risest from sleep with reluctance," he gently admonishes himself, "remember that it is according to thy constitution and according to human nature to perform social acts, but sleeping is common also to irrational animals." (*The Thoughts of the Emperor M. Aurelius Antoninus*, G. Long's translation, London, 1887, p. 148.) Even anterior to him, Confucius had said: "By nature, men are nearly alike; by practice, they get to be far apart." (James Legge, *The Life and Teachings of Confucius*, London, 1887, p. 239.) In pre-scientific language, Harvey stated the cultural view of the nature of man: "'Man comes into the world naked and unarmed, as if Nature had destined him for a social creature and ordained him to live under equitable laws and in peace, as if she had desired that he should be guided by reason rather than be driven by force; therefore did she endow him with understanding and furnish him with hands that he might himself contrive what was necessary to his clothing and protection.'" (Quoted by H. B. Donkin, *On Inheritance of Mental Characters*, London 1910, p. 43.)

specially distinguished from (a) the Primates (to whom he is most nearly related), by his completely erect posture and a higher development of brain, hand, and speech apparatus, and from (b) all plants and animals, including the Primates, by his being adapted for the specio-psychically determined mode of life, that is, by his dependence for satisfying his needs, instead of on primarily inherited organic means (such as instincts and associated organs), on in substance specio-psychically discovered, adapted, improved, and post-natally transmitted extra-organic means (such as historically developed material and mental tools). Or we may state that what defines man most truly is that the necessary means for adequately gratifying his nature are, in a growingly satisfactory form, provided—not, as in animals, by instinct, by individual intelligence, by learning casually from neighbouring members of the same species, by incidental traditions, by instinctive group cooperation, or by a combination of several of the just enumerated means, but—by the steadily increasing accumulation of material and other inventions and discoveries made and developed by his species as a whole and transmitted by inter-learning from generation to generation. Less diffusely expressed, *Man is the living being which satisfies its nature primarily through utilising and infinitesimally augmenting the substance of the consolidated inventions and discoveries of its kind past and present.*

Our conclusion is, then, that man is to be defined as the living being adapted for the specio-psychically determined mode of life and that the various current definitions of man do not make it apparent that profiting by the thoughts and experiences of one's fellows near and far in space and time is for man what special inherited needs, organs, and modes of procedure are for plant and animal species.

(B) Implications.

Before dealing with certain definite implications, we may glance at the probable effect of the specio-psychic theory on the various mental disciplines.

The so-called "orthodox" evolutionary view of human nature is to such an extent out of harmony with reality that it has been almost completely ignored, save perhaps in economics and social reform where, in the opinion of many, its influence has been decidedly baneful. Philosophical, æsthetic, ethical, juridical, political, and even sociological discussions continue to proceed on the assumption that the nature of man has not yet been scientifically determined and as a rule individual thinkers tacitly or explicitly postulate one or another of the numerous traditional theories on the subject.

Now the specio-psychic theory is likely to produce here a profound change. The wholly uncultured individual, who is almost in the

position of an ape (since he is speechless, toolless, and unspeakably ignorant), is world-removed from the man of culture of to-day. If the latter reasons consecutively, it is by means of a historically developed language and if he observes and cogitates scientifically, this is owing to his having assimilated the historically developed methods that have rendered such observation and cogitation possible. Man's interest in ethics, philosophy, science, and the beautiful is also the slow result of cultural development and so is, of course, his interest in the past and future and the far-off generally. Even his conceptions of space, time, quantity, thought, personality, and "self-knowledge, self-reverence, self-control," are specio-psychic products. The *philosophical disciplines* of the future will hence take the specio-psychic view for granted in all their investigations. The real thinker will be for them the collective human mind, the thousands of millions of individual human minds that cooperate to augment indefinitely the pan-human treasure of thought and sentiment. Thus intellectually man may be said to be to men what an organism is to the multitude of cells composing it.

In *moral and social reform*, as we shall see in the sequel, the guidance afforded by the new theory is of the most far-reaching character. The cardinal ethical and social problems will require to be drastically re-conceived by reformers, both the endless possibilities of the normal individual and the limitless influence of the environment being allowed for. The present-day eugenist theories will need to be erased from reform programmes, as they involve a radical misconception of the nature of man.

In *sociology* proper we obtain at last calculable units—*the culture-demanding individual, the culture-mediating community*, and *the culture-supplying humanity*. The primarily pan-social nature of man and the office of communities and governments are in this way established on an unequivocal basis, whilst over-emphasis on the individual, the family, the community, the nation, or mankind, or on past, present, or future respectively, is avoided, each of these having both duties and rights.

With regard to essentials, *religion* is, as we shall find at the close of the Chapter, vindicated and re-orientated by the specio-psychic theory.

In *education* we shall no longer be bewildered by the problem of the unknown potentialities of normal children in general and of social categories of children in particular (nor be confused by the hasty general conclusions drawn from "intelligence tests"). We shall know that virtually all alike require, and can profit by, the best available education and that this education should have a comprehensive object—

the inculcation of the love, the knowledge, and the pursuit of the good, the true, the hale,[1] and the beautiful.

The *historian* will be furnished with a clue to the kaleidoscopic picture which presents itself at present to his unguided vision. His task will remain arduous, but he will be cheered and helped by the master idea that the historic struggle reveals a struggle towards the light and the right and that universal progress, however slow, circuitous, intermittent, and varied by retrogression, is a stupendous reality.[2]

The *politician* will cease to be a blind conservative or a fanatical innovator. He will recognise the danger of over-estimating or undervaluing the contributions of the past. He will allow for the infinite potentialities of individuals of all classes alike. He will also learn that his object should be the present and future good of the people and of the peoples *as a whole* and that he should dissociate himself from purely sectional aims.

The *criminologist* will regard crime as primarily a social disease. Convinced of this he will urge the modification of the social conditions which breed crime and will devise means to convert the criminal into an honest citizen. He will, for this reason, encourage and develop the various humanitarian tendencies and agencies concerned with the subject of offenders and offences against the law which have evolved during the last few generations.

Lastly, the *economist* will find a potent reason for discarding the theory of "the economic man" in favour of that of "specio-psychic man." With the aid of the conception of the scientific organisation of commerce and industry, he will evolve a truly socialised, cooperative, and international economy where necessary wealth shall abound and be equitably distributed.

[1] Radiant physical and mental health in the individual and the race is of such priceless value (even for the life of the spirit) that it deserves and needs to be ranked with the good, the true, and the beautiful. With the development of science, interest in health and sanity has been growing by leaps and bounds, so much so that the idea of the prevention and the cure of disease has led to numerous religious and other movements concentrating on this issue. In reality, for him who hopes for a comparatively ideal state of society, there cannot be as much as moderate satisfaction unless radiant physical and mental health distinguishes that state. For this man the classic formula gains infinitely in meaning and weight when it is completed by the explicit introduction of the health element. Naturally, our conception implies that we take a broad and lofty view of health, as we do of goodness, truth, and beauty.

[2] "In our culture there is at present a most dangerous gap. While most other great subjects of knowledge have been brought under systematic treatment, rescued from mere popular misconception, and then, when the great generalisations have been duly settled, rendered back to the people in authoritative teaching, one subject remains an exception, and that one the all-important subject of the history of civilisation. No grand trustworthy outlines have yet been put within the reach of all, which may serve as a chart to guide us in political and social movement." (J. R. Seeley, *Natural Religion*, London, 1895, p. 298.)

The above examples render it manifest that, unlike the current evolutionary view, the specio-psychic conception of man would radically affect the mental and social sciences. Its influence on these should equal that of the introduction of the idea of organic evolution in biology. However, specio-psychism, it should be noted, lends no more encouragement to a facile optimism than to a damping pessimism.

1. *Theoretical Implications.*

(a) Since in its behaviour every species of animal known is for all intents hereditarily determined and in no degree can be species-determined, the mind of any animal must be of necessity almost infinitely poorer than that of the average cultivated man of to-day who has mentally assimilated the substance of the consolidated material and other inventions and discoveries of his species past and present.

(b) Since the human individual is a specio-psychic being, it follows that his mental connection with the rest of his species in space and time cannot be through biological heredity and must therefore necessarily be through post-natal communication.

(c) Since the civilised condition is an environmental datum, a human being, if left to himself, or left with others who are completely uncultured, would not be appreciably more capable than are many of the more highly intelligent animals (*vide* (a) and (b)).

(d) Since man is a specio-psychic being, he can assimilate virtually the substance of any civilisation however advanced.

(e) Since man's self-culturability is virtually zero (*vide* (c)) and his capacity for being cultured is virtually infinite (*vide* (d)), there is virtually an infinite distance between the minimally and the maximally cultured man and consequently any differences between any two individuals in respect of being cultured (Zulu in his Kraal, University Professor in his Chair) are to be explained first and foremost by the circumstances in which they are placed, which is equivalent to stating that human beings are, by birth, and because they are mentally species-dependent beings, almost infinitely more like than unlike each other morally, intellectually, æsthetically, and otherwise.

(f) It follows from (e) that the stock of humanity's moral and other acquisitions, divided by the number of human beings who have lived and postulating the actual physical and cultural conditions, virtually yields the latent capacity of the individual to contribute to the stock of human acquisitions and that, conversely, the quantity of mental effort put forth by one individual, in the above conditions, multiplied by the number of human beings who have lived, virtually yields the stage of possible culture reached.

(g) Since culture, as species-developed, is necessarily a product of many minds and many ages (*vide* (f)), it is of cardinal importance for

each generation to preserve, adapt, improve, and increase the stock of humanity's material and other inventions and discoveries, which process, seeing the weakness and the fallibility of the unaided human individual (*vide* (c)), must be, in advanced stages, normally performed by means of collective customs and institutions.

(h) Since man is adapted for the specio-psychically determined mode of life, he lives exclusively and necessarily in that state and is unfit for any other, which does not however preclude that in certain departments of life man does live largely still at the animal stage—that is, without the aid of pan-species culture.

(i) Being primarily adapted for the specio-psychically determined mode of life, man is only truly himself when he is truly cultured, the more himself the more he is cultured, and ideally himself when ideally cultured.[1]

(j) Being only truly himself when he is truly cultured (*vide* (i)), he naturally tends, if not discouraged, to improve the state of culture which surrounds him and cannot rest until the stage of universal culture becomes in every respect ideal.

(k) Since man ultimately aims at an ideal state of civilisation (*vide* (j)) and since civilisation ignores territorial limits, he ultimately aims at an ideally organised universal civilisation and universal fellowship.

(l) Since man is by nature culturable, but not cultured, he does not, apart from science, know that he is culturable, nor that he should not depend on unenlightened instinct or passing reflections ; he therefore frequently entertains erroneous notions regarding his essential nature, thinking that he is acting as a cultured being when he is not, that he exercises control over himself when he is really controlled by his primitive impulses, that he is satisfying his nature when he is not, and that he can rely on his native capacity for guidance when this would not lift him above the animal stage.

(m) Innate appetites, instincts, impulses, etc., excluding specio-psychic ones, are not distinctively human qualities and are therefore excluded from our conception of man so far as cultured and since man is indefinitely culturable (*vide* (d)), it follows that the enormous pressure of species-produced culture, when concentrated, is capable of overcoming any resistance that might conceivably be offered by man's sub-human nature. Finally,

(n) The further humanising and socialising of man's nature, consequent on the growth of culture, will lead to the educational

[1]Expressed in philosophical language, we may say with A. A. Spir (*Recht und Unrecht*, Leipzig, 1879, p. 22) : "The ultimate purpose in man is to develop in himself the truly human part to the fullest attainable degree."

process meeting with progressively fewer obstacles and becoming therefore progressively less arduous and more successful.

Hence our definition involves that since culture is a progressive pan-human product, humanity is capable of achieving in the course of the ages virtually everything, the unassisted individual virtually nothing.

A truly exhaustive definition of man ought to serve at least four purposes. It should, first, render manifest the innermost character of man. It ought, secondly, to help in explaining what we know of man and should, roughly, enable us to reconstruct the most general outlines of man's history from that knowledge. Thirdly, it should serve as guidance for the present and the future and save us from the countless errors which an incomplete understanding of human nature inevitably produces. And, fourthly, it should aid in the formulation of a definite philosophy of life or religion. As A. W. Small writes : "The central task of social science is to understand past and present men, and to derive from this knowledge valuations of both ends and means for the use of the men we shall be to-morrow." (*The Meaning of Social Science,* Chicago, 1910, p. 115.) Indeed, "in their aims, as formulated usually by their respective exponents, political science, political economy, and sociology are evaluative procedures of so many distinct kinds. Their outlook is prospective rather than retrospective. Each attempts to find out how to bring something to pass. In general, political science tries to find out the best methods of legal control ; political economy, the best means of assuring material prosperity ; sociology, the best means of promoting the development of human personality." (*Ibid.,* p. 227.) That is, there is a practical side to theoretical enquiries.

The first purpose we have endeavoured to realise in the definition proposed and in the series of reasoned statements deduced from it in the above theoretical implications. The second, third, and fourth purposes will be examined in the three following Sections.

2. *Historical Implications.*

The realisation of the second purpose is evidently the task of the ages and can scarcely be touched on in a general treatise. Nevertheless, we may note that since men were everywhere substantially alike and since the single individual's mental powers were infinitesimal, the advance of civilisation must have been by exceedingly slow stages and the stages must have been similar where the conditions bore a close resemblance to one another. This similarity must have been accentuated through personal or tribal contact however passing, which contact undoubtedly accounts for all peoples possessing in common

the principal elementary classes of tools and their products.[1] Granted, too, that man was only potentially man in the earliest stages and it will follow that his animal nature exercised a predominant influence over him for long ages (which may partially account for the microscopically slow advance in early times). Even beyond that, since man was necessarily ignorant of his super-brute nature, he was misled in a multitude of ways and was only kept to a single line of advance by his elemental specio-psychic nature, in spite of all temptations—through animality, narrow interests, lack of experience and knowledge, paralysing habits and customs, and fears of imperilling the cultural heritage by listening to would-be reformers—to fall a victim to permanent stagnation, aberration, or retrogression. It was natural that the end should be first discerned, however dimly, by those who were by circumstance averse to strife and given to prolonged contemplation. Accordingly, the ancient prophets and seers leapt in advance of their fellows who were immersed in the struggle for existence and comfort and pleaded for a beating of the swords into ploughshares and a harmonious cooperation between individuals and collectivities. Actual material, hygienic, intellectual, moral, civic, and æsthetic progress remained, however, unavoidably slow, owing, among other reasons, to the chaotic condition of social institutions and the absence of the

[1]This knowledge has enormously advanced during the last half century. A volume such as Osborn's *Men of the Old Stone Age,* for example, concentrates a great mass of material relating to geographical changes, as well as to the flora and fauna and to climate, right from Early Chellean to Magdalenean times. Moreover, the study of numerous skeletal remains has shown that physically man has undergone sundry changes and more especially that our distant ancestors were more ape-like in physique than we are, as is illustrated, *e.g.,* by *Pithecanthropus erectus, Sinanthropus,* and *Homo Neandertalensis*—that, indeed, several distinct humanoid species may have existed. So, too, it has been established that man lived for countless ages in certain parts of Europe and of other Continents by rivers in the open, in caves, or under rock shelters, occupying sometimes particular stations for hundreds of centuries. Lastly, the most remarkable fact is that throughout the paleolithic periods, the flint or quartzite tools used were, broadly speaking, everywhere of the same type at a given date and steadily improved from the earliest times, thus demonstrating the unity of the human race in space and time. This last statement should be considered in conjunction with the frequently noted fact that all but the earliest skulls indicate a brain capacity about the same as that of modern man, for it explains how it is that the early races referred to above were capable of producing, improving, and borrowing tools and other cultural products. Save for mutual fertility, the typical Caucasian, Mongol, and Negro, as we have already stated, are sufficiently distinctive physically to have been regarded by systematists as distinct species and yet, mentally —as in their cultural activities—they are, as we saw in Chapter IV., indistinguishable. This seems to have been also the case approximately with the even more widely diverging early human races, for the articulate history of flint tools proves their producers to have been distinctively human in mentality. The emergence of man from apedom may therefore have terminated prior to the date of the earliest known flint tools several hundred thousand years ago. Perhaps another half century of archeological discoveries, combined with a comparative study of the natures of anthropoids and of men, of the existing earliest cultures, and of young children, may place us in the position of roughly tracing the general lines of cultural advance and its causes from earliest times to to-day.

In the light of the above revelations of anthropological science, the discussions on the early social life of mankind by Hobbes, Locke, Spinoza, Vico, and Rousseau, appear positively childish and confirm the futility of all wide suppositions not founded on scientifically ascertained data.

needful knowledge of how to improve them. The advice of the prophets and seers could not be therefore accepted without serious reservations. Paradoxical as it may appear at first sight, the tendency towards socialisation expressed itself at the beginning in a heightened concern for self,[1] since wide cooperation had multitudes of obstacles to surmount and since there was much temptation, in the circumstances, individually or collectively to oppose, instead of to aid, others. Moreover, not aware of the pan-human origin and development of truth and knowledge, which only extensive experience and science could reveal, there was the tendency for individuals and groups to imagine that they could, with one bound, settle by themselves some great practical or theoretical problem. For the same reason men believed that the cultural differences between individuals, caused undoubtedly by slowly-working cultural forces, argued inherent differences, an error of the first magnitude which the modern world still largely shares with antiquity.

The considerations advanced in the last paragraph should go some little way to increase our theoretical understanding of the course which human history has actually taken. They may even be utilised sometimes to elucidate obscure points in history and to some extent to conjecture and discover intermediate historic stages. To reconstruct, however, the whole, or even parts, of history to any notable degree, is manifestly out of our present range. Our knowledge of man's early physical and biological environment, of his migrations and the migrations of his cultures, of geological and climatic changes, of man's inborn mentality and changes therein, of the nature and strength of his native dispositions, of the labyrinths created by numerous errors and by much else, is altogether too inadequate to entitle us to think of re-writing to-day man's history however sketchily. Nevertheless, something may be attempted in this direction even now and with a much improved specio-psychic theory and with increasingly augmented knowledge of secondary principles as revealed by a scientific history and psychology, the historian, the sociologist, and the anthropologist will be able warily to venture ever farther.

The primary social phenomena and their origin, development, and tendency should be deducible from the specio-psychic character of man and the general needs which he has in common with animals. Thus we should, broadly speaking, obtain a picture such as that outlined in the paragraphs that follow.[2]

[1] By parity of reasoning, we may appreciate the complementary nature of the simultaneous development in our day of a virile nationalism and of a no less sturdy internationalism.

[2] With regard to the far distant past the following recent works may be consulted with advantage : F. M. Feldhaus, *Ruhmesblätter der Technik,* Leipzig, 1910 ; Hugo Obermaier, *Der Mensch der Vorzeit,* Berlin, 1912 ; Ferdinand Birkner, *Die Rassen und Völker der Menschheit,* Berlin, 1913 ; G. Elliot Smith, *Primitive Man,* London, 1917 : Hermann Klaatsch, *Der Werdegang der Menschheit.*

The basis of all human groups, a fact too frequently disregarded in economics and politics, is (1) the *family,*[1] since the family alone ensures the persistence of the groups. However, the preservation of the cultural heritage is no less essential, for without it man would never have emerged from the state of the brute ; (2) *education,* provided in the first instance by the family, is accordingly indispensable. Now human progress cannot be said to begin with the isolated family, for the possibility of cultural advance would be thus virtually reduced to zero. We should therefore conceive of families as tending to live together in smaller or larger hordes, then hordes as being to some extent in contact with one another, and, eventually, growing by stages into organised clans which further develop into indefinitely expanding communities where family relationship gradually ceases to be the bond of social union. Thence we have (3) the *community* and with it, gradually, (4) *governments.* Still, governments are necessarily only concerned with externals and not with the control of the daily and hourly life of the people. This is accomplished by (5) *customs* (and, later, by customs, manners, and morals combined) which primarily embody the attempt to fix and regulate the ways of living and acting in order to prevent—in the absence of any more effective method—the loss of what had been acquired and, to some degree, to enrich the cultural heritage, at least along certain lines. Yet interchange of experiences, on the human plane, depends essentially on (6) *language.* Hence language must have been one of the earliest developments. With a certain lowly stage of culture reached, what we may call (7) *labour* began, that is, the vocations started, commencing perhaps with the chipping of flints by all indiscriminately and by no means concluding, eventually, with the framing of a world constitution by international lawyers. With labour we naturally associate (8) *leisure,* the

[1] " It has also been noted that among the most primitive tribes, monogamy is more generally the rule than is the case at somewhat later stages of social development." (A. A. Goldenweiser, *Early Civilisation,* New York, 1923, p. 238.) " The most significant and omnipresent function of the family is in that it serves as the principal point of transfer of civilisation from one generation to another. . . . There are other agencies through which he [the individual] learns, but in the earliest years the influence of the family is overwhelmingly preponderant." (*Ibid.,* pp. 238-239.) " The true social unit is certainly the family." (Auguste Comte, *Positive Philosophy,* vol. 2, London, 1853, p. 132.) The modern standard work on the subject of marriage customs is Edward Westermarck's *The History of Human Marriage,* 3 vols., London, 1921. " In the natural state the chimpanzees are monogamous, living in pairs and families." (H. H. Wilder, *The Pedigree of the Human Race,* New York, 1926, p. 68.) See also the chapter on " The Development of the Family," in Charles A. Ellwood's *Cultural Evolution,* New York, 1927.

Berlin, 1920 ; R. A. S. Macalister, A *Text-Book of European Archæology,* Cambridge, 1921 ; Robert H. Lowie, *Primitive Society,* London, 1921 ; A. Smith Woodward, *Fossil Remains of Man,* London, 1922 ; Marcellin Boule, *Fossil Men,* Edinburgh, 1923 ; A. L. Kroeber, *Anthropology,* New York, 1924 ; G. G. McCurdy, *Human Origins,* 2 vols., New York, 1924 ; William J. Sollas, *Ancient Hunters,* London, 1924 ; M. C. Burkitt, *Prehistory,* Cambridge, 1925 ; and E. N. Fallaize, *The Origins of Civilisation,* London, 1928.

time consecrated to games and festivities, songs and stories, and to the contemplative and artistic life. Here, in leisure needs more particularly, is the happy hunting ground of (9) *art*. But the sadder and profounder aspects of life also demand attention and accordingly we have broadly, on the physical side, the interposition of (10) *medicine* and, on the side of feeling, of (11) *religion*. Closely related to the latter is (12) *philosophising*, a more or less speculatively guided interest in larger life issues and then in truth generally. This leads, lastly, to (13) *science* which is the *ultima thule* of specio-psychic endeavours, since science throws open the gates leading to the perfect in every direction.

This outline sketch may be elaborated as below.

NOTE.—The peoples and individuals of to-day differ conspicuously in the stage of cultural development which they exhibit ; but this diversity must be accidental, since, as recent educational experience and recent history show, this stage is indefinitely raised and lowered by cultural circumstances. It should be also noticed in connection with the subjoined analysis that whilst progress grows through the ages, it is not by any means unintermittent in time or uniform in space. Moreover, we should allow not only for stagnation, but also, to a certain extent, for[1] retrogression.

1. *Family,* from quasi-animal family without fixed abode (through polygamy, polyandry, or other phases), to fully organised monogamic family with home for centre (relations between parents, parents and children, and other kindred ; courtship ; finding means of subsistence for family and protecting it ; etc.).

With the family should be correlated its environment, consisting of—

(a) Human Neighbours (from individual to clan, tribe, and to all peoples, including travel, residence, business visits, and study abroad), Acquaintances and Friends, Strangers and Enemies, also Voluntary Associations for local and specialist purposes to International and Inter-Specialist Organisations ;

(b) Animal Neighbours (wild animals—useful, useless, or dangerous to man and his interests—to domesticated animals and animals as pets, companions, and fellow beings) ;

(c) Plant Neighbours (wild plants—useful, useless, or dangerous to man and his interests—to plants cultivated for use or beauty) ; and

(d) Inanimate Neighbours (soil, water, air, clouds, etc.—useful, useless, or dangerous to man and his interests—to natural and transformed materials and forces utilised or admired by man).

[1]Still, we should remember that " cultures decline, but culture keeps sweeping on." (Roland B. Dixon, *The Building of Cultures,* New York, 1928, p. 282.)

The product of family life, the child and adolescent, should receive some kind of education, for men's abilities are derived first and foremost from learning, that is, from education and tradition[1]; hence—

2. *Education* of children; initiation of adolescents; acquisition of vocation; later, historically, universities to schools and life-long learning, study, and research.

With the family should be associated the

3. *Community.* More or less loosely organised families in small hordes; later, clans; later still, growing and cooperating territorial groups of mostly unrelated families, until, in time, is developed Continent State and World State (hierarchically subdivided).

And with the community should be correlated

4. *Governments* (through occasional Chieftain to Imperial Dynasty and to democratically elected President, and from Headman to Nobility and to an educated Democracy), displacing customs more and more (hence legislative, judicial, administrative, productive, protective, and aggressive features of Government), to Parliament of Nations, International Court of Justice, International State Services, and Universal Official Bureaux of Education, Statistics, Labour, Trade, Rationalisation, Communications, Motive Power, Health, Science, Art, etc.

The attitude towards others in the community should be well defined; hence—

5. *Customs* (manner of living; then also manners; and, at first, customs as general method of preserving past acquisitions); from manners based on customs, finally through intermediate stages, to

(a) Love of humanity and reverence for true self as the supreme standard of conduct for all, and feeling of oneness with humanity and then with all living things and the Universe; and

(b) The whole of the life of humanity organised by science, with the assistance of art, pursuant to the dictates of morality and to the needs of man's complex physical and mental nature generally.

Man's universal tool—language—conditioned all extensive collaboration and advance. Hence—

6. *Language,* growth from numberless tongues at first barely transcending animal cries, to, finally, one universal form of simplified and scientised speech, writing, and printing.

[1]F. H. Giddings thus sums up the various classes of traditions: "The primary traditions are: the economic, or the tradition of utilisation; the juridical, or the tradition of toleration; and the political, or the tradition of alliance, homage, and obedience. . . . The secondary traditions are: the animistic or personal, the æsthetic, and the religious. . . . The tertiary traditions are: the theological, the metaphysical, and the scientific." (*The Principles of Sociology,* New York, 1896, p. 141.) Here is a definition of tradition: "By tradition is meant the sum of all the ideas, habits and customs that belong to a people and are transmitted from generation to generation." (Morris Ginsberg, *The Psychology of Society,* London, 1921, p. 104.)

Life means unintermittent metabolism of energy. Therefore labour—chiefly the expenditure of energy in order to maintain energy—is inevitable for man, as for all living creatures. Hence—

7. *Labour* (General, *e.g.*, searching for animal and plant food, in earliest stages; Special, *e.g.*, making of tools and shelters, to minute specialisation in operations, processes, functions, and localities), relating eventually and mainly to food and clothing, fuel and light, buildings and furniture, supply of raw materials, energies, tools, and machinery, trading, lingual and material modes of intercommunication, science and medicine, æsthetic and leisure needs, and government, law, religion, morality, and education.[1]

(a) Self-maintenance; robbing, enslaving, oppressing, exploiting, or employing others; cooperating more and more, to occasional and eventually organised inter-individual, civic, national, and international cooperation.

(b) Property (considered as mainly Land, Mines, Roads, Waters, Domesticated Animals, Buildings, Furniture and Equipment, Apparel, Raw and Manufactured Products generally, Art Treasures, Rights, and Money and Investments) and grades of Owners, Producers, Transporters, Distributors, Middlemen, and Financiers, gradually developing, in later stages of civilisation, from chaotic private property and private enterprise to property and enterprise in the service of the organised commonweal;

(c) Collective migrations (to follow game, reduce over-population, escape enemies, find fresh pasture lands or colonies, settle in conquered territorities, improve status, etc.); later, individual and, perhaps, collective emigration;

(d) Means of communicating (commencing with beaten tracks and human carriers, and developing into roads, navigated rivers and seas, canals, tunnels and bridges, railroads, land craft, water craft, and air craft, pack and draft animals, postal, telegraphic, telephonic, and wireless communication, the press, reports, text-books, etc.);

(e) Internal Industries and Commerce (or division of labour within clan, tribe, etc.) to world-wide industries and commerce, involving

(f) Means of Exchange (developing from barter to coins, currency notes, cheques, credit, etc.);

[1]On early forms of labour, see L. H. D. Buxton, *Primitive Labour*, London, 1924. On later forms of labour: Paul-Louis, *Le travail dans le monde romain*, Paris, 1912; L. Capitan et Henri Lorin, *Le travail en Amérique avant et après Colomb*, Paris, 1914; Georges Renard and Albert Dulac, *L'évolution industrielle et agricole depuis 150 ans*, Paris, 1912; B. Nogaro and W. Oualid, *L'évolution du commerce, du crédit, et des transports depuis 150 ans*, Paris, 1914; Gustave Glotz, *Le travail dans la Grèce ancienne*, Paris, 1920; G. Renard and G. Weuleresse, *Le travail dans l'Europe moderne*, Paris, 1920; and P. Boissonnade, *Le travail dans l'Europe chrétienne au moyen âge* (Ve-XVe siècles), Paris, 1921.

(g) Rude Products to (1) Products all instinct with beauty, terminating in every vocation becoming enthused with the spirit of art, and to (2) Products of the highest quality, serving only goodness, truth, health, and beauty.

Relaxation from toil is a necessity. Hence—

8. *Leisure*—daily, weekly, annual, and other periods of rest and recuperation. Children's play; later, adults' games and festivities; songs and stories; dance and music; poetry, theatre, fiction, history, and literature generally; travel and leisure pursuits and hobbies in general; religious devotions; and delight in intimate communion with one's fellows and with nature, issuing in—

9. *Art* generally, also the eventual penetration and transfiguration of all spheres of life by the love and the realisation of the beautiful.[1]

In life's turmoil, body and mind are apt to lose their equipoise. Hence—

10. *Medicine and Hygiene* (sanitation, psycho-prophylaxy, medical schools, physicians, medicaments, hospitals, diet, exercise, recreation, birth, illness, burial), leading to the triumphs of surgery and sanitation, preventive medicine and hygiene of the body and of the mind and, finally, to hygienic living and a race sturdy in body and balanced in mind.

The attitude towards the master problems of life and towards the Universe should be also defined. Hence—

11. *Religion*—later, with priests, temples, and religious houses and organisations (philosophy of life and existence, nature, fabled under- and over-world, hierarchy of spirits, death and all great occasions of life, holy days; and supposed mysterious influences, as in magic and prayer), developing from almost pure superstition to an almost pure humanism grounded on a scientifically based philosophy of life and existence, and leading also at first to—

12. *Philosophising,* or speculative thought, because of lack or confusion of data; thence to gradual evolution of—

13. *Science,* theoretical and applied, specialised and synthetic, and growingly reasoned love of goodness, truth, nature, art, health, strenuousness, and joy.

Our general conclusion is, then, that our definition of man provides the sociologist with a principle which may aid him to understand and explain the chequered course of human history and the variety of human institutions and to surmise the trend of the calculable future.

[1]Most recent works on anthropology liberally treat the question of prehistoric art. To these may be added, as separate studies, G. G. McCurdy's "The Field of Palæolithic Art," in *American Anthropologist,* Jan.-March 1924, as well as Moritz Hoernes, *Urgeschichte der bildenden Kunst in Europa,* Vienna, 1925.

3. *Constructive Implications.*

We have now reached the third aspect of our definition, which is to deduce a general line of human conduct and organisation. The object is here twofold, *i.e.*, negatively, to avoid errors due to ignorance of human nature[1] and, positively, to act in harmony with human nature.

On the practical side, the general deductions from our formula are that in every department of life without exception specio-culture is of virtually exclusive importance for progress; that cultural progress is essentially social, historical, and pan-human, although, of course, ultimately dependent on individual effort and individual thought; that existing differences between individuals and peoples are primarily due to cultural conditions; and that the transformation of institutions and customs can be only compassed slowly and as the result of strenuous and unprejudiced collective thought and endeavour.

In submitting now the practical deductions which follow from the definition, it should be stated that they have been elaborated with extreme care, and that if they seem, on the one hand, to foreshadow profound social changes, they appear, on the other hand, to be plain corollaries of the principle of specio-psychically determined culture and in signal accord with what is suggested in the preceding Section and by modern advance generally. Considering especially that most of our acute social problems—status of individual, sex, family, class, caste, community, nation, and race; genius, talent, aristocracy, and democracy; and the problems of conservatism and radicalism, socialism and anarchism, government, institutions, marriage, comfort and pleasure, etc.—raise the fundamental issue of native capacity and acquired capacity, or heredity and opportunity, nothing (save the elimination of war) is more immediately urgent in the sphere of practice than to decide between these two conceptions of human nature.[2]

[1] "There can be no understanding of social actions without some knowledge of human nature." (Herbert Spencer, *The Study of Sociology,* London, 1874, p. 390.)

[2] The most important problem which confronts the social reformer is undoubtedly that of knowing what are the potentialities of human nature. Henry Jones (*The Working Faith of the Social Reformer,* London, 1910, p. 161) therefore rightly says: "What practical reformer would not prize highly the discovery of the line of compromise which would guide his endeavour and show what he may, and may not, attempt for the objects of his care?"

A different viewpoint to ours is expressed by Franklin H. Giddings: "Sooner or later there will have to be a courageous facing of the fact that one portion of every community is inherently progressive, resourceful, creative, capable of self-mastery and self-direction, while another portion, capable of none of these things, can be made useful, comfortable, and essentially free, only by being brought under bondage to society and kept under mastership and discipline until, if ever, they acquire power to help and govern themselves." (*Studies in the Theory of Human Society,* New York, 1922, pp. 243-244.) As will be observed, there is a hopeful qualification at the end of the statement. In a later work (*The Scientific Study of Human Society,* Chapel Hill, 1924, p. 206) Giddings writes: "It is probably true, as tests of more than one sort have indicated, that not more than four and one-half percent of our total population is capable of discovery or creative activity, and that not more than fifteen percent is capable of leadership."

1. *Society.*—The growth of specio-determined culture presupposes incessant contact and collaboration between individuals. This, in turn, involves increasingly cooperating and organised communities and societies. The focal importance of Societies and cooperation between Societies becomes thus self-evident and anarchist and extreme individualist and nationalist theories are hence definitely disproved.

2. *Equality.*[1]—The men and women of any community are, by definition, capable of assimilating, in favourable circumstances, the substance of any civilisation known to us. Consequently—

(a) Seeing that man is first and foremost a cultural being, all social, political, and other discriminations based on family, on sex, on class, caste, nationality, or race, should be abolished ;

(b) Since all individuals are for all intents equally dependent on pan-human culture, they should command identical opportunities of developing, labouring, and living ;

(c) Since the needs of specio-cultural beings are intrinsically similar, roughly one general standard of living should obtain, consequently also one standard for reward of services ;

(d) One unchanging moral standard should be applied to all individuals and groups of individuals—equal kindness, consideration, courtesy, respect, helpfulness, etc., although this does not preclude

[1]Nietzsche's view departs widely from our own. He says : " A morality of the ruling class is more especially foreign and irritating to present-day taste in the sternness of its principle that one has duties only to one's equals ; that one may act towards beings of a lower rank, towards all that is foreign, just as seems good to one, or ' as the heart desires,' and in any case ' beyond good and evil ': it is here that sympathy and similar sentiments can have a place. The ability and obligation to exercise prolonged gratitude and prolonged revenge—both only within the circle of equals,—artfulness in retaliation, raffinement of the idea in friendship, a certain necessity to have enemies (as outlets for the emotions of envy, quarrelsomeness, arrogance—in fact, in order to be a good friend): all these are typical characteristics of the noble morality, which, as has been pointed out, is not the morality of ' modern ideas,' and is therefore at present difficult to realise, and also to unearth and disclose." (*Beyond Good and Evil,* London, 1909, pp. 229-230.)

Here is an up-to-date indictment of democracy. It shows to what desperate conclusions the acceptance of a spurious biological theory may lead. Our author forgets that the " classes " as distinguished from the " masses " have ever been the protagonists of stagnation, defending autocracy, warfare, race prejudices, exploitation, obscurantism, superstition, cruel sports, and resisting every attempt at righting wrongs and at making the world a place fit for mankind to live in. Democracy is hated in certain quarters precisely because it symbolises the end of all-round reaction and of class domination. " The old doctrine of *vox populi vox dei* appears to be utter nonsense. The voice of the people is too often only the voice of ignorance, superstition, fear, and bewildered minds. Democracy becomes a helpless and panic-stricken mob in the absence of capable leaders. The danger of democracy is not its unwillingness to follow ; it must perforce do that like a flock of sheep. The danger is threefold : first, that it may not develop a sufficient number of capable leaders ; secondly, that it, like the European countries in 1914, may be deceived and led to its own slaughter by clever and ambitious men ; and thirdly, that the growing complexity of culture may make too great a strain on republican institutions." (Frank H. Hankins, " The Social Sciences and Biology," in Ogburn and Goldenweiser, *The Social Sciences and their Interrelations,* Boston, 1927, p. 406.)

paying most, but not exclusive, attention to the nearest duties (*our* home, vocation, community, country) and being guided by the actual requirements of others ;[1]

(e) The two sexes being equally dependent on pan-human culture, self-respect demands that marriage should be monogamic and that both partners shall share authority equally ; and

(f) Social advance should depend on the well-directed and well-organised individual efforts of the many rather than on the activities of a capriciously selected or favoured few—that is, the spirit of democracy should dominate human endeavours and human interrelations.

3. *Education.*—Culture being the measure of man, we should provide for its extensive assimilation by each and all. Hence it follows that thorough home and school education for all—moral, intellectual, hygienic, æsthetic, vocational, and domestic—is indispensable and that it is a primary social necessity to perfect the educational ends, the methods of educating teachers and children, and the school and college conditions.

4. *Science.*—Since abundance of sifted knowledge, combined with deliberate collective thought, are man's distinguishing weapon and since all wholly or partially instinctive or individual methods of dealing with general problems are pre-human because not pan-human, science should be man's guiding genius in all departments of life and thought.

(a) This involves that the desire for attaining strength, health, happiness, and the satisfaction of appetites and feelings, should be determined by ideas enlightened by science—ideas which would urge the implanting in men of a love of the good, the true, the hale, and the beautiful, as well as the development in them of a genial and joyous temperament, and would, it is probable, rule out as superfluous general luxury[2], intoxicants, narcotics, gambling, playing for stakes or otherwise than rarely, substantial dependence of happiness on amusements, idleness, and comforts, and would certainly condemn as brutish unchastity in the unmarried and infidelity in marriage.

(b) It equally involves, on the social and ethical side, that in all human dealings war, rewards and punishments, unfriendly words and deeds, uncritical assignment of motives, anger, scolding, ridicule, indulgence, coaxing, bribery, and argumentation—since these grow rapidly ineffective and prove frequently disastrous—should be replaced

[1]Numerous writers to-day stress the duty of respecting and appreciating differences in individuals and peoples and even regard it as fundamental to welcome and promote such differences. For them, the beauty and the value of life resides in boundless variety. We have here a violent reaction against the narrow provincial view which flies to the other extreme. Sheer similarity is spiritual death and sheer diversity is lunacy. Similarity and diversity have each their appropriate place.

[2]Individual requirements may be said to consist of material and other necessaries, comforts, and luxuries of life.

by methods resulting from scientific study, which counsel the exclusive application of rules of conduct of the type mentioned in paragraph 10 below (p. 209).

Other deductions are :—

(c) home education, like scholastic education, should have its roots in science ;

(d) the relationship between the two partners in marriage should manifest—besides love, mutual understanding, and respect—forbearance, mutual aid, and companionship ;

(e) vocations should be grounded in science and should be scientifically acquired and pursued and the love of good workmanship and of incessant improvement should displace perfunctoriness and the love of routine and sheer change ;

(f) the public services—which are visibly growing in importance year by year—should be reorganised root and branch on a scientific and democratic basis ;

(g) speculative reasoning should be discouraged, except where it is the result of, and is controlled by, carefully ascertained facts ;

(h) since the most efficient form of thought is a product of the slow growth of culture, the utmost should be attempted to discover and inculcate the soundest and simplest rules for the conduct of the human understanding ; and

(i) whilst it is true that without appetites, impulses, and bodily organs, action is impossible, it is knowledge alone which creates man's superiority, even in respect of generating breadth and depth of feeling and a powerful and unshakable will. Such knowledge also includes, of course, experience of others' appearance, expressions of feelings, and reactions to their environment.

5. *Cooperation.*—If science is indispensable in every department of life, cooperation is no less necessary, for since culture is a species-product, this implies that there can be no science without the widest cooperation and that all that humanity has achieved has been through cooperation. Consequently, cooperation is a requisite in every department of thought and action, in the humblest as in the highest domains, in domestic, vocational, social, national, and international affairs, in the inner life of the individual, and between past, present, and future. Hence—

(a) Cooperation in science and in the economic life as well as thoroughly democratic and democratically organised central and local governments and institutions are requirements ;

(b) Modesty, broadmindedness, appreciation of other persons and peoples and their ideas, and readiness to learn and serve, as well as virility, originality, initiative, enterprise, and the fixed resolve to add a full quota to the achievements of others, should stamp all individuals and groups of individuals ;

(c) Since in any community the prevailing social conditions provide the most potent incentives or impediments to the growth and spread of culture,[1] they demand the closest collective attention; more especially is it important to promote sanitation and education, democratic rule, friendship among nations and races, the humanisation and the democratisation of the law, and liberal insurance relating, among other things, to illness, industrial and other accidents, invalidity, unemployment, old age, death, widowhood, orphanhood, inadequate income, fire, losses, theft, burglary, and acts of nature;

(d) International cooperation is destined to play a notable part in the future. This may express itself mainly in the adoption of a universal form of speech, writing,[2] and printed characters, to promote and symbolise the unity of the race; in the acceptance of universal measures, coins, post, telegraphs, scientific and statistical terminologies and units, and rule of conduct[3] as well as rules of travel relating to land, sea, and air; in building suitable roads, railway systems, canals, air stations, etc., to connect conveniently every part of the world; in encouraging international free-trade, institutions, organisations, and bureaux; and in converting the League of Nations into an effective International Legislature, Judiciary, and Administration; and, lastly,

(e) The most intimate form of cooperation should be offered by the home. Here are two individuals, almost infinitely alike and yet infinitely different, who may strengthen themselves to an incalculable degree by becoming one for life. Furthermore, they may devote themselves in common to the incomparable task of rearing worthy, healthy, and happy offspring—a task which only loving attention on the part of those most nearly concerned can competently perform.

6. *Institutions.*—If science and cooperation are essentials, the necessity of storing in some manner the accumulations of the past becomes evident. Hence institutions and their equivalents are of inestimable value. Among the most important of these should be counted the institutions of Government, Law, Marriage, Religion, Arms (in earlier stages), Schools and Seats of Learning, Trades and Professions and associations connected therewith, Organisations for promoting reforms and for industrial, charitable, recreative, medical, intellectual, and other purposes, Recreation Grounds and Halls, Libraries, Museums, temporary and permanent Art and other Exhibitions, Sciences, Arts and Crafts, Public Lectures and Post-School Classes, Classics, Text-Books, etc. Indeed, institutions, or more or

[1] As Henry Jones (*op. cit.*, p. 170) expresses this as regards one aspect. "It is, I believe, as vain to expect the normal or right development of a child's rational nature in an unfavourable environment, as it is to expect the healthy growth of the body under unhealthy conditions."

[2] G. Spiller, *Foundations for a Scientific Longhand*, London, 1929.

[3] G. Spiller, "International Conduct-Rule," in Papers of *Congrès mondial des associations internationales*, Brussels, 1913.

less fixed collective aids, are to social advance what the family is to the perpetuation of the species and statesmen and social reformers should therefore concentrate their energies first and foremost on the improvement of institutions.

7. *Conservation and Conservatism.* Since any one generation can add but little to the accumulated treasures of the past, it becomes our duty, almost above all things, to conserve the substance of what has been transmitted to us by our ancestors and not to accede lightly to the suggestion of radically modifying the present order or heedlessly exhausting the riches of the earth or of culture.

8. *Progress.*—However, inasmuch as strict adherence to the principle of conservatism would have kept man in the lowest conceivable primitive state, progress should also be invariably aimed at in all departments of life and thought and in all institutions. The past, present, and future represent the one flowing and growing stream of culture and should be each equally respected.

9. *Perfection.*—Since man ultimately seeks to do justice to human nature as a whole, his aim should be to accelerate the creation of the all-round cultured or perfect man, the man in whom—and, by implication, the world in which—is realised the perfect, *i.e.*, the highest possible degree of the good, the true, the hale, and the beautiful combined.

10. *Rule of Conduct.*—In all human relations whatsoever, thoughtful men and women will carry out promptly and intelligently, and in a sympathetic, genial, and tactful manner, what an enlightened conscience demands.

11. *Supreme End and Sense of Oneness.*—Since the individual is only fully himself when fully cultured intellectually, physically, morally, and æsthetically, his supreme end is to become highly cultured and, by implication, to promote the cause of culture until the all-comprehensive ideal of goodness, truth, radiant health, and beauty is attained. Moreover, since culture is in its essence an expression of the whole of humanity past and present, his inmost thought and being, when truly himself, feels itself one with humanity and identifies itself inevitably and passionately with the life and good of mankind.

12. *Fundamentals.*—All life, of whatever kind, seeks to maintain, perpetuate, adapt, and expand itself, besides tending to develop to higher forms. Accordingly, the prime object of culture is harmoniously to maintain, perpetuate, adapt, expand, and improve the physical and cultural life of humanity as a whole and of its main constituent parts—nation, community, family, self.

Our conclusion is, then, that since man is primarily dependent on pan-human culture, every department of human life should be informed

by it[1] and that since individual capacity is infinitesimal by comparison with the collective capacity of the whole of humanity past and present, we should seek to realise the twelve principles expounded above.

4. Religious Implications.

A century ago a work like the present one could scarcely have been penned without frequently touching on religious implications; fifty years ago it would have been considered just as natural to ignore the religious aspect; and now that the pendulum has swung back, investigators are expected to do justice to the fundamental religious element when dealing with the larger human issues. As we shall now learn, the burning convictions of the great religious founders are vindicated by science, a naturalistic basis, however, replacing the supernaturalistic basis of a groping past.

The definition of human nature which we have arrived at meets, we believe, the demands of the religious consciousness in a surprising number of ways and constitutes therefore a contribution of science to religion. We may sum up as follows our conclusions on this subject.

The life of fellowship is of supreme worth and natural and manliness, strength, and happiness are involved therein, whilst the life of drifting self-indulgence is unworthy of man, is not natural to him, and argues unmanliness, weakness, and ignorant contempt for his own welfare. Universal justice and benevolence are bound to triumph and nothing is too lofty or too removed for man to achieve. A man is only truly himself so far as he lives the life of the ideal and subjects to it his senses, his appetites, his passions, and his fortuitous reflections. He is the heir of all the human past and may be justly proud of this. His contribution, for good or ill, enters the majestic stream of human progress which flows down the ages, leaving on him the weighty responsibility of a wise choice in thought and action. The good man's traces are destined to endure and the bad man's to be erased.

The mass of men are not nullities or a select few immensely superior to others, but all human beings are brothers and sisters capable of the highest and only truly happy in serving the highest. Men's equal dependence on culture makes unequal treatment and unequal opportunities indefensible. Liberty and personality are the outcome of self-control and of devotion to super-personal ideals, whilst lack of self-control and absence of super-personal ideals demonstrate the presence of inward slavery and of want of character. Since culture

[1]To be precise. Instead of practically ignoring the cultural heritage and indulging our crude fancies, we should adopt the rule of following, to begin with, precedent; then, following the best precedents; then, seeking to surpass these; and, lastly, ever improving on our own best precedents. (See Appendix A.) Those who desire to set a precedent in a radically new direction should remember, first, that most likely they are completely in error and, secondly, if they are not, that the venture requires to be socio-historically developed if it is to reach a high degreee of perfection.

is the outcome of all past human epochs, the truly cultured man is one, and feels at one, in thought and purpose with the whole of mankind. Since man depends on culture, he is neither good nor bad when devoid of it, but tends, at first, in his ignorance, to utilise it for self-preservation and self-gratification and, later, when better informed, for the preservation and the gratification of the race. Although man is capable of the lowest and of the highest, he is only fitted for the highest.

The grace of goodness and the knowledge of good and evil are given us by humanity. In humanity, we live and move and have our being and in it dwell the ultimate authority, motive power, and permanence of the good. When in sorrow, suffering, or sin, we earnestly meditate, we commune with the best in us and since this best is derived from humanity, it is with humanity we commune when absorbed in earnest meditation. In appealing to the best in others, privately or publicly, we appeal to the humanity incarnated in them—that is, to the greatest power in the world.

We cannot save ourselves by ourselves. The power and glory are in humanity and, by reflection, in the truly educated individual, and man the world conqueror is his own subduer, redeemer, and providence. Through pan-human culture we become as gods and through loving reliance on humanity we become free and strong. A man's life need not be paltry as it often is ; it may become sublime by his identifying himself with all the ages of humanity. Vanity and pride are foolish and modesty, appreciation of others, desire to cooperate, and readiness to learn and serve are natural to man. The innumerable injustices, crimes, prejudices, and blemishes in societies do not imply a depraved human nature, but only that men's education is yet imperfect and that they are therefore frequently guided by uncontrolled and unenlightened passion instead of by socialised and purified sentiment.

The evil in civilisation is due to the relative absence of civilisation and will be overcome by the extension of civilisation. Nature herself having created man with his magnificent possibilities which must come to be realised eventually and which will more and more revolutionise and humanise Nature herself so far as accessible to us, we may rightly place our trust in her whose children we are. Long before the sun's rays are too feeble to warm the earth adequately, man's scientific equipment will be equal to any demands made on it on that ground.

The goal of man's efforts is the establishment of a universal fellowship where all the virtues and all the graces meet and shine in men, and even now these could and should live and delight in the spirit of such fellowship. In the conception of man as the living being adapted to the specio-cultural mode of life, man is shown to be privileged above all other living beings and in this conception a whole ethics is contained providing guidance and refuting various theories which tend to distract and confuse the conscience.

We are the torch-bearers of humanity, happy in fulfilling this function until the time arrives to hand our torch to some one whose strength is not failing as ours is. We are born; we gradually grow strong; under proper conditions we as gradually lose our strength and pass away as we have come; and death is therefore as natural and less painful than birth. Death, at the end of a long and worthy life, when the physical powers are disintegrating, seems as fitting as birth itself. The horror of death resides in having to bid farewell to life when service is still possible; but enlightened mankind will prevent human existence from being prematurely brought to a close. We have each a great mission to fulfil and in its pursuit we should serenely welcome sorrow, suffering, disappointment, and death. In the cause of humanity we ought to face nobly death as well as life, inspired by the feeling that if death is necessary, we shall live by dying. Life is precious and worthwhile to the sons and daughters of humanity. We render ourselves practically immortal and create for ourselves a haven and a heaven, if we identify ourselves with humanity past, present, and future.

In ever-progressing humanity we recognise a mighty and wondrous power with the potency of everything admirable and majestic, the great and unique conscious being that slowly but irresistibly makes for righteousness, for reason, for radiant health, and for refinement, and virtually represents omnibenevolence, omniscience, omnipotence, and omnipresence. By believing in this power we are saved and by ignoring it we are lost. We are sparks of that power. Ineffable joy is ours when we enter into complete union with it.

Finally, man has excellent reasons for being an optimist, but of a kind requiring strenuous service in order to combat aberrations and contribute to man's positive advance.[1]

Our conclusion is, then, that in probing our definition, we find contained therein a considerable portion of a rich, bracing, and emphatically helpful philosophy of life. To complete this philosophy, however, we require the conception of the Universe as science presents it—existing from eternity; one, indivisible, and self-contained; and lastly, knowable and tractable.

[1]In a sense we may agree with John Fiske that "from the first dawning of life we see all things working together toward one mighty goal, the evolution of the most exalted spiritual qualities which characterise Humanity." (*The Destiny of Man*, viewed in the Light of his Origin, Boston, 1884, pp. 113-114.) Walter Bagehot says: "The better religions have had a great physical advantage, if I may say so, over the worse. They have given what I may call a confidence in the universe." (*Physics and Politics*, London, 1873, p. 216.) "Life, fulness and perfection of life," writes Leuba, "is the aim of religion." (J. H. Leuba, *A Psychological Study of Religion*, New York, 1912, p. 331.)

The thesis of this Section is developed in G. Spiller's *Outlines of a New World Religion*, London, 1918.

BOOK II.

THE LAWS OF HUMAN DEVELOPMENT.

INTRODUCTORY.

In the preceding Book the idea gradually emerged that man, owing to his specio-psychic nature, was in a fundamental respect different from all plants and animals and formed therefore a new kingdom, the kingdom of man. We learnt there that man's vast superiority over animals was not to be attributed to his possessing by nature a vastly superior mentality. It was rather due to a relatively inappreciable superiority over his precursors. These, however, represented the limiting stage of intellectual development among animals, so high a stage that their superior successor, man, was placed automatically in the privileged and novel position of the individual members of his species being able to profit by the experiences of their countless fellows near and far in space and time. Thus a comparatively slight mental advance opened up a new world, the world of ever-growing and ever-progressing culture. This world of culture ranges human beings almost infinitely above the members of any given animal species whose ability to profit by the experiences of their fellows near and far in space and time may be said, by comparison, to be little removed from zero.

Having established man's distinctive nature and arrived at certain broad conclusions, we might have arrested our enquiry there. Still, the comparative novelty and audacity of the theory demands a detailed justification to the end of preventing unnecessary confusion of thought. That justification, consequently, we shall attempt to provide to some extent in this Book II., by developing systematically the main implications of the four dynamic laws enunciated in Chapter IV.

The reasons for the nature of these laws are not far to seek. Since the central fact of human life is that of the limitless mental interaction through inter-learning of the members of the human species in space and time, the laws must be dynamic and historical in nature, embracing the story of man from the earliest ages in the past to the remotest conceivable times in the future. Here, again, we are dramatically faced by the crucial difference obtaining between animals and man, for whilst a dynamic and broadly historical view is of paramount importance for comprehending the life-histories of men, such a view is of absolutely no significance for comprehending the life-histories of the members of any animal species.

The number of the laws is possibly arbitrary. Their order suggests, however, that they are probably complete. The first law, that of the *limitless increase in cultural diversity,* reflects the bare unanalysed fact revealed by a comparison of the dawn of humanity with the latest ages—almost entire absence of signs of culture, at the one end, and an almost infinitely rich culture, at the other end.

Examining more closely this seeming diversity, we arrive at the conclusion that there is not only limitless increase in variety but *limitless progress.*

In the third law—that of *limitless growth in cooperation*—we find the explanation of the first and second law, namely that the limitless growth in diversity and progress is due to the limitless growth in cooperation. That is, had men not cooperated, there would have been no growth through the ages either in diversity or in progress.

Why, however, do men cooperate, and this more and more intensively and extensively ? Because, as the historic process irresistibly suggests, they know or feel that they can only satisfy their nature to the fullest by taking advantage of the illimitable possibilities inherent in limitless inter-individual, inter-social, and inter-periodic cooperation. Since, however, limitless cooperation, as we have seen, leads to limitless progress and since limitless progress implies pressing towards the ideal of the good, the true, the hale, and the beautiful, it follows that only the perfect can satisfy man's nature to the fullest, which explains the fourth law—that of the *limitless perfectibility of the individual.* With this law established, the problem of problems, that of man's inmost nature, is resolved in a substantially optimistic sense.

The next point to claim our attention in this brief introduction is the method whereby to test, and eventually to demonstrate, the truth of the four dynamic laws. If we followed general precedent, we should inevitably fail in our aim, for however large the number of facts we might cite in support of these laws, the reader would be haunted by the suspicion that, consciously or unconsciously, the selection of facts had not been impartial.

Accordingly, we shall formulate a comprehensive inventory of civilisation and surround even this with a wall of methodological safeguards. This will render haphazard illustrations impossible, compel the author to cover the ground as a whole, and enable the reader to check with ease the adequacy of the survey and the justice of the reasoning. Here is the methodological statement:—

1. It is suggested that when the most general sociological and social problems (*e.g.,* the fundamentally distinctive nature of man, the development of primary institutions, or the reality of progress) are under consideration, past, present, and future should be conceived comprehensively—that is :—

(a) The past—from pre-eolithic times to approximately to-day ;[1]
(b) The present—comprising roughly the last quarter of a century and the one succeeding it ; and
(c) The future—stretching millions of years beyond our time.

[1] "The comparison cannot be decisive unless it embraces the whole of the past." (*The Positive Philosophy of Auguste Comte,* vol. 2, London, 1853, p. 108.)

Past, present, and future are preferably to be regarded as constituting the indivisible unity of time, and *each* of the three aspects should be therefore taken account of in *every* general problem.

2. The foregoing requires to be supplemented by the statement that in each of these three categories every section of society and every people, together with their interrelations, are to be included and that each generation of mankind is to be conceived, so far as the facts at any time warrant it, as a single interdependent unit.

NOTE to 1 and 2.—An all-embracing bird's-eye view such as the preceding, appears to be alone consistent with a truly comprehensive sociological science. Much which would otherwise remain obscure becomes transparent when we advisedly concern ourselves with sweeping periods and with classes and peoples generally.

3. Similarly, instead of examining chance facts of a more or less limited and ambiguous order, or relying on an abstruse theoretical tabulation of human activities (which only distantly suggests the greater verities of life), we require for scientific purposes a simple and practically inclusive classification of the subject matter of sociology, such as the following :—

(1) Language and transport (including also all media, such as newspapers and bridges).
(2) Buildings (including also conveyances) and furniture (including also decoration).
(3) Implements (including also methods of thought, instruments of measurement, &c.) and industrial and other processes.
(4) Domesticated animals and cultivated plants as well as discovered and utilised energies (heating, lighting, motive power, &c.) and raw materials.
(5) Work and play and inner life and its expression.
(6) Trading, travel, and diffusion of information, practices, ideas, and sentiments (local, regional, national, and international).
(7) Nutrition (including also beverages, sedatives, &c.) and personal and social care of health (hygienic and curative).
(8) Dress (including everything on the person) and education (including also vocational training and learning throughout life).
(9) Morals and religion (including also customs and philosophy).
(10) Science and art (including attention to the true and the beautiful generally).
(11) The family (including also sex relations generally) and other civil groupings (vocational, associational, &c.).
(12) Civic groupings and government and law (sub-national, national, and inter-national).
(13) Miscellaneous.[1]

[1] Clark Wissler (*Man and Culture*, New York, 1923, pp. 73-74) also proposes a culture scheme. His main sections are : Speech, Material Traits, Art, Mythology and Scientific Knowledge, Religious Practices, Family and Social Systems, Property, Government, and War.

As far as possible, *all,* rather than only one or some, of the above items should be considered when a general question is approached. In this way alone will bias and superficiality be circumvented and defeated.

NOTE.—(1) (1) to (12) virtually cover the sociological data which matter. (2) No distinct chronological order is aimed at in the foregoing list, for the development has been simultaneous along most lines. (3) The classing of two or more items under one number has for its main purpose to reduce the total numbers and the juxtaposition of two or more items does not denote any necessary or even intimate connection, although a certain relation will be frequently patent. (4) The object of the list is to reduce an infinity of particulars to a manageable aggregate of fixed and readily comprehensible categories. In the absence of such a list the interpretation of sociological data is bound to be, and generally is, seriously inadequate.

CHAPTER VIII.

THE LAW OF LIMITLESS INCREASE IN CULTURAL DIVERSITY.

FIRST LAW.—*The law of the limitless increase, among peoples generally and through the ages, of diversity in cultural or tool-made products, together with the secondary law of the gradual development historically of error, of anti-progressive habits and customs, and of cultural and social inequality.*

1. *Basis.*

THE principle of specio-psychism involves that each human being, insofar as favourably situated, tends to utilise the substance of the thoughts and experiences of the whole of his kind past and present and that each, according to circumstances, adds his microscopic quota to the accumulated cultural heritage. Consequently, the store of culture commences at practically zero and tends, by infinitesimal increments, one may say, to approach infinity in volume. There having been tens of thousands of millions of human beings, many frequently cooperating actively with their fellows, we cannot be surprised at the numberless tools and tool-made products created out of individually negligible contributions. The process resembles that involved in the formation of a chalk cliff out of separately almost invisible portions of organisms.[1]

2. *Secondary Causes of Cultural Diversity.*

A variety of causes tended to produce remarkable diversity in man's inventions and discoveries. One of the most influential of these was the *time factor*. We build on the past and as the past differs for different peoples, so the cultural developments vary. Geographical factors largely determine at first wherewith we are to satisfy our needs and time erects on these foundations modest or mighty structures of well-defined types.

[1]Montaigne (*Essais de Montaigne,* book 2, chapter 12), by the recital of numerous instances of animal achievements, endeavours to show that man's superiority over animals is an illusion, created by ignorance and vanity. He commits, however, in this argument the capital fallacy of comparing man with *all* animals instead of with some particular *one*. Accordingly, his reasoning amounts to this at best that man is not superior to all animals combined.

This difference in the past of different peoples is manifestly accounted for, in the first instance, by gradual changes taking place within each people. In fact, normally—where immense social pressure is not brought to bear on individuals, as in those lower civilisations which have resolutely set their faces against change—notable differences are observable within each *generation.* Every new generation tends to exhibit, as a consequence, a somewhat divergent attitude towards a variety of matters from the generation preceding it.

The *seven ages of man* are largely responsible for this. The child, the juvenile, the adolescent, the young man or woman, the mature, the middle-aged, and the old do not have each the same environment, nor are they, because of the sheer differences of age and experience, feeling towards problems in the same way. Accordingly, the younger generation, both because of its youth and because of its more limited experience and the absence of settled habits and ideas, is differently influenced by events and tends therefore to develop in slightly different directions from its seniors.

Moreover, the imperfection of the human *memory* plays a part here. The old forget their youth and the claims of youth. Each individual forgets to a measurable extent his experiences and how he arrived at a certain viewpoint. There are consequently always misunderstandings of one's own views and those of others and, as a result of the haphazard clash of opinions, new developments and new adaptations take place, even apart from the general causes which make for change or progress.

Thus where the young are not rigorously confined to the ways of their elders, there is an eternal uprush of new ideas and new ideals. Other time factors act in the same direction.[1]

Coming now to the *geographical factor,* we find that it is by no means the least important in accounting for cultural diversity. The respective dress of the Hindoo, the Englishman, and the Laplander offers a case in point. The magnificent Chinese vases are manifestly related to the precious earths found in China, just as the marble palaces and churches of Italy are connected with the rich marble quarries of that country. Architecture, indeed, as in the light structures of Japan, the wooden shanties of the United States pioneers, the snow huts of the Eskimo, or the kraals of the African, has frequently an intimate relation to geographical conditions. Climate, soil, altitude ;

[1]The relations of succeeding generations are interestingly discussed in François Mentré's *Les générations sociales,* Paris, 1920. He does not, however, seize the factors making for progress as distinct from those making for change. Arthur Fairbanks (*Introduction to Sociology,* London, 1922, p. 222) writes on this subject : " The young persons of each new generation are plastic material which may be moulded in harmony with the higher ideals of the former age, while at the same time they do not hestitate to adopt new practices and to champion new ideas. . . . The new world of the generation that succeeds us is no mere copy of our world, but the living continuation of it."

proximity of mountain, forest, river, and sea; relative abundance or dearth of food; ready access to or absence of raw materials and fuels, such as iron and coal; animal or human enemies—each of these is influential in causing appreciable deviations in the degree and kind of cultural attainments.[1]

However, we are not helpless slaves of our physical environment. Hence *peaceful intercourse* between neighbouring and distant tribes leads to an interchange of ideas and goods and in this way group benefits by group and master inventions and discoveries, such as the making of fire and the cultivation of the soil, become universalised and improved. From time immemorial, again, caravans travelled over vast tracts, carrying commodities from one region to another and the trader, for example, visited many shores. Matthew Arnold pictures in his "Scholar Gipsy" what must have been familiar incidents in antiquity:—

> —As some grave Tyrian trader, from the sea,
> Descried at sunrise an emerging prow
> Lifting the cool-hair'd creepers stealthily,
> The fringes of a southward-facing brow
> Among the Ægean isles;
> And saw the merry Grecian coaster come,
> Freighted with amber grapes, and Chian wine,
> Green bursting figs, and tunnies steep'd in brine;
> And knew the intruders on his ancient home,
>
> The young light-hearted Masters of the waves;
> And snatch'd his rudder, and shook out more sail,
> And day and night held on indignantly
> O'er the blue Midland waters with the gale,
> Betwixt the Syrtes and soft Sicily,
> To where the Atlantic raves
> Outside the Western Straits, and unbent sails
> There, where down cloudy cliffs, through sheets of foam,
> Shy traffickers, the dark Iberians come;
> And on the beach undid his corded bales.

The lure of strange lands and foreign products ever exercised an irresistible fascination. The leading civilisations of the last few thousand years thus showed distinct traces of foreign influence. Indifferent and perilous as were, for example, in the Middle Ages, the means of

[1] T. Griffith Taylor (*Environment and Race*, London, 1927, p. 4) writes: "A vast amount of evidence has accumulated of late showing that during the time of man on the earth it is . . . the changing environment which has led to many, perhaps most of the migrations, aggressions, and wars which constitute so much of the history of man both in the earlier and later stages of his evolution." See also C. E. P. Brooks, *The Evolution of Climate*, London, 1922, and Ellsworth Huntington, *The Character of Races*, as influenced by Physical Environment, Natural Selection and Historical Development, New York, 1924. Also chapter 5, in Francis S. Chapin, *An Introduction to the Study of Social Evolution*, New York, 1913.

reaching distant portions of the globe, Europe was yet in more or less unintermittent contact with Africa and with remote parts of Asia.[1]

Warfare and *conquest* contributed their share towards the exchange of ideas and goods between social groups. Slaves and captives imported foreign customs and the conquering of peoples entailed intimate relations with those whose experience diverged in numerous directions from those of the conquerors, leading thus to wholesome mental friction. Especially was this emphasised where the conqueror, as in later ages, extended his sway over vast tracts, *e.g.*, as in the wars of the Persians, Greeks, and Romans. However, warfare and conquest also exercised the opposite influence of exterminating peoples or of forcing on them the customs and ways of the conquering race.

More radical still in its influence is wholesale *migration,* particularly where the objective is comparatively distant. Here the geographical factor and the total surroundings are frequently altered, with far-reaching consequences to the life and habits of a people.

Exogamy, at one time a widely obtaining institution, naturally led repeatedly to modifications in the contents of slightly different civilisations.

In all these types of intercourse, to summarise the last four paragraphs, not only were different modes of life introduced into communities, but these modes of life frequently reacted on one another and led to a more diversified cultural output.

The *growth and concentration of populations* leads automatically, as Durkheim has well pointed out, to a more or less extensive division

[1] " Generally speaking, intertribal contact is a constant civilisational phenomenon. Nevertheless, such contact in early conditions is relatively infrequent, irregular and non-productive of civilisational change." (A. A. Goldenweiser, *op. cit.*, p. 402.)

So R. R. Marett : " The primitive world is to-day envisaged as a scattered array of cultural units, each area of characterisation displaying its own typical form together with manifold aberrant variations. Between the several units culture-contact takes place and is indeed held to be the mainspring of decisive change. Yet, despite such intercommunications, each unit maintains its self-identity, thanks to the fact that it assimilates some contributions and as freely rejects others." (In *Sociological Review,* January 1923, p. 57.)

Here is a similar view : " During the last twelve years a fresh school of thought has come into prominence. According to this new view discoveries are made but once, and when resemblances are found between the cultures of different communities, even though widely separated, this is due to some connection between them, however indirect. According to the new school of thought the development of civilisation has been proceeding by many different paths, in response to as many types of environment, but these various advances have frequently met, and from the clash of two cultures has arisen another, often different, more complex and usually more highly developed than either of its parents. . . . The new school . . . conceives of each group as traversing its own particular way, but that the paths frequently meet, cross or coalesce, and that where the greatest number of paths have joined, there the pace has been quickest." (H. J. E. Peake, " The Study of Man," in *British Association Report for 1922,* p. 150.)

As we shall see, evidence has been accumulating to show that cultural intercommunication was widely prevalent even in the Stone Ages.

of labour, for arrangements practicable in small and scattered communities are inadequate where large populations and densely populated centres are in question.[1] Marked differentiation and abundant variety thus result ; but it should be remembered that growth in communities is mostly due to certain favouring factors and that the degree of the division of labour will greatly vary with circumstances not connected with this growth. In fact, growth in the division of labour—as at the beginning of the nineteenth century in England—leads to growth and concentration of populations. David Hume, in his essay on "The Populousness of Ancient Nations" (*Essays,* Moral, Political and Literary), already occupied this standpoint.

Mixture of races has been regarded as an important cause of civilisational change. W. M. Flinders Petrie, in his *The Revolutions of Civilisation* (London, 1911), writes on this point : "Every civilisation of a settled population tends to incessant decay from its *maximum* condition ; and this decay continues until it is too weak to initiate anything, when a fresh race comes in, and utilises the old stock to graft on, both in blood and culture. As soon as the mixture is well started, it rapidly grows on the old soil, and produces a new wave of civilisation." (p. 114.) In a word, "the source of every civilisation has lain in race mixture." (p. 131.)

Still, not only intercourse between societies and their growth and intermixture should be envisaged, but also the *social life* within these societies. Experience varies from individual to individual and from vocation to vocation and because of the factors we have already dwelt on in the preceding paragraphs, the conceptions of the individuals also vary to some extent. Hence an incessant interchange and refashioning of ideas take place in a free community and give rise to a progressive differentiation in thoughts and activities.

Moreover, as we shall now see, within societies various causes lead either to stabilisation or to variation.

Thus *customs* have always exercised a double effect. Negatively, they have tended to keep alive the past and have formed a barrier against innovations. Positively, however, they have frequently encouraged the vigorous development of a civilisation along a certain line. In this way customs, conservative and reactionary as they are in one respect, have substantially contributed towards augmenting the cultural heritage.

What customs are to the group, *habits* are to the individual. Here also there are the two sides—reluctance to accept novel suggestions and eagerness to reorganise everything in conformity with rooted habits. As with customs, habits also end in promoting diversity to a certain extent.

[1]See Camille Bouglé's *Qu'est ce que la sociologie?* Paris, 1907.

Within a limited range the love of *novelty* encourages change amongst almost all peoples. One of the most noteworthy aspects of this phenomenon, is *fashions*. They prevent the extreme of conservatism which deadens sense and spirit. The apparel of men of the seventeenth century and the dress of fashionable women of the twentieth, illustrate the limitless and brilliant vagaries to which the chase for trivial novelties leads. But fashions are by no means limited to dress; they may be found in almost every department of human interest, even in the sciences.

"Movements" present a nobler form of the mode of change referred to in the last paragraph. Scarcely a people but has traditions of an epoch when it was in the toils of a great idea. The golden eras of Greece, Rome, of the Renaissance, and of Elizabethan England, offer apt examples. At such times the fund of culture grows by leaps and bounds, both because the minds of men are bent on reaching an alluring goal and because emulation and rivalry act as keen incentives. Such Movements may persist for several generations and may eventually furnish the basis for a new social order.

Special developments along a particular line, as the establishment of the Copernican and Newtonian theories, the introduction of the railway and the telegraph, the indirect effects of scientific research and free inquiry, have generally a wide repercussion on the life and thought of peoples and lead to profound changes in society.

So far as the creation of variety is concerned, *error* has played a not inconspicuous part. Appearances being deceptive, the single truth is preceded by many hasty surmises. The teachings of magic, of the cruder forms of religion, of astrology, and of alchemy, are exemplifications of this tendency, which however ramifies literally in every direction and materially affects every sphere of human action.

Absence of a thoroughly hygienic environment and upbringing affects in a multiplicity of ways the *health,* and therefore the thoughts and tempers, of most men. Hence endless divergences in opinions and interests. Uncorrected defects in *native constitutions* tell in the same direction.

Social inequality also acts as a potent force. It separates the community into classes, each of which naturally inclines to possess its own ideals and to develop along its own lines. Moreover, those very favourably situated are in the position of being able to gratify their most fastidious tastes and hence a profusion of luxuries, comforts, and pursuits springs up.

Increase in social well-being, finally, forms a powerful stimulus to invention and discovery.

There are undoubtedly other influences swelling the diversity of cultural products. Chief among them, however, we shall mention

here, in conclusion, *social and individual needs.* These exercise an irresistible pressure and sooner or later every dam is broken and swept away which obstructs man's fuller expansion in his attempt to satisfy the boundless needs of his nature.

3. *The Cultural Store of To-day.*

We shall now undertake a systematic survey of the contents of our civilisation. However, in order to escape the temptation of indulging in generalities, we shall follow the outline scheme of human culture presented in the introduction preceding this Chapter.

1a. *Lingual Communication.* The number of languages alleged to exist to-day amounts perhaps to a thousand and if each language consisted only of a thousand words, the aggregate of words would be about a million. But since some lowly languages, such as that of the Fuegians, are said to number some thirty thousand words, it is probably no exaggeration to surmise that perhaps five million words are known to-day. To simplify the problem, we shall concentrate on an analysis of the English language. An ordinary dictionary, containing some twenty thousand words, with many more meanings, most inadequately represents the facts. To approach these more closely, we should examine the monumental series of folio volumes of a *New English Dictionary.* When we reflect, besides, that over a million living species of plants and animals are known, each with its descriptive name,[1] and that the number of named towns, villages, and streets, together with the names of individuals, practically passes calculation, we shall appreciate how almost infinitely human expression exceeds the cries and calls of any one animal species. We should take into consideration, besides, the question of spelling, of pronunciation, of accent, of emphasis, of intonation, and of accompanying gestures. The language problem is, however, not confined to the single, isolated word. Thousands of compound words and idiomatic expressions exist, thousands of proverbs, thousands of quotations from indigenous, foreign, and ancient literatures, and perhaps thousands of rules pertaining to grammar and polished diction in speech and writing. Many an educated Englishman, again, has also a passable knowledge of perhaps French, German, Italian, Latin, and Greek and some acquaintance with the anatomy and physiology of the principal types of languages.

Writing does not present such extensive series of facts as speaking, if we ignore idiographic languages like Chinese. Still, there are probably scores of alphabets, and within these limits there are numerous styles of handwriting. In connection with writing, we may direct attention to the multitudes of shorthands which exist to-day. Typewriting forms a transition between writing and printing. Hundreds

[1] "There are 250,000 different species of backboneless animals, named and known." (Patrick Geddes and J. A. Thomson, *Biology,* London, 1925, p. 26.)

of different typewriters are probably on the market, particularly if we allow for typewriters adapted for special work.

Caligraphy as a fine art leaves ample scope to the æsthetic sense. Typewriting is, in this respect, almost devoid of variety of characters. Printing, however, admits of unlimited diversity. Thousands of different founts of type exist and the number of appliances, from the homely composing stick to the giant newspaper printing machine, also runs into hundreds. The output of the printing press is colossal. The number of newspapers and magazines is very large and probably over a million leaflets, pamphlets, and books were printed in Europe during the last century. The pages printed amount presumably to hundreds of millions. In all probability considerably over five million different books, &c., are catalogued in the national libraries of the United States, England, France, Germany, Russia, and other European countries.

Speech enables us to express ourselves intelligibly ; ordinary writing to record our thought ; shorthand to keep pace with the flow of speech ; typing to write legibly ; and printing to multiply rapidly and inexpensively what is spoken or written. The voice does not carry far even when strained and accordingly we resort to the telephone which bridges the space between us and those at a distance. The telegraph effects for writing what the telephone accomplishes for speech, whilst wireless further simplifies the problem of communication.

Naturally, the above statement does not exhaust the subject of lingual communication, for codes, braille, &c., and the gramophone, also play some part in our civilisation. For our ends, however, the above slight sketch will suffice.

1b. *Material Communications.* The role of these in primitive times was an exceedingly modest one. To-day we have flints, gravel, flag stones, asphalt, cement, reinforced concrete, tar, rubber, and wood used in the making of roads and these, often wide and straight, not only ramify through cities, but through countries. Embankments, cuttings, viaducts, bridges, and tunnels, of hundreds of types, are incidental to modern roads. In the course of their construction trees are felled, undergrowth is cleared, bogs are drained, and sharp inclines are converted into hardly perceptible gradients. The road leading across the Splügen Pass from Switzerland to Italy vividly illustrates what boldness of conception, perseverance, and art can accomplish. The railroad is a case of a specialised pathway, of which the Trans-Siberian railway is an impressive illustration. Men even speak to-day of air roads.

The simplest method of transport was to carry loads on one's head or back. To-day we have many types of conveyances crowding the roads, the sea, and the air. Especially pointed is this in the case of water craft. Here we find every variety, from the frailest canoe to

the majestic eighty-thousand ton liner affording accommodation for some thousands of passengers. Moreover, if we disregard mere size and fix on the diversity of water craft outfits, the broad differences may be counted by the tens of thousands and the particulars by the hundreds of thousands. Nor is it far different when the individuality of land vehicles is considered.

In modern times transport has swollen to gigantic proportions and the question of time-saving has become of prime consequence. Powerful physical forces are therefore utilised, such as steam, electricity, and petrol.

Mechanical energies, again, usually require engines of one type or another and of these there are countless numbers, from a single toy-battery to the thudding monster engines of a great ocean liner.

2a. *Buildings.* Birds construct nests many of which are models of exquisite and delicate workmanship. Some quadrupeds and other animals build burrows and other fabrics, not infrequently elaborate, such as the mole's retreat. Bees' cells are marvels of accurate and economical activity and ants' settlements are extensive. Nevertheless, in a fair comparison, these fall almost infinitely below human edifices. Broadly speaking, all the members of each animal species or subspecies erect precisely the same type of structure, the divergences being insignificant. In fact, for all intents and purposes we may say that the shelters of any given animal species are infinitely alike and those of mankind infinitely diversified.

The history of architecture is one which man may well be proud of, leading as it does from the uncouth, comfortless cave to the luxurious mansion. What interests us, however, in this Chapter is the limitless variety which an examination reveals. We find different more or less fundamental styles, such as those which distinguish Babylonian, Egyptian, Chinese, Indian, Persian, Greek, Roman, and Arab buildings, besides the architectural styles discoverable to-day in the West. Perhaps the most sumptuous modern style is the Gothic, well represented in the great French cathedrals with their endless multiplicity of harmoniously related architectural and sculptural details. To a minor degree this richness is common to the Gothic, the Renaissance, and other Western styles. With few exceptions architects seek to individualise every building or block of buildings, even though the resulting differences are too often of no special consequence, just preventing monotony. Accordingly, a fair proportion of the millions of buildings in existence may be said to be individualised to some extent. That is, architectural features can be counted by the million.

The buildings vary, of course, in other respects than general style. The material used may be, for instance, brick, wood, iron, concrete, common stone, marble, granite, or a mixture of some of these, and where the exterior is plaster, the colour of the buildings may differ within

wide limits, the differences being potentially limitless where pictorial designs are introduced. Size, too, presents a consideration, for there is an unbroken series from the one-roomed cottage to the Vatican, the Louvre, or the monster hotel boasting of over a thousand rooms, and the storeys may differ from one to fifty or more. Lastly, buildings are specialised for a variety of purposes : we note churches, schools, art galleries, museums, parliament, law courts, municipal and government buildings, theatres, concert halls, cinemas, hotels and restaurants, single and composite dwelling houses, and buildings specially adapted for factories, warehouses, shops, and offices, to say nothing of moving buildings—ships, railway carriages, tramways, omnibuses, commercial and private vehicles, dirigibles, and airplanes. Within each of these divisions, again, there is extensive latitude for adaptation to special needs.

A general survey reveals the fact that we may classify countless millions of diverging objects under the heading of buildings.

2b. *Furniture.* Bare residences would be mere shells, repellent to civilised man. It is furniture which spells comfort. The strenuousness of the present age is dependent for its continuance on alternating periods of hard work and soft repose. Without the latter, men and women would far from readily recover their physical and nervous equilibrium.

In matters of furniture, bearing in mind the uniformity characterising the products of the animal mind, we might imagine every chair to be a replica of every other chair, every table of every other table, and every bed of every other bed ; but if we did so, we should be absurdly caricaturing the facts. The diversity in pieces of typical furniture knows no bounds. Thousands of different types of chairs have existed and thousands more are possible. So it is approximately with everything relating to furniture. Who could circumscribe the limits within which flower vases, pictures, clocks, and other ornamental or utilitarian pieces of furniture may differ ? Material, size, shape, colour, ornamentation, adaptation to particular circumstances, give endless scope to private taste and to artists.

An examination of some well-furnished houses will undoubtedly suggest that the number of typical articles of furniture does not perhaps exceed a few score ; but if we extend our review to specialised articles used in well-appointed homes, the number is immense. In fact, it would be instructive to draw up such an inventory, comprising the contents of every class of apartment, from the drawing room to the nursery and bathroom. The kitchen, for instance, forms a little world in itself. Or consider such an utensil as a spoon : we have salt spoon, egg spoon, tea spoon, black coffee spoon, dessert spoon, soup spoon, soup ladle, sieve ladle, caddy spoon, sauce spoon, medicine spoon, besides various kinds of wooden and other more specialised

kinds of spoons. If we add to this that the range of materials out of which spoons are manufactured is considerable and that shape and ornamentation may vary indefinitely, we can appreciate the fact that we meet with numerous kinds of spoons in the course of a lifetime. As with spoons so with many other household articles, in the most liberal sense. Who, for instance, would care to describe the variety of easy chairs to be seen to-day ?

Actually and potentially therefore the contents of residences defy enumeration.

3a. *Implements.* The more we ponder over the numerous classes of tools in existence, the more embarrassing does the problem appear by virtue of its magnitude. In the course of time the number of trades and industries has fabulously increased and so has the invention of specialised tools. Particularly with the coming of the machine age have implements or instruments been lavishly multiplied. In this way an engineering establishment or a scientific laboratory may count its tools by the hundreds. Size alone is responsible for much diversity. From the giant steam hammer down to the diminutive hammer utilised in delicate watchmakers' operations, or from the towering steam crane to the simplest pulley, unnumbered transitional forms may be registered. Perhaps every type of tool-made product requires, to a certain extent, its own appropriate form of tools and we are all aware how colossal is the series of such products. Technical specialisation has striven to adapt means closely to ends and has developed crowds of tools. Moreover, machine tools have reached an intricate complexity which beggars adequate description save by a trained expert. There may be hundreds of parts in a single machine.

3b. *Processes.* Processes and methods are probably not less abundant than tools. For example, in offices hundreds of thousands of printed and other forms are used and the modes of performing the industrial processes or of conducting the work of offices, may be computed to amount to many millions. Scientific and educational methods materially increase the above numbers.

4a. *Domesticated Animals and Cultivated Plants.* The variety of domesticated animals, especially if races are comprised in the specification, is considerable. Far greater, however, is the diversity of cultivated plants. These amount to thousands.

4b. *Energies and Raw Materials.* The total of discovered energies is undoubtedly a modest one, owing to the smallness of the number existing in nature. It is different with raw materials. "Until a few thousand years ago some half-dozen kinds were employed ; now there is scarcely a substance on the globe which has not been utilised for certain general or specific purposes. The surface of the earth down to appreciable depths, is for us one prodigious depository of raw materials.

5a. *Work.* To enumerate the varieties and problems of work—manual, clerical, organising, and professional—would be practically to write an inventory of our civilisation.

5b. *Play.* Children's toys, games, and enjoyments are many and the indoor and outdoor games and recreations of adults are not easily counted. If, in the latter connection, we only think of the theatre, music, dancing, variety entertainments, the cinema, listening in, visiting galleries and museums, reading poetry, fiction, and prose literature generally, and light conversation, we shall be deeply impressed by the diversity of the life of leisure.

5c. *Inner Life and its Expressions.* These are protean from first to last.

6. *Human Interrelations.* In the earliest human stages relations outside the social group were mostly of a casual or aggressive character. To-day trading, travel, study and visits abroad, migration, and the diffusion of information, practices, ideas, and sentiments, have reached such proportions that the human permutations and interrelations may be counted by billions. The whole of mankind has very nearly become a single body acting and reacting in every one of its numberless parts.

7. *Nutrition and Care of Health.* Eating and drinking are now fine arts ministered unto by a thousand servitors. The number of different dishes and the number of different methods of preparing them are enormous. Similarly, the sciences of hygiene and medicine are so rich in content that it is difficult to express this in figures. When we remember the libraries of medical works and encyclopedias, we obtain a fair glimpse of how vast a subject we have before us. The maintenance and the recovery of health are inexhaustible topics of scientific discussion.

8a. *Dress.* The principal articles of male and female attire are easily enumerated. Nevertheless, when we pass through crowded thoroughfares, the conclusion is almost inevitable that practically every woman wears a somewhat different hat, if not a somewhat different dress. Material, size, shape, colour, and shade of colour, infoldings and outfoldings, arrangement and ornamentation, diverge so much, and the tendency to individualise is so general, that almost no two women are dressed exactly alike, unless indeed they wear a uniform. Adaptation to circumstances and to taste has reached here its highest mode of expression. For all intents, the number of differences concerning dress may pass into thousands of millions. In comparison to women, men appear in this respect puritanically attired to-day. Yet it would be interesting to know how many kinds of men's ties the last few decades have produced.

8b. *Education.* To an appreciable degree education is standardised in the present day. Still, from the nursery and the kindergarten

to the post-graduate course, there are not a few steps. Furthermore, professions, trades, and industries, have their separate schools. We should remember likewise the host of text-books connected with teaching and learning and the alarming quantity of particulars incorporated in these. The long apprenticeship of the teacher, the years spent at school by the child and in many cases by the adolescent, are a faint indication of the diversified nature of education in general.

9a. *Morals.* With the passing of the ages and the extension of historical and geographical experiences, the moral sense deepens and its ramifications become bewilderingly numerous. Insight, delicacy, discrimination, tact, tolerance, and breadth of sympathies, broadly distinguish the highly from the lowly civilised man and woman and since the conceivable range of conduct is as wide as the range of human life, the number of moral possibilities is virtually infinitude. It should be remembered, besides, that moralities almost universally reflect to some extent the collective desire to maintain and develop the social organisation of a people and as these organisations greatly differ in various respects and diverge from period to period, the moral contents of human life, socially and historically considered, are of necessity highly varied. To the above we should add what is yielded by the rich kindred subject of customs and manners, these also being deflected in various directions by class exclusiveness and provincial aloofness.

The traditional aspects require to be supplemented by what is presented in literature. Works on ethics seek to describe the nature of morality as well as to elucidate it. There is also an extensive hortatory literature. Moral philosophy, too, has been cultivated for ages and the relations of the moral to the other aspects of life are being more and more eagerly canvassed.

Altogether, comparing primitive man with contemporary man, the wealth of details in morals has increased almost boundlessly.

9b. *Religion.* Religion is in a similar position to morals, save that the former has been, as a rule, organised. The practices of primitive magic and animism, undifferentiated and undiscriminated at first, have developed into imposing hierarchical systems of regional religions. The Zoroastrian, the Hindoo, the Buddhist, the Jewish, the Christian, and the Mahommedan religions exemplify in a general way the development which has taken place. Studying, for example, the Roman Catholic section of Christianity, we are confronted with a complicated and world-wide organisation ; with churches and other establishments, such as monasteries, convents, schools, and colleges ; with catechisms adapted for different countries ; and with libraries of special books for students, for scholars, for priests, for the devout, including patristic and hagiographical literature and church history. To these may be added sermons, lectures, and general works, conceived from the

standpoint of the Roman Catholic Church. The Protestant Churches offer another illustration of amplitude of detail, inasmuch as there are several hundred sections and sects to be taken into account. In brief, the richness of the contents of most present-day religions is bewildering, seeing that in any instance the original scriptures, themselves often voluminous, represent but a fraction of the religious reading and thinking matter offered.

10a. *Science.* Organised knowledge is a powerful magnet attracting fresh facts in geometrical ratio. The mind reels at the thought of summing the particulars incorporated in modern science. There are scores of sciences, with their text-books and original treatises. Numerous learned societies exist, with opportunities for propounding questions and solutions and publishing them in ponderous transactions. Many periodicals serve the same end. Such individual sciences as mathematics, astronomy, chemistry, and physiology, impress one with the innumerable truths which research has disclosed.

10b. *Art.* Art is more individual than science, although its scope is necessarily more modest. The artist rarely repeats himself and his life-work is practically composed of an unintermittent series of novelties, only akin in style and confined in range by experience and opportunity. Hence everything worthy the name of artistic is to some extent singular and accordingly, granted the wide interest in the beautiful, works of art exist in great multitudes, even though comparatively few have survival value.

Moreover, the attractiveness of what is beautiful, combined with its expressiveness, have, with the development of appropriate modes of reproduction, more and more encouraged the copying of originals. Consequently, particularly in the form of small and large facsimiles and through illustrated books and articles generally, artistic productions are universally disseminated.

The endless diversity of art treasures is a commonplace of every leading civilisation.

11a. *The Family.* At first sight the small number of the members of a typical home, suggests that the family is deficient in variety. However, the family is a social microcosm, the parents preparing the new generation for the collective life which comprises most human aspects. The tending of the infant, the nurture of the young child, the education of the juvenile, the training of the adolescent for the larger world, and the provisioning and other duties of the home, represent not only a subject of momentous importance, but one full of variety.

With the family we may join sex relations generally, most especially those of courtship and matrimony. This links our subject with the huge stream of present-day novels and plays which practically all have love between the two sexes for their central motive.

11b. *Civil Groupings.* In the early stages of man's history, civil groupings were negligible in most respects. To-day private, social, national, and international life are honeycombed with them. Clubs, societies, federations, and confederations, permeate all relations of concern to men and women. Everything, from the smallest and most trivial to the largest and most important interest, tends nowadays to be organised. We live to-day under the sign of organisation. Philanthropy, industrial and commercial interests, science and art, movements for reform, are all furthered by organisations which are apt not only to become national and international, but to federate with allied organisations of a national and international character.

12a. *Civic Groupings.* We shall let this heading speak for itself. An up-to-date atlas of the world or a gazetteer will help us to understand the vast number of civic groupings in existence.

12b. *Government.* The governance of a tribe or nation in antiquity was a crudely simple affair. To-day, when despots have grown into "constitutional rulers" or into elected Presidents and when individual citizens feel themselves responsible for their country as a whole, the governmental and legislative machine has become highly complicated and concerned with almost every social interest of measurable importance. In fact, its relation to voluntary activities generally is so intimate that it not only controls but supplements them. From being almost solely concerned with keeping thralls in subjection and order and with securing funds and fighting men for the personal use of the personal ruler, government has come to regulate and promote social conduct and collective rule, commerce and industry, agriculture and fisheries, hygiene and medicine, public works and postal communication, foreign relations and education, art and science, and other chief departments of the life of a nation. The regional and national bureaucracy forms accordingly an appreciable percentage of the total adult population, whilst the variety of its activities reaches colossal proportions.

12c. *Law.* Law may be said to be morality so far as it is deemed expedient to organise it nationally and internationally. To what extent this has been regarded as practicable may be divined from the rows on rows of bulky volumes which are to be found in the chambers and studies of members of the legal profession. From the patriarch seated at the city gate to the modern judge on his bench there is a distance too great to be easily expressed. These types broadly represent the opposite poles of almost unassisted good sense and profound erudition, of virtually no elaboration with an infinity of minutiæ.

4. The Calculable Future.

It is fairly evident that richness in diversity almost automatically increases with the ages and that consequently the distant future will

no more be a bare copy of the present than the present is a bare copy of the distant past.

With the further rationalising of life, various drastic changes may be anticipated. Ignorance, error, prejudice, fitful passions, eccentricities, and narrow interests, will sway the world less and less and thus diversity will be materially reduced in one direction. Rationalisation also will discover the best methods and the best products, will make its discoveries public, and these methods and products will be everywhere applied and used. Accordingly, instead of numberless individuals and collectivities tentatively and crudely experimenting and frequently modifying their unsatisfactory experiments, exhaustive scientific investigations will reach solutions of a high order of perfection, solutions which will be universally adopted. Moreover, inasmuch as rationalisation not only applies to industry and commerce but to every sphere of life including the home, health, art, education, and science, its results are bound to revolutionise life and enormously reduce sheer diversity.

On the other hand, two factors will tend greatly to increase diversity. Growing knowledge brings to light far more than an erratic imagination can conjecture and knowledge applied to practical and other activities is also superior to error in this respect. Hence the loss spoken of above will be probably more than balanced by solid gains. Grossness of perception will be replaced by delicacy of discrimination, as the most recent methods of investigation abundantly exemplify. Ever new worlds will be discovered by the microscope and the telescope and refinements in analysis and specialisation will act in the same direction. Secondly, art will come progressively into its own as the stream of time passes. It will transfigure every domain of life. All material things in use will embody to some degree at least the spirit of beauty, a state of things for which there are even notable precedents in the past, and refinement, tact, sensitiveness, sympathy, and delicate discrimination generally, will tend in the same direction.

The future will consequently record a far-reaching readjustment in the matter of the diversity of life's content, substituting rational for irrational dissimilarity without materially affecting the growing richness of life.

5. *The Goal.*

Richness in diversity has no intrinsic value. Its object is to satisfy and gratify human nature, individual and collective. Assuming this nature to be extremely limited in range, as it is in animals because they are dependent on instincts, the diversity may be conceived as showing negligible dimensions. On the other hand, if only infinite goodness, infinite knowledge, infinite well-being, and infinite beauty can truly satisfy a human being, the rich diversity these imply should

be also regarded as tending to be infinite. The goal of human life, given man's distinctive nature, hence involves limitless diversity of a type tending to satisfy humanity fully and as an integral whole.

6. *The Cause of Cultural Diversity.*

A review of our subject discloses several highly significant facts. First, we note that a broad historical examination shows that within animal species variety has remained for all intents stationary, whilst in man there has been a stupendous increase. Seeing that man differs in this from all animals equally, his uniqueness in a pivotal respect is demonstrated by the enquiry. Secondly, man's earliest culture astonishingly differs from the culture observable to-day. It is not only that in our time the diversity is, by comparison, immeasurably larger, but that in the pre-eolithic period there was even less diversity in human life than we find among bees and ants to-day or could have found among them then. Thirdly, there is nothing suggestive of organic evolution in the increase of diversity. Variety has not universally and simultaneously grown as a single mass. In fact, we can scarcely speak here of a general historic growth at all. Different social units diverge almost as much as regards cultural diversity as do the earliest from the latest ages. What is more, *within* some groupings the differences between individuals are scarcely less than those *between* certain groupings. Finally, the cultural position of any group or individual may vary conspicuously within brief periods. In all these respects man departs radically from the standard set by animal communities and species.

If we closely examine the forementioned points, we perceive that the mountain of diversity is the outcome of the summing of the miscroscopic cultural efforts of the individual minds composing humanity in space and time. Here lies the cause of the limitless increase in cultural diversity through the ages.

7. *The Promotion of Cultural Diversity.*

The duties relating to the promotion of cultural diversity can be readily inferred from the foregoing Sections. Indeed, our remarks relating to the calculable future outlined them by implication. We ought to further that form of cultural diversity which is most in harmony with the true individual and social needs of the present and the future. This is given primarily by an exhaustive scientific study of the most important classes of facts and human activities and by the promotion of the best art and conduct, the latter involving sensitiveness, refinement, tact, sympathy, and fine discrimination generally. In brief, we should seek to discourage haphazard diversity and encourage intrinsically desirable diversity.

Chapter IX.

THE LAW OF LIMITLESS PROGRESS.[1]

Second Law.—*The law of the limitless improvement, among people generally and through the ages, of the cultural or tool-made products which tend to satisfy ideally mankind as a whole, together with the secondary law of the gradual elimination historically of error, of anti-progressive habits and customs, and of cultural and social inequality.*

1. *The Meaning of Progress.*

In the foregoing Chapter we stressed the fact of the existence of almost infinite cultural diversity resulting from man's specio-psychic nature. In a general way such diversity may be regarded as constituting of itself an index of progress, as it certainly is where important classes of desirable variations are in question. For our present purpose, however, we wish to emphasise the fact of a universally acceptable and realised improvement in a general object, idea, or process.

The creation of variety may promote many ends. It may subserve *the needs of different classes of society,* when, in some cases, it will, to a certain extent, involve improvement in the above universal sense and, in other cases, adaptation to a depressed standard. The shoddy clothing, the innutritious foodstuffs, the jerry-built dwellings, the trumpery amusements, for instance, of the disinherited classes, are a striking illustration of adaptation combined with deterioration; but it would violate the common-sense acceptation of the term Progress to cite adaptation to the needs of the indigent as true progress.

[1]For a general discussion of the literature of the subject, see Arthur J. Todd, *Theories of Social Progress,* New York, 1918, and for its history, J. B. Bury, *The Idea of Progress,* An Inquiry into its Origin and Growth, London, 1920, and Jules Delvaille, *Essai sur l'histoire de l'idée du progrès* jusqu'à la fin du XVIIIe siècle, Paris, 1910. Some references to progress will be found in Darwin's *Descent of Man,* pp. 132-133, 140, and 143. See also Louis Weber, *Le rythme du progrès,* Paris, 1913; Boris Sidis, "The Source and Aim of Human Progress," *Journal of Abnormal Psychology and Social Psychology,* 1919; L. L. Bernard, "Invention and Social Progress," in *American Journal of Sociology,* 1922 and 1923; G. C. Painter, "The Idea of Progress," in the same journal, November 1922; Julian Huxley, "Progress: Biological and Other," in *Hibbert Journal,* April 1923; L. T. Hobhouse, *Social Development,* its Nature and Conditions, London, 1924; Robert E. Park and Ernest W. Burgess, *Introduction to the Science of Sociology,* Chicago, 1924, contains a chapter on progress and also a very full bibliography on this subject; Frank W. Blackmar, *History of Human Society,* London, 1926. The desire for progress is most characteristically expressed in utopias. On this see J. O. Hertzler, *The History of Utopian Thought,* London, 1923.

There is a higher species of diversity, one which is expressive of *artistic peculiarities*. Here artists or craftsmen vie with one another in producing what is more or less characteristic and individual as well as decidedly pleasing and æsthetic. In architecture and in the decorative arts, for example, this tendency to individualise obtrudes itself. We find here an enrichment of human life, a certain satisfaction of the sense of beauty. Nevertheless, for the object we have in view, general or fundamental improvements rather than profuse variety appeal to us.

Another type of diversity is that appertaining to *climatic adaptation*. Here, broadly speaking, decided progress is to be recorded, for it enables man to live, and to live in comfort, in most parts of the world. We trench here on progress proper, since in most cases there is in this instance not only diversity but extensive improvement in the means whereby men may adapt themselves to different climates.

Similarly, with *environmental adaptation generally*. Adaptation to individual, family, or social circumstances, to the circumstances of particular concerns, trades, or institutions, to local or national government and history, to certain habits, customs, traditions, and religious beliefs, or to a special habitat, has frequently no bearing on general human progress and falls, therefore, to that extent, outside the framework of our present study.

The extreme type of variety is that of *fashion in apparel*. Here, as a rule, variety as such, without any reference to improvement or even to hygienic requirements, holds sway. At one period women's skirts trail on the ground and fall into innumerable loose folds and at another they reach to just about the knee and are so tight that accidents are difficult to avoid. Now every part of the body is jealously concealed—scarcely the tips of the shoes protrude, the neck is wrapped to the chin in stiff collars or in furs, and the face is covered with thick veils ; and, again, the skirts are short, like those of girls entering their teens, the stockings are transparent, and the arms, neck, and breast are exposed in outdoor habit beyond what was previously regarded as decorous in ball-rooms. Even the seasons are flouted and flimsy, open-necked garments in winter, and furs in summer, are not uncommon. Here sheer love of variety is the governing factor. Since development is in this case absent, since eccentricity proceeds so far as sometimes to impair health and comfort, and since only violent oscillations are observable, the diversity obtaining in modern fashions bears generally no traceable relation to progress.

An indispensable part of the meaning of progress is, as we have stated, *improvement*. The telescope offers one among a thousand instances of this. The credit of its discovery was claimed about 1608 in Holland by two individuals. The news of its discovery slowly spread and eventually, some two years later, reached Galileo in Italy.

He proceeded forthwith to experiment, fitting a convex lens to one extremity of a leaden tube and a concave to the other. "His first telescope magnified three diameters; but he soon made instruments which magnified eight diameters, and finally one that magnified thirty-three diameters." (*Encyclopædia Britannica,* 14th edition, 1929, p. 905.) Newton sought to improve the reflecting telescope and drew some untenable conclusions on the subject. John Hadley produced eye-pieces magnifying up to 230 diameters. Initially, and for a long time subsequently, chromatic lenses were used which materially impeded accurate observation. This was remedied by the invention of the achromatic lens in 1733. Furthermore, the spherical aberration was corrected by Dollond in 1758. "In its practical form the principle of the instrument has remained unchanged from the time of the Dollonds to the present day; and the history of its development may be summed up as consisting not in new optical discoveries but in utilising new appliances for figuring and polishing, improved material for specula and lenses, more refined means of testing, and more perfect and convenient methods of mounting." (*Ibid.*)

The aim of the telescope was to reinforce the eyes which, unaided, could only discern about three thousand celestial bodies and these imperfectly. Galileo's first telescope, magnifying three diameters, revealed a new world and the most recent telescopes, magnifying thousands of times and enabling us to detect a hundred million stars and to study the surface of the moon and the planets somewhat minutely, argue an immense improvement on our original means of astronomical research. Here we encounter an instance of progress on a magnificent scale and one proceeding for centuries, innumerable improvements converging to produce a superb scientific instrument. If we placed side by side Galileo's leaden tube and the Reflector of the Mount Wilson Observatory, we should have a graphic illustration of what progress means.

Yet we should further distinguish between *progress* and *improvement.* There may be remarkable improvement in burglars' appliances, in carrying on the "white slave traffic," in subjugating races, in extorting usurious interest, in perfecting instruments of warfare, in felonious imitations of banknotes and signatures, and in much else. Such improvements could not be said to be indicative of progress. The difference between the two terms is perhaps made clear by stating that the term Improvement may be taken to mean any invention, discovery, or development which is conceived as having wrought a more or less appreciable change for the better in the condition of one or more men, regardless of the fact that perhaps harmful consequences may also result from the improvement for the same or other persons.

In brief: *by progress we mean general human progress or the progress of mankind.* If it be true that Hellenic culture depended materially

on slavery, then Hellenic culture, on the moral side, constituted a comparatively low and imperfect form of progress. It may be contended, of course, that immaculate progress is impossible in a world where most men are steeped in ignorance and error. This is true. Nevertheless, we should insist that, broadly considered, we may only speak of progress proper where mankind as a totality is likely to benefit, sooner or later, by an improvement. Thus all sectional progress, however real and valuable otherwise, is excluded from our purview. The patient who is progressing favourably ; the school-child who is making satisfactory progress ; rural, urban, and national progress ; and all similar types of fractional advance, concern us here only indirectly. In fact, in the light of general human progress these types are frequently doubtful in character and have either no close connection with the larger advance or are even opposed to it. In this case also we often deal with improvements adapted to a distinctive environment and having little influence on, or relation to, general progress as such.[1] Still, whilst deliberately ignoring for our purposes sectional progress, we are, of course, aware of the fact that general and universal progress is due to the thoughts and actions of individuals and groups of individuals.

Progress may, accordingly, be roughly said to have taken place in so far as there has been through the ages a more or less constant growth in improvements tending to satisfy human nature as a whole (*i.e.,* as regards morality, truth, health, and beauty) *and humankind as a whole,* whilst the sum of progress may be said to be diminished by any corresponding historic growth in " improvements " having the opposite tendency.

The law of human progress should therefore not be confounded with increase in possessions, variety of objects or processes, adaptation to climate and to special environmental circumstances, sectional progress, nor even with improvements generally. Its connotation is distinctly pan-individual in tendency or possibility and all other alleged types of progress must submit to this test. Whatsoever, like the telescope, which we adduced as an illustration, more fully satisfies one part of universal human nature without, to an extent worth speaking, detrimentally affecting another of its parts, is distinguished as expressing and exemplifying the principle of progress.

Such being approximately the proper signification of the term Progress, we are led to enquire whether it is a fugitive rarity or an imposing fact.

[1] " ' Progress,' says one grave thinker (Charles H. Pearson, *National Life and Character: A Forecast,* 1893), not over-stating a plain historic truth, ' is the rare exception ; races may remain in the lowest barbarism, or their development be arrested at some more advanced stage ; actual decay may alternate with progress, and even true progress implies some admixture of decay.' " (Viscount Morley, *Notes on Politics and History,* London, 1913, p. 84.) Plainly, Viscount Morley was thinking here of sectional progress.

However, the idea of human progress is liable to be misapprehended in so many ways that we shall endeavour to remove a few of the most mischievous preconceptions before commencing our concrete and systematic exploration of the field of fact.

First, we should be clear as to the general end of progress. This may be considered as a condition of humanity where the good, the true, the healthful, and the fair, are universally realised to a virtually ideal degree both in men's minds and in men's actions. Speaking in relativist terms, we imagine the highest conceptions of morality, art, science, and hygiene of *our* age thoroughly appreciated, eagerly followed, and vigorously promoted by virtually all.[1] This view excludes a more nebulous ideal which vaguely takes into account the morality and the happiness of particular individuals and particular communities.

The man who incidentally strives to make his neighbour happy, is an incomplete conception, leaving humanity very much on the primitive or animal plane. The enlightened individual demands, as an ideal, a goodness far exceeding that of the indifferently civilised person and contends that man is only truly satisfied with the immensely vaster ideal outlined above. To ignore art, science, health, and moral refinement is decidedly unsatisfactory. Besides, it appears on further reflection that the simpler ideal just criticised is incapable of immediate or rapid fulfilment as a general proposition, inasmuch as it depends on the realisation of the larger ideal. That is to say, a humanity highly developed morally, as we shall soon see, involves a humanity highly evolved in most other main directions.

Secondly, progress may be partial in two ways, but should not be therefore condemned. Suppose that art and science are highly developed, but not men's modes of social living. All that can be

[1]Here are some other useful conceptions. J. S. Mackenzie, in his *Outlines of Social Philosophy* (London, 1918, p. 243), stresses a threefold end : " (1) The control of natural forces by human agency ; (2) the control of individuals by the communal spirit ; (3) self-control." C. A. Ellwood, in his *Sociology in its Psychological Aspects* (New York, 1912, p. 393), regards as the goal and purpose of our life " the progressive realisation of a society of harmoniously adjusted individuals." F. W. Blackmar and J. L. Gillin (*Outlines of Sociology,* 1923, pp. 449-450) formulate a somewhat exhaustive list of criteria of progress : " We may say that the criteria of progress are : (1) closer integration of society, (2) differentiation of social structure and function, (3) closer articulation of parts, (4) better conditions of life for each succeeding generation, (5) improvement of race or stock, (6) equalisation of opportunity, (7) increased service of wealth in the interests of all, (8) social direction of society in the interests of the individual and (9) control over the forces of nature." Joseph K. Folsom (*Culture and Social Progress,* New York, 1928) proposes a " barometer of welfare," which includes the following items : index of longevity, of health, of mental adjustment or mental health (crime, suicide, insanity, pauperism, unemployment, &c.), leisure time, per capita consumption of true luxuries, recreational variety, and individual liberty. J. A. Thomson defines progress thus : " Progress is a balanced movement of a social whole towards the fuller embodiment of the supreme values, and at the same time a more all-round realisation of the physical and biological pre-conditions, namely the wealth and health which secure stability." (*What is Man?* London, 1923, p. 215.)

inferred from such a condition is that human nature is being highly gratified in certain directions, but not in others. Progress has actually taken place to a notable degree, although it is not rounded progress. One could even reason similarly regarding a condition of society where morality only was highly developed. In such a case we should be obliged to consider the progress made as requiring to be supplemented by progress in a number of other directions. If, therefore, we should find in the analysis we are about to make that there has been more decided progress in some directions than in others, this does not militate against the fact that there has been progress. Progress, we should remember, is far from resembling a disciplined and well-led army manœuvring on an enormous plain.

Two families may live in close proximity on farms and be most neighbourly. If our ideal is as modest as this, it is easily realisable. If, however, our ideal is comprehensive, embracing the whole of mankind and the varied potentialities of human nature, it may absorb perhaps a million years before approximately perfect results are obtained. Accordingly, human nature as a whole must await the advent of the approximately ideal age with infinite patience. Clouds of errors and illusions have to be dispersed, whilst truths can only be established with exasperating slowness. The end of rounded progress—progress towards the full realisation of our highest and truest *present-day ideals*—has therefore to be placed in the distant future. Now, whilst under somewhat primitive conditions two families, or a whole small tribe even, may live contentedly together and cooperate heartily, a whole world of men and groups of men seeking to satisfy their nature as they understand it, are not in a similar position. Here distance in space tends to rouse suspicion and jealousy. Hence rivalries and misunderstandings innumerable, leading frequently to friction. In the past men had no true knowledge of their own nature and they were hence gravely in error as to how happiness was to be secured. The wealth created was so modest that unseemly scrambles ensued everywhere in order to make sure of more than a pittance. It was immeasurably difficult, too, to devise an economic system that should produce abundance for all, a political system that should preserve order and be just to all, a system of international relations that should properly regulate the international life, and a hygienic system that should ward off the deadly physical and mental dangers inherent in unenlightened community life. With moral education based mainly on good intentions and general education founded on what were mere gropings, the complexities of social intercourse and cooperation had little prospect of being resolved. Accordingly, we see that general moral progress is also of necessity preternaturally slow.

Lastly, the central social problem requires consideration, namely that of the condition of the great mass of the populations of most

countries. For these populations the advance made by mankind appears, at first sight, scarcely to exist. Here is undoubtedly the black spot in the theory of progress and to remove that black spot should be the primary aim of reformers.[1] However, here also the facts should be respected. On the one hand, the humanisation of the law, of working conditions, of religion, and of the common life, improvements in sanitation, insurance against illness and other untoward contingencies, child welfare activities, and uncounted other reforms, have substantially alleviated the lot of the great mass, whilst, on the other hand, owing to absence of social enthusiasm, much which might be done to elevate vast numbers, is left undone. Beyond this, however, should be noted the cheerful fact that if social progress has lagged behind progress in manufacture, art, and science, these will be there to serve society so soon as its organisation has become truly social. From this viewpoint even the stern moralist should appreciate the immense value for humanity of the non-moral progress of the past and present.

We have to weigh now the pessimist's reply to our last two points. The pessimist[2] holds that the mass of mankind has profited little by past progress and that it is an unwarrantable delusion to think that it will ever be otherwise.

Two explanations, however, may be offered. Moral science and educational science are still in their infancy. Since, now, all the

[1]Edward Carpenter's essay, *Civilisation : Its Cause and Cure* (London, 1921), is not as pessimistic and negative in tenor as its title would lead one to suppose. In his view civilisation, or more correctly advanced modern civilisations, represents a necessary transitional stage to a higher cultural level where robust physical and mental health will distinguish the race. Thus, according to him, our modern phase represents a sort of teething period. Much of what he says regarding some of the advantages of tribal life and some of the disadvantages of " civilised " life is palpably true, but he omits to note the corresponding advantages and disadvantages of the two stages of civilisation. A reading of Albert Schweitzer's *Zwischen Wasser und Urwald* (Berne, 1921), does not at all suggest that primitive men do not suffer from a multitude of ailments. However, it appears that " the adjustment of organisms to their surroundings is so severely complete in Nature apart from Man, that diseases are unknown as constant and normal phenomena under those conditions." (E. Ray Lankester, *The Kingdom of Man*, London, 1912, p. 18.) Still, a gruesome instance like the following does not exhibit animals in a favourable light from the viewpoint of health : " A vivid impression of the prevalence of parasitism is afforded by the capture, not infrequent at a channel zoological station or by fisher-folk anywhere, of the huge and majestic sunfish, *Orthagoriscus mola* ; and by picking off with forceps into museum bottles his crowds of uninvited passengers—the tuft of barnacles upon his back, the biting isopods like enormous fleas upon his skin, the trematodes sucking like leeches upon his eyes ; and within to find not only his alimentary canal crammed with worms more than with food, but his liver changed from its natural brown almost into the likeness of a tangle of white worsted, of which each thread is a tapeworm." (Patrick Geddes and J. Arthur Thomson, *Evolution*, London, 1911, pp. 104-105.)

[2]The pessimist should remember : " As we all know, happiness is mute whilst unhappiness cries aloud. This is because the former is the natural and the latter an abnormal condition of human life." (Paul Oltramare, *Vivre*, Geneva, 1919, p. 52.)

omens are against their remaining permanently so, we may both understand the present low general level in this respect and the certainty that the level will be immeasurably raised in the future. Those who doubt this, cannot justify their doubt on the ground of experience, for the eventual progress of moral and educational science is guaranteed by what we know of the historic growth of all the sciences.

Secondly, we need no longer fear that the economic chaos will remain with us for ever. Against the contention of some socialists that the millennium will be here so soon as the capitalist system is abolished, the pessimist might plausibly urge that socialism will very likely founder on the same rock as capitalism. Fortunately, the present generation is furnishing a conclusive reply to the pessimist's reasonable doubts. Rationalisation is being tried in industry and is succeeding and it is difficult to see how any one can escape drawing the conclusion that it will in time rebuild the whole economic edifice on a scientific and humanitarian foundation, essentially on the basis of producing abundance of desirable commodities for *all* under wholly humane conditions.[1] Already it has been demonstrated that a forty-four hour week, without overtime, is more than the equal, from the viewpoint of output, of the long week of sixty or more hours. The profitableness of a wage permitting a health-and-decency standard of living is also being admitted and so is the wastefulness of unemployment, of bad factory conditions, of imperfect and unscientific vocational training, and of employers behaving callously and arrogantly towards the workers. Hence the alleged reason for treating the masses harshly has gone. Similarly, there is general agreement among those competent to pronounce an opinion on the subject that scientific management places at the service of mankind universally applicable methods for greatly increasing the wealth of the world and practically abolishing waste of effort and of materials. Internecine economic struggles are therefore bound to be replaced by economic cooperation and the

[1]For instance, since the War, opinion, based on sweeping practical experiments, has been growing that the periodically recurring economic crises, with the disastrous unemployment and misery which they entail, can be mitigated and even prevented by the control of credit, the systematising of the industrial demand, and the like. Social insurance, too, is abolishing privations in a wholesale fashion and the legal protection and uplifting of the worker, mainly through the instrumentality of the League of Nations' International Labour Organisation, is proceeding apace. Sanitation and hygienic enlightenment are also playing a leading part in this connection. The outlook is therefore distinctly hopeful.

As to the past, we must avoid a superficial view. For all but the last few thousand years, there were no poor or rich and the privileges of the most favoured were trivial. Great or considerable wealth was extremely rare until recently and few could be sure of basking long on the sunny side of life's road. In fact, prosperity harboured within itself its own grave dangers. Frequently, again, guilds, customs, and laws regulated and softened life. Poverty and wealth, indigence and comfort, are therefore historically very relative terms, which tell us nothing as to future possibilities. Moreover, it would be outraging fact to argue that wealth is in any way synonymous with happiness or indispensable to it.

extravagant luxury of the few by the healthy and solid comfort of all.[1] We may therefore legitimately conclude that the pessimist is more likely than not mistaken in his belief that the mass of mankind will never have an opportunity to live a life truly worth living.

We shall now turn to an analysis of the facts, examining to begin with the question of the reality of progress.

2. *The Reality of Progress.*[2]

To avoid the perfunctory method of illustrating the reality or unreality of progress by a promiscuous selection of examples, we shall guide ourselves by the comprehensive list and principles drawn up in the introduction to this Book. The author will thus escape the temptation to wander aimlessly through the mazes of time and space and the reader will have furnished to him a criterion which will satisfy him that the survey of the facts is unbiased and thorough. Without a controlling idea of this kind our enquiry would almost certainly

[1] Franklin H. Giddings (*Studies in the Theory of Human Society*, New York, 1922, p. 236) is sceptical on this point. He writes : "The relative dimensions of poverty will contract and its misery will be alleviated, but there is no reason to believe that it will ever wholly disappear." In a polemical work, dialectical and dogmatic in method, Robert Shafer (*Progress and Science*, New Haven, 1922, p. 227) presents the pessimistic view in these terms : "We are bound to conclude that there is at present no valid ground for belief that life will ever be easy and pleasant for the vast majority of mankind." An older writer (T. R. Malthus, *An Essay on the Principle of Population*, London, 1826, vol. 2, p. 441) thus expresses the same depressing thought : "The structure of society, in its great features, will probably always remain unchanged. We have every reason to believe that it will always consist of a class of proprietors and a class of labourers."

[2] A remarkably complete anticipation, in general terms, of the comprehensive conception of cultural progress developed in this Chapter, will be found in Adam Ferguson's *Principles of Moral and Political Science* (Edinburgh, 1792, vol. 1, p. 194). Ferguson dwells in some detail on man's progressive nature, stating in one place : "The state of nature relative to the species . . . consists in the continual succession of one generation to another ; in progressive attainments made by different ages ; communicated with additions from age to age ; and in periods, the farthest advanced, not appearing to have arrived at any necessary limit. . . . So long as the son continues to be taught what the father knew, or the pupil begins where the tutor has ended, and is equally bent on advancement ; to every generation the state of arts and accommodations already in use serves but as groundwork for new invention and successive improvement. As Newton did not acquiesce in what was observed by Kepler and Galileo, no more have successive astronomers restricted their view to what Newton has demonstrated. And with respect to the mechanic and commercial arts, even in the midst of the most laboured accommodations, so long as there is any room for improvement, invention is busy as if nothing had yet been done to supply the necessities, or complete the conveniences, of human life."

Kant, in his *Streit der Fakultäten* (Second Part), basing himself on certain data, definitely asserts that mankind has always been progressing and will continue to do so in the future.

Referring to current pessimistic views, Lord Avebury says : "Far more true, as it seems to me, are the concluding passages of Lord Dunraven's opening address to the Cambrian Archæological Association, 'that if we look back through the entire period of the past history of man, as exhibited in the result of archæological investigation, we can scarcely fail to perceive that the whole exhibits one grand scheme of progression.'" (*The Origin of Civilisation*, 1912, pp. 431-432.)

degenerate into a partisan statement.[1] Such a comprehensive view will also stress the progressive or universal element in which alone we are here interested.[2]

1. LANGUAGE.—(a) *Animal Language.*—Dogs bark, growl, howl, whine, moan, and make a few other sounds expressive of their emotions and desires. Most land animals, in fact, employ sounds to express or communicate their feelings and wants. In practically all instances these vocal or other signs are few in number, not exceeding perhaps a dozen or so. Only among birds is there marked variety, as in the notes of the thrush and more especially in the song of the nightingale. In most instances, too, the vocal signs are inherited, although the controversy regarding the extent to which the young of birds imitate their parents, is yet proceeding. In certain cases vocal imitation is pronounced, the parrot constituting the outstanding example in this respect. The vocal sounds of animals may be regarded as possessing two characters—an exceedingly limited range, as intimated above, and inarticulateness.

Man, being descended from animals, originally uttered presumably sounds allied to those of animals in general and the Anthropomorpha in particular. No reason exists for surmising that these were other than exceedingly limited in range and inarticulate in nature. Some indications of the vocal sounds of proto-man may be found in the sounds uttered by human infants. These entirely bear out the inference that earliest man was not very differently situated to animals in respect of cries and calls, or the means of communicating his feelings and wants.[3]

(b) *Human Language.*—Man, as we know him, is distinguished from animals by the possession of an articulate mode of vocal expression. In the most lowly developed extant races the number of

[1] A favourite method is to examine microscopically the dark side of our time and to compare this with the bright side of some other time, such as the Middle Ages. A notable example of this will be found in R. Austin Freeman's *Social Decay and Regeneration,* London, 1921. As irrelevant a case might be made out by an equally sincere and brilliant special pleader who contrasted, in the same selective spirit, the bright side of our time with the dark side of the Middle Ages. Justice can only be done to a conception such as that of Progress by ignoring everything but the general trend from eolithic times to an equally remote future, the present being considered but a point in that trend. Objections too, should not be forthwith considered as justified or important. They may be superficial or groundless.

The following passage gives the reverse of Freeman's picture: "Bad as our urban conditions often are, there is not a slum in the country which has a third of the infantile death-rate of the royal family in the middle ages." (J. B. S. Haldane, *Dædalus; or, Science and the Future,* London, 1924, p. 54.)

[2] If J. B. Bury, in his *The Idea of Progress* (London, 1920), had undertaken a systematic survey such as we suggest, his views would have changed as regards several points. For instance, he could not have maintained that "belief in it is an act of faith" (p. 4), nor that some day progress may "come to a dead pause" (p. 3) because of some obstacle in the path.

[3] Darwin's work on *The Expression of the Emotions in Man and Animals,* London, 1890, is still authoritative in this connection. See also Bastian Schmid, *Die Sprache und andere Ausdrucksformen der Tiere,* Munich, 1923.

articulated expressions or words has reached, it is stated, no higher a figure than a thousand or so. These few words, too, tend to be concrete terms, and often particular, relating mostly to individuals or species and rarely to wide classes. The articulation of the words into sentences is also frequently primitive, lacking in definiteness and lucidity. In some instances the word-language has to be eked out with gesticulations, rendering vocal intercourse difficult at night or when out of sight. Still, the progress registered in such primitive types of language is almost indescribably great when compared with the cries and calls of animals. It places these tribes on an entirely new and higher plane. It enables them to communicate their feelings, needs, and ideas incomparably better.

From this lowly human stage let us proceed at once to the language of to-day. Instead of a thousand words or so, we meet with a hundred thousand words or so ; instead of excluding abstract terms, there is an abundance of them ; classification is not circumscribed by any boundaries ; meanings are recorded in dictionaries and explained in encyclopedias ; sentences are regulated by a multitude of rules ; and virtually every thought, however complicated, admits of lucid, impressive, and refined expression. A vast gulf divides the language of primitive tribes from the language of animals and another such gulf divides the tongues of primitive men from those of modern men of culture. From earliest human times to to-day there appears to have been something like a steady development in this matter. The superiority of the highest developed men of culture to-day over proto-men is in this respect prodigious.[1]

(c) *Writing.*—Comparatively early in man's history the inadequacy of the spoken word for communicating ideas became apparent. From remote times rude sketches probably supplemented the transient utterance and as time passed, and as man's power to draw, carve, and paint developed, pictorial and plastic records of events became more common. These representations with a purpose became gradually conventionalised, as in the Babylonian and the earlier Egyptian monuments. Subsequently, they were slowly transformed into a hieroglyphic or pictographic language. And as an extreme simplification of these, came the classical and other alphabets. It was possible now to fix an idea or an account by ascribing elementary visual symbols to vocal sounds. A man could thus communicate with his fellow-man at a distance ; leave a message ; and preserve an exact and lasting record of anything which appeared to be of more

[1]Recent works on the subject of language are : T. G. Tucker, *Introduction to the Natural History of Language,* London, 1908 ; Wilhelm Wundt, *Die Sprache,* Leipzig, 1911 ; Gustav Baumann, *Ursprung und Wachstum der Sprache,* Berlin, 1913 ; Paul Cordier, *La linguistique et l'origine du langage,* Paris, 1919 ; Edward Sapir, *Language : an Introduction to the Study of Speech,* New York, 1921 ; and Grace Andrus de Laguna, *Speech : its Function and Development,* New Haven, 1927.

than passing interest or consequence. Ideas could be thus conserved and man acquired in this way a new power.[1]

(d) *Printing.*—With men's growing desire widely to communicate their wants and cogitations, writing was increasingly felt to be unequal to this ambitious aim. Many men, in monasteries and elsewhere, pursued the profession of copying manuscripts. Legibility exacted, however, slow production, and the danger existed, besides, of corrupting a manuscript. A more expeditious, less expensive, and more reliable process was hence sought by mankind, a process which was to be to writing what hieroglyphics were to picture stories. Printing embodied these advantages to a remarkable degree. So recently as the Middle Ages, only princes and their peers could afford to possess a library of a hundred manuscript volumes, whilst before the war of 1914-1918, a large number of classics could be obtained in shilling editions and a volume containing all Shakespeare's plays or Milton's works for half that sum. The cost of producing copies of manuscripts has been thus marvellously reduced simply because thousands of copies of a book may be printed within a few days by a few individuals. A possibility hence exists now of disseminating knowledge widely at inconsiderable expense. Thus one may purchase a well-printed, well-bound, and broadly exhaustive etymological dictionary for one shilling, when the same work tolerably copied in handwriting and produced at the same rates of pay as the printed one, might cost at least fifty pounds, or a thousand times as much. The printing press has in this manner proved itself to be one of the basic pillars of humanity. Without it, rumour would rule almost unchallenged and the avenues of learning and culture would be closed to all but the favoured few.[2]

(e) *Telegraphy.*—Speech, writing, and printing carry us a long way; but they still fail to grapple with certain difficulties in communicating with our fellows. The world is wide and even New York cannot be reached by post from London in less than about seven days, and if a reply be required, fourteen days have to elapse, as a minimum, before it is received. Again, should a merchant in London wish to make a postal enquiry of a firm in Adelaide, many weeks will pass before an answer reaches him. Exchange of views with those at a great distance is hence almost excluded, and certainly gravely discouraged, when we have no more expeditious agency of communication than the written word, on the one hand, and the railway and the steamship, on the other. The practical unity of mankind has scarcely any meaning in these circumstances. Here,

[1] See W. A. Mason, *A History of the Art of Writing*, New York, 1920, and Hans Jensen, *Geschichte der Schrift*, Hanover, 1925.

[2] See Robert A. Peddie, *An Outline of the History of Printing*, London, 1917, and Thomas F. Carter, *The Invention of Printing in China and its Spread Westwards*, New York, 1925.

once more, an almost miraculous progress has to be chronicled. For all intents, the factor of time is annihilated by the telegraph. In test conditions, an answer to a message to China, for example, may be received in London within a few minutes of its being despatched. Modern civilisation is thus in daily communication with every part of the globe and lightning-like transference of information to some one thousands of miles away becomes not only a possibility but is of hourly occurrence.

(f) *Wireless.*—The ordinary telegraph, however, has not been available in certain contingencies, as in communicating with vessels at sea. So long as the wire is indispensable, these vessels are isolated and unapproachable telegraphically. Frequently, too, vessels in the past were in imminent danger of foundering or of falling victims to a conflagration, in which cases, save for rare and fortunate accidents, their crews and passengers miserably perished, perhaps after being exposed for days in open boats on a tempestuous sea. To meet such emergencies, we should have to use the telegraph, but dispense with its wires. Wireless telegraphy has accomplished this and has incidentally saved thousands of lives. It has in this way supplemented wired telegraphy in a signal manner. More than this, since numberless wireless stations the world over may receive, and now do receive, a message broadcasted by one station, radio-telegraphy is also coming to be to ordinary telegraphy what printing is to writing. Moreover, the wireless apparatus is now promising to bring into every home the best music, song, lecture, sermon, political address, debates, and news, and, eventually, picture and play, revolutionising in this manner the spiritual side of life, most especially in small country towns, villages, and secluded or isolated spots. And monster amplifiers are beginning to extend the present privileges of the individual home to public halls catering for the socially-minded, besides permitting incredibly large gatherings in the open air to hear a speaker.

(g) *Telephone.*—Inasmuch, however, as telegraphy implies the equivalent of writing, conversations proper and the personal element are excluded by it. This difficulty the telephone overcomes. By an ingenious contrivance the voice spoken into the transmitter is recreated in the receiver and thus it is possible to-day to conduct lengthy conversations and negotiations *viva voce* over distances extending to several hundred and even to several thousand miles.

Here, then, we have a superb example of progress on a colossal scale. The dozen or so indefinite and inarticulate species cries and calls of animals slowly develop in the course of man's history into languages containing over a hundred thousand words, words which may be fixed in simple visible characters, printed with almost incredible speed and at trivial expense, transmitted by the time-annihilating electric wire and the wireless apparatus, and addressed in the living

voice to those far removed from us in space, to single individuals or to multitudes. Speech, writing, printing, ordinary and wireless telegraphy and telephony, and broadcasting, not forgetting the gramophone and the sound film, surely constitute a triumph of collective thought and endeavour of which mankind may well be proud.

2. MATERIAL COMMUNICATIONS.—We shall direct our attention now to the allied subject of material communications or transport.

In pre-culture days the surface of the globe was mostly covered with fens and jungles. Locomotion, therefore, was then greatly impeded. However, since there was nothing to transport except the person itself and that never to any long distance, there existed no great or urgent problem to solve. Only beaten tracks were available and men's minds and efforts were concentrated on finding their way by scrupulous attention to minute features in the environment.

(a) *Road and Tamed Animal, Wheel and Vehicle.*—Little by little the products of culture accumulated and as these included tame animals, such as the ass, horse, and camel, capable of transporting individuals and their goods, advantage of this was probably taken at a comparatively early period of later human history. The master invention, the wheel, came subsequently and developed gradually from logs of wood to wheels proper. Convenience then evolved by degrees the receptacle placed in some manner above the wheels. Simultaneously, more or less primitive roads came into being, rendering vehicular traffic possible. Once this stage was reached, improvements, except for bridges, were of a less sensational character. Roads were perfected, as among the Romans; several species of domesticated animals were employed to draw the vehicles; and the coachwork became as appropriate and as well adapted for its purposes as circumstances permitted. Thus at the end of the eighteenth century we find professional carriers employed in transporting goods by means of horse-drawn conveyances mainly, whilst coaches, with relay stations, catered for travellers.

(b) *Railroads and Locomotives.*—A drastic change then took place. Already rails had been frequently employed in connection with mines and similar enterprises in order to enable heavy loads to be moved with relatively small expenditure of energy. The evolution of the steam engine suggested the possibility of propelling heavy loads on specially constructed railroads by means of moving steam engines or locomotives. Many laboured to solve the problem and soon railways were established and were developing their full powers.

The revolution wrought was an amazing one. Instead of four horses, frequently replaced, drawing a stage-coach accommodating about a dozen passengers at a rate of about seven miles an hour in poor comfort, we have now express trains conveying several hundred passengers, at a rate of perhaps sixty miles an hour, in commodious

and comfortably furnished compartments; and in the place of a lumbering waggon proceeding at a walking pace, hampered besides by rising ground and bad roads, by the need of rest for the horses, and by other impediments, we have locomotives indefatigably propelling twenty or more heavily loaded large trucks at perhaps ten times the speed. We enter here, as it were, an entirely new world. Countries become covered with nets of railroads spreading in every direction until every place of any consequence has its railway station.

The railroad serving such an important purpose demanded many fresh developments. Railway cuttings, railway embankments, railway bridges, railway viaducts, and railway tunnels, soon came into existence and the mighty efforts became ever more daring, efforts such as, for instance, those involved in the construction of the Tay Bridge two miles long and the Simplon Tunnel twelve miles long.

(c) *Electric Traction.*—After a time electric traction followed steam traction. This was conspicuously exemplified at first in electric trams for towns and their suburbs and electric urban and suburban railways, underground and overhead. And now the electrification of main lines is being everywhere considered or carried out.

(d) *Petrol.*—Scarcely were the possibilities of electric traction fully realised when a new form of energy brought us partly back to the railless days. Petrol has ushered in the private and the commercial motor car, permitting swift transport of merchandise and of individuals along railless roads to every part of the country. Everywhere the motor car, the motor taxi, the motor bus, the motor lorry, the motor coach, the motor van, have almost entirely superseded horse-drawn traffic and are beginning to compete sensibly with railways.

From the trackless wild, where there was a complete absence of means of transport, we arrive thus at the railway and the motor vehicle. Instead of every journey being a venture and an adventure, we may travel safely and in comfort round the world in about forty days.[1]

(e) *Water Craft.*—A revolution also took place in a related sphere. The tree fallen into the river provided for primeval man an opportunity of travelling on the water. Gradually trunks were hollowed out to form boats. These as gradually became refined into the light canoe. In time oars, the rudder, sails, were invented and perfected. The boats grew then in bulk until mighty galleys, moved by some hundreds of oarsmen and by a great expanse of sail, rode the main. Here also, as with land traffic, there appeared to be a barrier to any notable advance beyond what was attained in antiquity. With the aid of the mariner's compass and with daring and skilful seamanship the

[1] In 1872, Jules Verne's hero, Phineas Fogg, occupied 80 days in circling the globe. This record has been steadily bettered and in 1926 Messrs. Evans and Wells went round the world in 28½ days. (*The Observer,* London, 13th May 1926.) In 1929 the German airship *Graf Zeppelin* made the tour of the world in 21 days or, if we include only actual travel, in 12 days.

ocean could be crossed; but the perils were many and the passages were often fabulously prolonged through unfavourable weather.

What steam did for land transport, it accomplished for overseas transport. It permitted the construction of enormous ocean palaces capable of carrying some thousands of persons, not a few of those persons in comfort and even luxury, and certain of these boats could be relied on to complete the journey from England to the United States in between four-and-a-half to five-and-a-half days. Even the dangers from accidents were reduced to negligible proportions and life on the sea was enlivened and made more secure by the introduction of wireless. Hence overseas travel and transport were metamorphosed and the world came thus truly to resemble a single organised totality.

(f) *Air Craft.*—Not only on land and sea has there been majestic progress in material communications, but in the air as well, although this is a recent development. For two centuries man had to be content with the rudderless and therefore almost purposeless balloon; but the advent of the light petrol engine led to daring experiments in the air. The results have been remarkable. Airplanes are now able to travel for several thousand miles in a chosen direction without landing and regular passenger and goods air services are multiplying and promising to cover the earth. It should be now only a question of a few years for aviation to compete sensibly with railways in the matter of light traffic. Moreover, since airplanes will be able to proceed at certainly more than treble the rate of express trains, travel by air is likely to prove popular and compete keenly with travel by land and sea. And the airplane may yet find a serious rival in the airship.

If we now take a bird's-eye view of the subject of transportation, we note that the progress made has been incalculably great, beyond the boldest dreams of historic man and beyond the hardiest anticipations of our paleolithic forerunners. As the evolution of language has welded almost the whole of humanity into a unity in regard to the communication of ideas, sentiments, and facts, so transport evolution has brought most human communities into intimate material contact. The foundations of a world civilisation are thus laid.[1]

3. SHELTER.—One of the earliest and most urgent problems primitive man was confronted with was that of securing shelter. Caves and overhanging rocks in certain districts met to a certain extent the

[1]Here are some works treating of the question of transportation: W. O. Tristram, *Coaching Days and Coaching Ways,* London, 1888; M. M. Kirkman, *Origin and Evolution of Transportation,* New York, 1897; J. C. Hemmeon, *The History of the British Post Office,* Cambridge (U.S.A.), 1912; Octave Uzanne, *La locomotion à travers le temps, etc.,* Paris, 1912; W. T. Jackman, *The Development of Transportation in Modern England,* Cambridge, 1916; Caroline E. MacGill, *History of Transportation in the United States before 1860,* Washington, 1917; Georges D'Avenel, *L'évolution des moyens de transport,* Paris, 1919; A. W. Kirkaldy and A. D. Evans, *The History and Economics of Transport,* London, 1924.

need and trees afforded some protection in certain seasons and countries. Lopped branches, rudely disposed, provided sometimes shelter against the wind. Slowly, however, primitive structures were evolved, such as the hut and the tent, being fashioned of all kinds of materials : of snow, in the arctic regions. In these primitive fabrics the lack of glass caused them to be windowless and largely without ventilation. With the employment of wood, more ambitious projects could be realised. The Doric, the Ionic, and the Corinthian columns in Ancient Greece, matched by similar forms in other countries, suggest the course of invention. The trunks of trees were used as columns to uphold the roof and gradually these simple shelters were improved so as to afford increasingly better protection against the capricious elements. In certain districts where rocks abounded, experience probably suggested their excavation and also their utilisation for building purposes and this process of providing solid shelters was continued until it reached a high perfection. The use of dried or baked earth in certain easily transported units—bricks—opened the possibility of erecting substantial buildings anywhere and at relatively small expense. With the invention of glass, admitting of light and ventilation, modern buildings became, finally, practicable. The Roman arch carried mankind a step beyond and thereafter closer and closer adaptations to men's needs engaged the minds of architects. The problems relating to lighting, heating, ventilation, cold and hot water supply, bathing, drainage, sanitation, refuse removal, cleaning, and general comfort (cupboards, mirrors, etc.) received increased attention. At the same time due heed was given to differential needs. Churches, schools, public buildings, offices, shops, factories, were provided with the form most convenient for their purposes.

From the earliest times beauty was studied in architecture and this to such an extent that the term architecture suggests even more the beautiful than the barely useful. Residences and public buildings were manifestly regarded as precious possessions on the embellishment of which individuals and communities could not lavish too much thought, labour, and treasure. Many countries possess hence imposing architectural monuments whose beauty has evoked the admiration of successive centuries. The great ancient civilisations expressed themselves characteristically and intimately in their architectural styles, while modern times have originated other types of architecture.

Contemplating the architectural distance traversed from the cave dwelling to the modern palatial residence and from the tent which housed the sacred Jewish Ark to the Church of St. Peter's in Rome, we cannot help being profoundly impressed with its prodigiousness. The progress perceptible here is so great that it is difficult to express it without appearing to be extravagant.

4. FURNITURE.—We need not linger over the progress noticeable in furniture. If we studied a cave inhabited by our primeval ancestors, the furniture would be probably conspicuous by its entire absence. Yet the pressure of human needs, and the desire for comfort and the satisfaction of the ever-hungering æsthetic sense, have created modern furniture. There is the bedroom with its central feature the cosy and restful bed, its wardrobes and chests of drawers, its washstand and its dressing table, its rugs and its curtains. There is the drawing-room with its soft carpet, its sumptuous sofa and voluptuous easy chairs, its tables and ordinary chairs, its piano, pictures, statuary, flower vases, and the like. There is similarly the appropriate furniture of the library, dining-room, entrance hall, kitchen, scullery, bath-room, and other apartments, as already touched on in our description of Sir Fullman Lovetruth's residence. To these have to be added, as further examples, the furniture in offices, public buildings, ships, and railways. Less impressive as furniture is when compared to architectural monuments, its usefulness and restorative value can scarcely be exaggerated. It reflects civilisation in its sanest form.

Furniture offers accordingly another sweeping illustration of the principle of progress.

5. TOOLS.—To treat at all adequately the progress traceable in the matter of tools, would fill more than one chapter. Accordingly, we may not here attempt more than the faintest adumbration of the subject. Archeological opinion inclines to the belief that prior to man using chipped flints as tools, he had recourse to unchipped ones. A pre-eolithic man's tool, like that of certain monkeys, was therefore any suitable stick or stone he met with in his perambulations.

What an incalculable distance between an eolith and the locomotive of an express train, for example ! The most up-to-date spectroscopes and microscopes, the best surgical instruments, the best chronometers, the best calculating machines, the best agricultural machinery, the best dredgers, the best motor cars, the best equipped engineering works, illustrate the same fact of the incomputably great advance made by man in the improvement of tools.

6. METHODS.—The industrial processes and those of finance and commerce, the methods employed in the arts and crafts, the procedures in scientific enquiries, the practices in government and law, need only be hinted at, to convince the reader that progress in method has been hardly less marked than progress as regards material tools and implements.

7. DOMESTICATED ANIMALS AND CULTIVATED PLANTS.—From our knowledge of the habits of the Primates, we appear justified in concluding that the domestication of animals belongs to the human period and from what we know of paleolithic man, that such domestication belongs to a late historic stage. Its importance it would

be difficult to exaggerate, for our food supply, so far as meat and allied provisions are concerned, and part of our clothing, are derived from that source. And until less than a century ago transport depended on the horse principally, and without it—and without oxen, camels, or elephants which are employed for this purpose in some countries—our civilisation would have been unthinkable and at all events infinitely poorer. Nor should we forget the valuable protection afforded by the domestic dog or cat, the useful part played by the shepherd's and hunter's dog, the horses or oxen drawing the plough, and the much appreciated companionship of pets.

Cultivated plants, again, are of comparatively recent origin and their influence on man has been decisive. Our cereals, which furnish us with much of our food, are humanly improved natural varieties; our fruits we owe to the sagacity of human selection and amelioration; and our green vegetables are also mostly unknown in nature pure and simple.

Without domesticated animals and cultivated plants we should be ourselves undomesticated and uncultivated. These may be largely superseded in the future; but they will have placed us in a position to dispense with them.

8. ENERGIES.—The only forces which man could at first exploit were those residing within his muscular system, together with the use of sticks and stones. He then supplemented these by the energies dwelling in powerfully-built animals. This marked a great advance. Until recent days he only added to these, in the main, water, in the form of water-driven mills, and wind, in the form of wind-mills. Beyond these, however, wind-blown sails supplied him with an inexhaustible and inexpensive, though unreliable, store of energy.

With the arrival of the machine age man's powers were immeasurably augmented. Steam, electricity, gas, and petrol, were the chief transformers, although experiments have never ceased aiming at the fuller exploitation of wind and water. The world-wide harnessing of waterfalls and descending streams and the suggested production of electric power for national use at the pit's mouth are intimations of what we may expect of the future, leaving aside the utilisation of the tides and of high winds and the capturing of the energies locked up in the atom and in the sun's rays.

However, one form of energy of primal consequence early man discovered, namely fire. Its importance for cooking and as a heat, light, and energy producer is patent. The exploitation of coal mines, again, placed an almost unlimited fund of heat and power energy at the disposal of communities.

In our day we can only profoundly pity our ancestors whose lighting arrangements were of the scantiest. Rush-light and tallow

candle look strangely primitive and antiquated by the side of incandescent gas and electric arc. The cheerless night has been turned into day by the agency of modern appliances. Instead of the perpetual darkness of the primeval cave, we have homes almost as well lighted by night as by day.

To pan-human cooperation is due the enormous progress in man's control and utilisation of nature's energies.

9 and 10. WORK AND PLAY AND THE INNER LIFE AND ITS EXPRESSION.—For the sake of reducing the length of this Chapter, we refrain from submitting evidence in favour of progress so far as it relates to work and play and the inner life and its expression. Instances will readily crowd into the reader's mind,[1] exemplifying the inconceivably great advance in these directions from primeval times to to-day.

11 and 12. CONTACT BETWEEN GROUPS.—Communities were at first small and almost self-contained and cultural products were practically absent in man's earliest stages. Hence trading and commerce of every type were necessarily non-existent then. Here, since a separate Chapter will be devoted to tracing the growth of cooperation among men and communities, we need only direct attention to the manifest truth that the progress in trading and commerce has equalled that in any other sphere. Travel, too, has developed from neighbourly visits to pleasure trips round the world ; individual migration has not only come into being, but has grown into a universally prevalent safety outlet for the economically handicapped and the politically dissatisfied ; and the diffusion of information, practices, ideas, and sentiments, has attained gigantic proportions in comparison with primitive times.

13. DRESS.—The subject of dress has much interest for the anthropologist. In the remotest ages, as still sometimes among tribes in the tropics, the adult was no more elaborately dressed than the infant which comes crying into the world. Since in the warm regions where man presumably first developed, the need for garments was problematical, it is natural to assume that ornamentation of the body preceded the use of clothing. Less inviting climates, however, must have imperatively driven man to seek to cover himself, whilst considerations of decency played later no negligible part. Skins and other natural products were at first made use of ; but by degrees a systematic development took place : special coverings for the feet, the limbs, the trunk, and the head, were invented and perfected. Everything was also varied to suit different occasions and seasons, making a wardrobe an interesting and suggestive study. The length to which specialisation has gone may be surmised from the statement that the German revolutionaries of 1918 are said to have found something like six hundred suits of apparel belonging to their fugitive

[1]As regards play, see, for example, under 20 below.

ex-emperor. Leaving aside all exaggeration and recognising the ineptitude of fashion-makers, the advantage derived by a modern individual from his wardrobe is far-reaching. Life, where a diversity of seasons prevails, would be much less tolerable without a corresponding variety of garments. The development of clothing furnishes hence a further proof, if any were needed, of the reality and prodigiousness of progress.

14. EDUCATION.—Education is one of the arts to be found in embryo among the higher animals. Children were therefore probably taught something in some fashion at the very bend where pre-man turned man-wards. The initiation ceremonies among so many tribes indicate that the education of youth was the grave concern of early man. Moreover, the prevalence of many customs made it incumbent on the young to acquire the substance of the civilisation wherein they were born and reared. Legends, tales, economic and religious demands, further contributed to the education of youth.

With the growth of knowledge, education of a more systematic character became advisable, if not indispensable. Desultory instruction by ill-prepared teachers accordingly ensued. Perhaps only the Catechism was taught (in Christian lands); perhaps a smattering of reading and writing was required; and, in any case, the number of children instructed was almost negligible. Only slowly was systematic provision made for general education and for the training of teachers. Rousseau, in his *Emile*, dealt with principles rather than with practice and scarcely had in view the common school. Even Pestalozzi, inspired by Rousseau, found the social conditions so unfavourable that he dare not dream of children in the mass being educated otherwise than by their already overburdened mothers. The public primary school, however, soon materialised. Yet, save for a few countries, illiteracy is still alarmingly prevalent. For a century, nevertheless, the determination has been growing among civilised peoples to provide their young with an adequate education and the intricate problems of educational goal, matter, and method, of the training of teachers, of the formation of the moral character of the coming generation, and of inspiring that generation with the love of truth, health, and beauty, have increasingly engrossed attention.

The education of the socially and economically favoured has been naturally attended with greater success, both because of the home atmosphere and, above all, because of the larger sums available for education. The training provided in this instance is more liberal, more thorough, and extends over a considerably longer period. In not a few of these cases the child passes from the secondary or public school to the university, where he finds the amplest opportunities of assimilating the culture of his time.

Confused as the problem of education is because of economic factors, we can see nevertheless that mankind has travelled a long way since the period when man was speechless to this hour when we are looking forward to a near day when every child of every land will receive an excellent education and when the teachers' colleges will be truly worthy of their unrivalled mission. At all events, comparatively solid progress is noticeable in this direction.[1]

15. FOOD.—Food is a matter of paramount concern for the individual's physical constitution and a considerable part of most men's waking time is absorbed accordingly in providing directly or indirectly sustenance for themselves and their families. However, we have seen that man is now mainly dependent for his food on domesticated animals and cultivated plants and that most of his food undergoes a radical transformation through cooking. The simple arts of hunting, fishing, and root and fruit collecting have been largely superseded and chance provisioning has been practically eliminated. Man can now nourish an immensely larger population and this more adequately and more satisfactorily, specially aided by the rearing of livestock, and by countries exchanging produce.

In relation to food, then, there has been progress on a grand scale.

16. CARE OF HEALTH.—The medicine-man is a well-known institution among primitive communities and he is the outcome of man's anxiety to grapple with injuries and illnesses. The medical man is likewise a symbol of progress in matters of health. Sanitation is cutting the ground underneath many maladies and most epidemics; hygiene is steeling the body against the insidious attacks of the enemies of health and sanity; minute diagnoses and observations, physiological and psychological, have suggested remedies for certain grave physical and mental disorders; anæsthetics have almost obliterated the factor of pain and permitted thus of effective and extensive operations; surgery has performed marvels; antiseptics and aseptics have proved a great blessing; and the discovery that micro-organisms are responsible for epidemics, will eventually furnish man with a weapon to extirpate children's and other infectious diseases altogether.[2]

Progress, in what one may broadly denominate hygiene, may thus be said to have been gigantic.

17. MORALITY.—Our first proposition is that we are more humane than were our forefathers. *Corporal punishment* has been abolished in

[1] Frankly, the progress made thus far in education is disappointing and the immediate future promises only flimsy theories. See, for example, C. W. Kimmins, "Modern Movements in Education," in *British Association Report for 1929.*

[2] "At present by the hormone 'insulin' thd deadly disease diabetes can be kept indefinitely in check; by thyroid extract goitre is cured; by vitamin D rickets; by vitamin B beri-beri; by vitamin C scurvy." (Ronald C. Macfie, *Metanthropos,* London, 1928, pp. 87-88.)

the schools of several countries and in the school systems of most civilised countries it is now strongly discouraged. In the home, chastisement is being speedily reduced. Apprentices no longer suffer this brutal indignity and journeymen and domestic servants would become incredulous when informed that their forerunners did not escape it. The law has diminished corporal punishment to a point almost and lunatics are no longer subjected to savage treatment. Wives are also now fortunate in living in a humaner age. Moreover, cruelty towards animals is now widely deprecated and has become a punishable offence. The barbarous sports, so prevalent a century ago, have one by one been banished until hardly any can be said to survive and recourse to fisticuffs or weapons for the purpose of settling personal differences is dying out.

Protection has developed. Children have been either excluded from factories or else have only been permitted to work there from a certain age and under conditions which are intended to safeguard their health, their education, and their freedom. Women have been similarly protected. And various Acts have been passed protecting men and women from unhealthy or dangerous occupations or conditions.[1]

In a word, respect for the individual as such, a resentment of harshness towards any one or anything, has become a trait of our age.

The above is specially applicable to the law. Three centuries ago the penalties were so severe that we can only with difficulty conceive how our forefathers could tolerate them.

It is much the same in matters of *warfare*. Even when one reads the Old Testament, one is joyously grateful at the amelioration engendered by time. To kill all the children, women, and old men of a community appeared to be a settled policy and hideous mutilations and torture were also not uncommon. The laws of war were even more callous and cruel than the laws of peace. Utter devastation and servitude were the lot of the conquered land and, in still earlier stages, cannibalism was a widespread practice. On the other hand, the wars of the last century or so have been fought in a comparatively chivalrous and humane manner unknown to antiquity. (See Chapter XI.)

Again. *Self-control* has developed to a remarkable extent. Gluttony is no longer the general vice it used to be. Drunkenness is censured by well-nigh all classes. Passionateness in joy, grief, or anger is almost invariably rebuked and has largely ceased to exist. And dissoluteness has lost its social charm : it has become a mole, an underground animal.

[1] In this connection see the series of Draft Conventions agreed to by the International Labour Conference held at Washington in 1919 and supplemented by those of later Conferences. Information on the subject may be obtained by writing to the International Labour Office, Geneva, Switzerland, which is quietly revolutionising the conditions of labour the world over.

Once more. Respect for the individual and *a sense of human equality and equity* have been growing. Cannibalism has almost completely disappeared; slavery has been well-nigh universally abolished and serfdom has shared its fate; the worker is largely protected by numerous legal enactments and to some extent insured against most untoward contingencies; equality before the law has been won to no small extent; every adult—man and woman—is having, very widely, a voice in the management of the affairs of his or her district and country; and the demand that all should have an adequate income and adequate opportunities to live a life in accordance with a tolerably high moral, intellectual, hygienic, and æsthetic standard, is fast assuming a categorical form.

In a word, the moral progress of the race has been far from insignificant.[1]

18. RELIGION.—In proto-man religious emotions probably did not exist, if we exclude the feeling of anxious perplexity which overcomes dogs and other animals when something wholly contrary to their experience occurs. Magic, animism, and fetish worship, however, gradually develop. Men's heroes become, later, their gods and the sky and the under-world become eventually peopled with them. These gods invariably reflect the time spirit and we are therefore not surprised when we read that they required at one time human sacrifices and subsequently animal and vegetable offerings. By a complicated process of social development these gods gradually assume the form of a hierarchy, and ultimately they coalesce into a single deity. This deity, again, continues to evolve in the minds of men until, from an arbitrary power, with dubious ambitions reflecting in many respects the tyrants of old, it becomes identified with the Ideal of the good, the true, and the beautiful.

We note therefore that man's religious development synchronised with his general development and that consequently the highest religions excel the lowliest approximately as the highest culture, at least on the ethical side, surpasses the lowliest.

19. SCIENCE.—Man's ignorance was abysmal in primitive times and it was only after struggling through a forest of grave errors that he caught glimpses of the commanding verities of existence. The altitude we have reached to-day in connection with science is so awe-inspiring that we can hardly believe that man at one time was as

[1] "In the relations between individuals, violence has been superseded by law; in the relations between the sexes, the rule of the stronger has yielded to respect for the weaker; in the relations between the classes, imposed labour has been replaced by free collaboration; and in the relations between peoples, war will, one day, be ousted by friendly emulation." (Paul Oltramare, *Vivre*, Geneva, 1919, p. 320.) There is also an economic aspect to moral neglect. According to M. F. Bower (*The Economic Waste of Sin*, 1924), sin costs the United States 13.000 million dollars a year.

The moral aspects of progress are discussed in some detail in Chapters X. and XI.

scienceless as he was clothesless. The history of mathematics and astronomy, of physics and chemistry, of botany and zoology, of geology and geography, and of many other sciences, illustrates the amazing progress realised in the domain of science.

20. ART.—Art is as old almost as mankind and from the first, it seems, has been pursued with enthusiasm. It started to flourish in the later paleolithic ages. Many of its lines culminated in ancient Greece—the drama, eloquence, sculpture, and architecture. In some of these directions the modern world has perhaps equalled, although scarcely surpassed, classic achievements. The last thousand years have secured their highest triumphs in the spheres of painting and music. From mere caricatures of reality in the Dark Ages we rose to the long period of, more particularly, Italian mastery in painting. However, even during that period outward nature was conceived in an infantile manner. The earlier painters displayed a crude conception of rocks, animals, and plants, and until a much later date one would have imagined from the pictures painted that perpetual summer reigned in Europe. In reality, not until the nineteenth century were there successful attempts to depict nature in all her variety and seasons and not until nearly the end of that century were seascapes painted which reminded one of the power and majesty of the sea. Even now sunrise and sunset are only tentatively treated by painters.

Strangely enough, the idea that there is progress in art is widely and indignantly repudiated, when no realm of human endeavour bears higher testimony to its reality. Instead of artistic geniuses capriciously branching out in every direction and their productions being decisively unrelated—as the genius theory postulates—the very contrary is proved by the facts. To the cultivated layman this is conspicuously manifest in the history of modern painting and accordingly we shall elaborate this point.

In its earliest, post-classic, phases—to about the eleventh century—miserable caricatures of faces and figures, such as young children might perpetrate, are alone discoverable. Quite gradually, almost generation by generation, there is noticeable improvement until we reach the earlier and the later primitives. The representation of the human form, the human features, the human drapery, and the human surroundings is in this manner slowly perfected. Virility, vivacity, and verisimilitude to life are still, however, absent and the scenes presented are childish, commonplace, melodramatic, and lacking in discrimination and refinement. The landscapes are also humorously unrealistic and, even so, practically all sheepishly embody certain prevailing technical rules, such as the types of sky and the colour of distant hills. By the close of the fifteenth century and the opening of the sixteenth, the old style comes near to reaching its zenith and begins to shed its artificiality. At this period we notice how studiously Raphael imitates his older and younger contemporaries in rendering the human form, features, drapery, movements, and surroundings, and in his colours, colour schemes, distances, light and shade effects, composition, landscapes, and themes. An example will illustrate the progress made by Raphael's time. Take, for instance, Perugino's St. Sebastian, at the Louvre in Paris. It is not just any St. Sebastian. The figure is marvellously drawn compared to the figures of the primitives. The flesh-tint is singularly warm and life-like and the entire body is faithfully and vigorously rendered. The perspective, the colours, the colour scheme, the light effects, the particulars, and the total composition are virtually flawless and a single conception dominates and pervades the whole. Furthermore, here there is nothing childish or commonplace, melodramatic or coarse, harrowing or repulsive. An ideal hovers before the painter and, accordingly, we have presented to us an ideal physique, an ideal posture, ideal features, ideal feelings, ideal surroundings, and an ideal atmosphere.

As the generations pass, the pictorial treatment of subjects becomes decidedly natural. However, the painter skilfully guards himself from seeking to accomplish what is beyond the then state of development in painting. Thus, for instance, the sunsets—as in Titian and much later—are of the most unpretentious character ; only in Rubens' " Rainbow landscape " do we begin to have cultivated fields and agricultural activities depicted ; and spring and autumn, and in the real sense winter, have to bide for the later nineteenth century to find themselves translated onto the canvas. Landscapes generally, including representations of trees, flowers, and animals, continue to press nearer to nature, up to Constable and beyond. The boisterous sea, after many brilliant but futile pictorial vagaries—such as those of Turner—comes to be painted. And, lastly, more successful ventures at painting dawn, sunset, sky and clouds generally, and mountains have recently begun to be made. The best modern paintings of natural scenery are thus leagues in advance of the first efforts of the earlier pre-Raphaelites and, as time proceeds, the distance is bound to become more accentuated. Yet, through it all, there has been and is slow development along a definite line, from complete bondage and imperfection to complete emancipation and perfection.[1] So continuous, indeed, is the progress made that it is difficult to detect any dividing lines, any indubitable proofs of independent progress by any one individual. If, therefore, a Giotto, a Raphael, a Titian, a Rembrandt, a Reynolds, or a Watts, paint as they do, their cultural acquisitions proffer the paramount explanation ; or, expressed more startlingly, these artists, apart from the higher cultural bequests they utilised, would not have produced better or different pictures than, say, those of the painters or mosaic workers of the ninth century. Besides, the absence of notable painters in certain countries (as in Scandinavia) or at certain epochs (as in England up to the eighteenth century when there was a meteoric shower of painters) or their abundance in certain countries (as in Italy in the sixteenth and Holland in the seventeenth century), point to the same conclusion. Accordingly, we may well claim that there is progress in art and that without taking advantage of this progress, the artist would be incapable of producing any work of even the humblest merit.

A passage in C. J. Holmes, *Old Masters and Modern Art* (vol. 1, London, 1923, p. 218), stresses the historical point of view. He writes : " The advantage of studying Art in connexion with History is that the subject is presented to us in a natural sequence. We start at the very beginning, and go forward step by step with those who have struggled with the various difficulties of the craft, and have mastered them one by one. So when we study the Italian school we can watch the different stages by which the conquest over Form was attained. We see it at first attaining monumental dignity with Masaccio and Piero della Francesca. Next we see it acquiring dynamic energy with Signorelli, Pollaiuolo, and Michelangelo. Then, and not until then, we can appreciate the additions of tenderness, grace and substance made by Leonardo and Raphael, by Correggio and Titian, and its employment by great and audacious designers like Tintoret, Veronese and Tiepolo."

We shall deal in Appendix A. with progress in music. Beethoven's symphonies and the works of Bach, of Mozart, and of a host of modern composers, to judge by the rudimentary music of present-day primitive communities, surpass almost infinitely in beauty and dignity the initial efforts of primitive man.

Prehistoric art also illustrates the reality of progress. As Sir Arthur Evans writes : " When we turn to the most striking features

[1]This should not be construed as signifying that relative perfection has not been attained at *any* point. On the contrary, genuine progress means adding to the number of perfections already reached. Thus portrait painting (the head more particularly), the drawing of the human figure, colour schemes and light and shade effects, the representation of force and movement, joy and grief, ordinary summer landscapes, and much else, may be said to have passed out of the shadow and the mist of inevitable imperfections and, conceivably, after a few more generations of steady advance, it will be possible to fix by pigments Nature in her happiest and sublimest moods. Perhaps thereafter the deep appreciation of exquisite paintings and the discovery of masterly methods of painting beautifully, will begin to be developed. After which . . . However, within the limits of possible achievement, there is the duty of doing full justice to the progress already made and the choice and treatment of an arresting theme.

of this whole cultural phase, the primeval arts of sculpture, engraving, and painting, we see a gradual upgrowth and unbroken tradition. From mere outline figures and simple two-legged profiles of animals we are led on step by step to the full freedom of the Magdalenian artists. From isolated or disconnected subjects we watch the advance to large compositions." ("New Archæological Lights on the Origin of Civilisation in Europe," in *British Association Report for 1916*, pp. 11-12.)

Art generally has thus advanced almost as far beyond the achievements of earliest man as science has.[1]

21. FAMILY.—The family forms an association whose history dates back to the dawn of man's existence. Its importance, as may be inferred from this, is elemental: it preserves the life and largely transmits the culture of the race. That it has participated in the general progress might be illustrated by offering an account of the life and organisation of a primitive and a modern family. With such an account we must dispense here.

22. CIVIL AND CIVIC ASSOCIATIONS.—The progress in the growth of civil organisations has been as marked as in that of civic ones. From no organisation at all, countless organisations have developed serving multifarious ends. From associations in particular workshops we pass to local associations of a particular trade. These subsequently ramify into ever larger bodies until national unions, and finally international federations, are formed. This process is continued with allied trades or professions until gradually, as we shall see in the next Chapter, associations are created which combine all trades, industries, and professions. Lastly, an association may be formed (one, in fact, already exists at Brussels, the Union of International Associations) which endeavours to federate all international associations of whatever category. Generally speaking, the progress here, save as to details and firm rooting, is almost as complete as the human mind can conceive. In the economic domain we also pass, roughly, from the independent worker to the single employer, the firm of employers, the trading company, the ever-expanding trust, socialised trades, and the socialisation of industry and commerce generally. And on the political side, there are some indications, after the recent fall of the three European despotisms, that a universal State association, represented at the present moment by the League of Nations, is likely to be realised in the comparatively near future.

23. GOVERNMENT.—This brings us to Governments and the transformations they have undergone. In primeval days what may be regarded as government did not exist. As the social groups grew

[1]On an æsthetic defence of ancient Egyptian art, see the profusely illustrated volume by Arthur Weigall, *Ancient Egyptian Works of Art*, London, 1924.

and developed, collective decisions had to be taken sometimes. Temporary chiefs and headmen came into being and these developed along the lines well known from history. Government itself became more complicated, until now when a modern State has perhaps twenty departments, including many of a productive character, such as Education, Fine Arts, Post, Health, Public Works, Labour, Trade, Mines, Agriculture, Fisheries, and the like. On the personal side the tendency has been to pass from temporary chief, through arbitrary despot, to legislatures and presidents elected by adult suffrage. From the viewpoint of progress towards a world organisation, man has thus scaled to dizzy heights from very modest levels.

24. LAW.—Vengeance and the vendetta constitute the earliest forms of retributive justice and, like all early forms, they endured for ages, and still survive here and there. The community then tentatively undertook to regulate the relation of the criminal to the subject of the crime. An eye for an eye and a tooth for a tooth, was no doubt the widely accepted principle of primitive law. The ascertaining of the facts was similarly left to the ruler sitting in judgment and depended on shrewd common sense and a desire to arrive at an unbiased verdict. Gradually, codes were formulated, such as those embodied in the Egyptian *Book of the Dead,* the Babylonian *Hammurabi Code,* the Indian *Dharma-sastras,* the *Old Testament,* and the *Koran.* The justice meted out was, however, not only rough and ready, but allowed more and more for the growing social distinctions—slaves, serfs, freemen, priests, soldiers, the aristocracy, and the rulers. The Stoics sought to systematise and humanise the law and were remarkably successful in this. With countries becoming densely populated, professional judges were needed and appointed and the legal machinery became highly intricate.

Simultaneously with the development of the modern police court and court of law, the humanisation of the law proceeded. Reflecting the stage of social development, the law became progressively less harsh and less discriminative until, in theory and in general practice, there was (as a rule) one law—in several countries at least—for the rich and the poor and the authorities frequently aimed at reforming the criminal by well-considered and humane methods and laboured to remove the rank social conditions which bred crime.

The blood feud and the torture chamber are almost infinitely removed from the best law of to-day. Mankind may well heave a sigh of relief when it meditates on the atrocities and indignities many of its members escape because of the gigantic progress incarnated in modern law.

CONCLUSION.—After the foregoing historical survey of the principal departments of life and mind, no alternative is left but to regard the

reality and the stupendousness of progress as a scientifically established fact.[1] There remains, however, first and foremost, the supreme and urgent task of extending the benefits of progress to populations and to peoples as a whole.

[1] "If we put the question, 'What is the actual result of historic progress?' the answer is in outline sufficiently clear. Progress has consisted in the realisation of the conditions of full social cooperation and in the extension of the rational control of life. But the whole of the advance actually realised now assumes the aspect of a merely preparatory stage. For it culminates, as its lines converge, not in a sense of completeness but in the formation of a purpose—the purpose of carrying forward consciously and unswervingly that which has gone on in unconscious, broken, and halting fashion, the harmonious development of the social life of mankind." (L. T. Hobhouse, *Social Evolution and Political Theory*, New York, 1911, p. 156.) "The positive result that emerges is that . . . the advance is real, and what is more, it is of a kind to prove the possibility of a far more substantial and unchallengeable advance in the future." (p. 161.)

The new tendency, probably a passing one, in the field of the human sciences is to discourage all generalising and to dwell on individual and group differences. Thus the idea of *general* progress towards a single end is discarded in favour of a conception of progress, neither general in extent nor single in intent. As Marett expresses this: "In the sphere of social science, it might be well to look less for lines of progress converging towards a universal civilisation, and instead to face the fact that the actual world in its civilised no less than its uncivilised aspect is what William James would call a 'multiverse' of experimental forms of culture, none stable, none truly dominant and final, but variously directed towards a seeming good that has as many facets as there are individual lives." (In *Sociological Review*, January 1923, p. 58.)

The partial truth contained in the "multiverse" view should not be overlooked, namely that general progress is a mighty river whose waters are brought, and should be brought, by innumerable streams coming from every point of the earth's compass.

CHAPTER IXA.

THE LAW OF LIMITLESS PROGRESS.
(Continued.)

3. *The Calculable Future.*[1]

IN the last Section our interest centred in demonstrating the reality and stupendousness of recorded progress. This attitude involved severe self-restraint, seeing there was some danger that we might be carried away by our theme and tacitly assert or suggest that the achievements of the past and present leave nothing to be desired.

A moment's reflection will rectify any finalistic conclusions we might have been tempted to draw. The stream of progress comprises past, present, and future and no valid reason exists for assuming that the goal of progress has been already somehow reached or decidedly approached. Rather should we postulate that just as the civilisation of to-day almost infinitely transcends the civilisation of eolithic times, so the civilisation of the remote future will almost infinitely surpass the civilisation of to-day.

Before proceeding, however, we may nevertheless consider the objection that by now man has probably achieved all that he possibly could achieve and that therefore progress has reached its natural term. This objection may be shown to possess little force.[2] At the present moment intensive progress is taking place along a number of signally important lines. Beginning with politics, we note a general movement towards the consolidation of democracy, including the universalising of the suffrage by the recognition of women as voters and legislators. In the sphere of economics two master ideas are commencing to affect all issues—those of the scientific management of industry and commerce and of workers' co-control in all matters affecting him inside and outside his place of work, to which should be added the profoundly important social insurance movement which robs poverty of half its terrors, the fast growing conviction among employers that

[1] For a forecast of the future, see also the last chapter in René Worms' *Philosophie des Sciences Sociales*, vol. 3, 1907, and Charles Richet, in an article on Civilisation in the *Revue des deux mondes*, 15th March, 1923.

[2] "After observing how the processes that have brought things to their present stage are still going on, not with a decreasing rapidity indicating approach to cessation, but with an increasing rapidity that implies long continuance and immense transformations; there follows the conviction that the remote future has in store forms of social life higher than any we have imagined." (Herbert Spencer, *The Study of Sociology*, London, 1874, pp. 399-400.)

good wages and good working conditions further their own interests, and the radical potentialities of the world-wide birth-control movement. In science we seem to be on the eve of the transformation of at least some of the chemical elements and perhaps also of a closer understanding of the physical Universe through Einstein's theories and through a more intimate comprehension of atomic structure and of the living cell. In religion a peaceful and universal revolution of a most far-reaching character is enacting itself. As regards transportation, the perfecting of the airplane and airship, as well as the superseding of horse-drawn conveyances by motor vehicles, are rapidly proceeding. Again, the conversion on a gigantic scale of water power into electrical power is about to revolutionise to no small extent in many countries the form of energy employed by factories and more particularly by railways, whilst the moral and other potentialities of "wireless" are such as to suggest the development of a largely new world in the relatively near future. The increasing utilisation in agriculture of machinery and of expert advice is also a symptom of a significant social trend. The discovery of a series of vitamins bids fair to revolutionise preventive medicine. Internationally both the League of Nations and its Labour Office are active in furthering peaceful collaboration between States in countless matters. There is noticeable, too, a world trend towards a universal civilisation. Finally, the conviction has ripened that differences between nations shall no longer be settled by the arbitrament of fratricidal and suicidal war. Nor should we forget the tell-tale implication of the existence of literally hundreds of reform associations.

Progress has manifestly not yet reached its natural end. What will be revealed to the remote future, it would be futile to surmise. The comparatively near future, however, may be anticipated to some extent by a study of the trend in history. We may therefore attempt to approach deductively this limited problem. (See also Chapter VII. under Historical Implications.)

Centuries of linguistic studies have laid bare the inwardness of language. The time may therefore soon arrive when the recasting of language in a scientific mould is undertaken in earnest by competent authorities. What a French Commission at the time of the Great Revolution attempted and achieved in regard to weights and measures, some scientific commission of an international character will attempt and achieve in respect of the far more important subject of language. In its proposals the latter Commission will be as drastic and thorough as the former, all compromises being rejected, save for æsthetic considerations. The letters, phonetically arranged, will probably each have their scientific and mathematical value and the use of the language will compel accurate thinking and fix in the mind the knowledge of the main facts of existence. This language will be as different from

and as superior to extant languages, as the metric system is different from and superior to the old empirical systems of measurement. Like the metric system, also, it will be exceedingly simple. Our distant descendants will marvel how we could bear to live in the mental and moral jungle of present-day "natural" languages.[1]

The problem of future transport has for us one interesting aspect besides that of the means of communication being scientifically transformed in the direction of adequately meeting local, national, and international requirements. Granted the development of reliable and suitable toy-sized and wireless air mechanisms, and also the wireless transmission of energy, it should become possible for the individual to rival birds in ease, speed, and grace of flight and, at all events, for commodities and passengers to be transported by air conveyances at the rate of perhaps three hundred miles an hour.

With the prevalence of a universal tongue and of swift communications, the consolidation of mankind and the rapidity of progress will be more than measurably accelerated.

Buildings and furniture, implements and processes, will doubtless continue to be improved as heretofore.

The future of domesticated animals, from the mere point of utility, is difficult to forecast with any degree of probability. Cultivated plants have unquestionably an intensive future and are likely to become as superior to their kindred of to-day as the scientific language of to-morrow will be to the languages of to-day. It is also intolerable to think that so much space should be occupied with arable and pasture land and that the produce of that land should be at the mercy of the wayward elements. Present-day agriculture will appear to our remote posterity as a grotesque dream. For horticulture and, more especially, frugiculture, a brilliant future may be prophesied. That synthetic foods will supersede natural foods to a certain extent, it would be difficult to doubt.

A great future is unquestionably in store for mankind in the exploitation of the forces of nature. Science will, by its discoveries in this direction—including at least the full utilisation of wind, tide, and streams—practically achieve for posterity what the dreamers of the Middle Ages anticipated from the discovery of perpetual motion. Inexpensive power for lighting, heating, cooking, and industry, there will be in abundance and electric accumulation and wireless transmission will incomputably simplify the problem of its utilisation.

The Society of Nations, with its European, American, and other Continental branches, and with its Parliament, Courts of Justice, and Administration, will be a solid reality and civil organisation—local,

[1] A more extended study of this problem will be found in the author's *A New System of Scientific Procedure*, London, 1921, pp. 384-391. On the problem of an international and scientifically conceived alphabet, see the author's more recent *Foundations for a Scientific Longhand*, London, 1929.

national, and international—will be complete. Each individual will readily learn from all and all from each and cooperation in industry, commerce, reform, and in other activities will be scientific, cordial, and boundless.

Dress reform will favour health, comfort, variety, and beauty in body wear.

In elementary and secondary education, as already intimated, there is at present the widest scope for reform. Most probably in the distant but calculable future parents and instructors will successfully inculcate a profound love of the good, the true, the healthful, and the fair; effectively convey to the young the methods whereby they may gratify this love; and do their utmost everywhere to bring their charges into immediate and living contact with all that is best in literature, art, science, nature, institutions, social practices, and social life, laying the stress at first on reading interestingly written and richly illustrated books of value. Only the combined enthusiasm for head work, heart work, and hand work can create the man and woman of genuine culture. Needless to state that the home training of the future, owing to its being rooted in science, will greatly excel that commonly obtaining to-day and that vocations, ardently embraced, will be acquired and pursued according to the precepts of scientific management.

Preventive medicine has before it promising times. Germinal, deficiency, and redundancy diseases will be eradicated and thus our children, ourselves, our domesticated animals, and our cultivated plants will be saved from much sickness and from premature enfeeblement and extinction. Other maladies, arising from improper feeding, drinking, ventilation, cleansing, and exercising, and from mental and moral laxity,—that is, most other maladies,—will have ceased to exist. Sanitation will continue its triumphal march and the vexing problems of noise and proper ventilation will have been satisfactorily resolved. Scientific exercises will help to make the body strong, supple, and beautiful and quicken and sharpen the senses as well as strengthen the character and deepen the love of work. Preventive psychotherapy will make us masters in our own bodily and mental households, incidentally putting an end to anti-individual and anti-social sophistications. The joy of living will be a universal reality, since a superior mental hygiene will ensure a radiant mind in a radiant body. The physician will be well able to grapple with the ills that flesh, mind, and heart are heir to, even in a truly civilised world. Most men and women will live to be hale and hearty centenarians.[1]

A more effective control of nature and of self and a scientifically conducted social and economic organisation will permit of ample

[1] "It is more than possible that medical science will be able by a single vaccine or serum to render a man immune all his life to all germ diseases." (Robert C. Macfie, *Metanthropos*, London, 1928, p. 87.)

leisure for all. Hence recreation will play in the future a more significant part than in the past. The muses will have the whole world as their votaries and the zestful recreational life of ancient Greece will be resumed on a loftier and more democratic plane. Joy and art will as surely distinguish the future as science and plenty. Moreover, the inner life which, because of its social inaccessibility, has tended to caprice and chaos, will be as intelligently organised as man's overt life. The individual will then be truly his own ruler, instead of being, as now, virtually the slave of momentary desires and of casually acquired habits of thought and action.

On the religious plane we shall most probably return to the formerly prevalent conviction of the momentousness and intense reality of religion. Our entire narrower and wider life will be saturated by the specio-psychic view and its critical bearing on all human issues. The relation of this to the human past, present, and future, and to life as a whole and to the Universe, will furnish a fountain of emotion which will express itself in private and public practices and rites psychologically akin to those of the historic religions generally.

Perhaps the moral life will profit most by the advance of mankind. Harshness and indifference to others' fate will have been definitely supplanted by gentleness and altruistic solicitude in all relations of life. Control of one's instincts, appetites, feelings, habits, and ideas, in the service of defensible ends of a social and individual character, will be practically complete and easy, as it is already for not a few to-day. A sense of oneness with their fellows near and far in space and time will pervade all individuals and social groups. This, and much more, a true science of ethics and a moral education based thereon, will accomplish, not without the assistance however of radically improved social conditions.[1]

The recognition of the specio-psychic nature of man will issue in a world-embracing political and economic order of an unquestionably democratic and cooperative character. Each individual will feel that all have about the same capacity for, and right to, the fullest life. Strife between races, nations, and classes will have lost its alleged justification and will be only comprehensible in retrospect. Especially will the supersession of our present unorganised system of economics by a coordinated communal, national, and international system of scientific organisation (ensuring a high health-and-decency standard for all), permit the good in man to rise to the surface.

[1] "The scientific mastery of the facts of man's own nature and the laws which control society linger far behind the corresponding insight into the nature of the processes of the physical world. But surely it is only a matter of time when these social sciences, so-called, will also have perfected a technique enabling man to secure mastery over himself and his social relations comparable with that which has begun in the control of physical nature." (James R. Angell, "The Evolution of Intelligence," in G. A. Baitsell, *The Evolution of Man*, New Haven, 1922, pp. 123-124.)

The calculable future will see *our* scientific problems solved. The physical constitution of what we now call matter will be understood ; the essential nature of the several elements and the method of their transmutation will have been discovered ; the stars and planets will have been brought much nearer ; life and the evolutionary process will have ceased to be a riddle ; and meteorological conditions will be under man's control. On the active side this will mean a prodigious extension of man's power over nature. Manifestly, the individual sciences will record proportionately vast strides, as well as the applied arts dependent on them. Both the telescopic and the microscopic worlds will have been conspicuously enlarged and the common facts of life transfigured through being sympathetically grasped. The scientific organisation of all things human, including the understanding, will confer a priceless boon on humanity.

That art will penetrate and permeate every realm of human thought, sentiment, and activity and be a source of boundless pleasure and refinement, we may confidently anticipate.

The family will be everywhere that centre of noble living which it is here and there to-day, whilst civic and civil associations will realise to the full the universalising and federating tendencies which force themselves on our attention to-day. Home, town, country, and world State will share man's devoted allegiance.

A society of socio-democratically and wisely governed nations will be a fact, whilst war and selfish competition will have joined cannibalism, slavery, serfdom, religious intolerance, and the subjection of races, peoples, classes, and women, in the limbo of the past. Government will mainly organise the nation's activities, rather than specialise, as heretofore, on holding down a dissatisfied multitude. With a high moral plane reached, with a true appraisement of the illusory nature of thoughtless self-indulgence, and with a just economic order, law will be radically transformed in character, discovering and removing the causes of crime and only secondarily dealing in a humane way with offenders.

Nor should we omit to allow implicitly in our forecast for innumerable future developments which are hidden from us to-day.

Finally, taking a broad survey, we may say that *the critical difference between the present and the calculable future will be that* ALL *individuals and peoples will enjoy the best of the pan-human legacy,* instead of only the few as at present.

" Our hopes for the future condition of the human race may be reduced to these three important points : the removal of existing inequalities between nations, the removal of existing inequalities within nations, and the true perfecting of the individual." (Condorcet, *Esquisse d'un tableau historique des progrès de l'esprit humain,* Paris, edition 1822, p. 256.) Chapter XI. will deal with the last point. The above Section is conceived in the spirit of the closing chapter of Condorcet's book.

William Godwin (*Thoughts on Man,* London, 1831, p. 471) writes : " Human understanding and human virtue will hereafter accomplish such things as the heart of men has never yet been daring enough to conceive."

Here is a complementary view of the calculable future : " The more evolved society will have a wider range. Common life will extend farther, circle beyond circle. More numerous associations, duly coordinated with one another, will arise to satisfy through cooperation its clarified interests. Despotic control and arbitrary subjection will give place to an order based upon the common will. Force will become less effective and less important. The subject will be transformed into the citizen. Custom will no longer be, in the words of an ancient historian, ' the being of men.' Diversity will increase, corresponding to the liberation of individuality. The likeness of all men will be the basis of order while their differences will be suffered to express themselves, in so far as they are not clearly anti-social, and to contribute to the whole that unique element of worth which resides in free personality, the origin of all the permanent gains of civilisation." (R. M. Maciver, *The Elements of Social Science,* London, 1921, p. 124.)

As to the possibilities of the near future, H. G. Wells (*The Outline of History,* London, 1923, p. 588) writes in a sanguine spirit : " Only the spiritlessness of our present depression blinds us to the clear intimations of our reason that in the course of a few generations every little country town could be an Athens, every human being could be gentle in breeding and healthy in body and mind, the whole solid earth man's mine and its uttermost regions his playground."

An optimistic conception of the future is also expressed by Robert Briffault, in his *The Making of Humanity* (New York, 1919, p. 363): " Human evolution is probably as yet in a comparatively early stage. There is no ground for supposing that it will not attain to phases surpassing the present one as signally as that surpasses even the dimmest human beginnings. There is no reason why the standard of development of human faculties and qualities attained by a few individuals whom we call great, should not become the average of the race."

4. *The Goal of Progress.*

The base of man's mentality is so broad that we must postulate the possibility of a practically limitless advance in the aims and objects which are to satisfy him. Moreover, when we note how unpredictable has been man's progress from eolithic times to our day, it becomes evident that we cannot have the faintest inkling of the correspondingly remote future of the race. No final human order is thinkable and if it were thinkable, its constitution would be nevertheless as concealed from us as the constitution of our modern world was from eolithic man. Of the mankind of a million years hence we can only state tentatively that it will regard us as being as far removed from it culturally as eolithic man is from us. And what shall be said of the achievements and attainments of man ten million or a hundred million years hence ? A reverent silence is the only appropriate reply.

Some thinkers appear to reason : Granted that progress is a reality ; that man has risen from low to high ; that a time will come when knowledge, virtue, beauty, health, and happiness (in what would seem to our epoch as their most perfect form) will be universally diffused ; and that, in fact, for untold ages men will live in a practically beatific state—still, what boots this, if we are convinced " that all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the débris of a universe in ruins " ? (Bertrand Russell, *Mysticism and Logic, and Other Essays,* London, 1918, pp. 47-48.)

This view of what *may* happen millions of years from now[1] captivates not a few thinkers, to the extent of inducing them to believe that progress, with its magnificent achievements, is but a mocking mirage.

[1] "There is no obvious physical reason why, having once arrived, man should not continue to populate the earth for another ten billion years or so." (A. S. Eddington, *The Nature of the Physical World,* Cambridge, 1929, p. 178.)

One feels at a loss to understand why the remotest future should exercise such a blinding fascination. First, seeing our blank ignorance on this subject, modesty pleads that we should let the distant ages take care of their own problems. Secondly, what reasonable grounds have we for anticipating that millions of years hence men will not be equal to the task of meeting successfully any natural changes in the temperature of the earth? Simply to state that we, who live in the infancy of scientific development, would be helpless if suddenly faced by such a condition of the globe, is manifestly irrelevant. For aught we can state, those distant ages will be in a position to grapple lightheartedly with such problems.

Moreover, in view of the advances already made by science, and in the light of latter-day discussions relating to the transformation of the elements, the essential unity of the forces in nature, the unlocking of the energies of the atom, travel through the stratosphere, the entering into communication with Mars, and the visiting of the Moon, it appears immeasurably more probable than not that long before the dreaded catastrophe could be impending, man will have discovered ways of dealing with the apparently critical situation.

Instead therefore of a gloomy pessimism, the remote future suggests a cheery optimism—man transforming the earth or conquering other worlds. Words such as those we have quoted from Bertrand Russell, or prophecies like those of Dean Inge (*The Idea of Progress*, Oxford, 1920, p. 12) who states that "man and all his achievements will one day be obliterated like as a child's sand-castle when the next tide comes in," should therefore be regarded as expressions of overwrought solicitude rather than of sober reason.

5. *The Method of Progress.*[1]

We have defined the innate mental capacity of the specio-psychic unit as being approximately as superior to that of the higher ape as the latter's is to that of the average monkey. So low do we therefore rate the individual's native intelligence that we regard the variations to be found in man's innate mental powers as for all intents completely negligible when discussing the method of man's progress. What the individual is able to add to the common stock should be hence considered as microscopic in dimension, although none the less invaluable from the viewpoint of there being a measureless number of such increments.[2] If experience appears to belie this conclusion, it is mainly due to the modern educated individual operating with a vast pan-human treasure house of methods and facts and that, in addition, some individuals may be enabled not infrequently to devote many years to the study of a given topic. The glossing of these acquired cultural advantages may accordingly give rise to a distorted conception of the method of progress. Another virtually insuperable difficulty lies in the fact that we have commonly before us the bare *final* result of much learning and thinking, the exact method of progress being practically masked. For example, the author is responsible for a one-page leaflet the preparation of which, with the help of various

[1] Helvétius (*De l'homme*, vol. 1, London, 1773) rightly insists that "every new idea is a chance product" (p. 218). Continuing, he adds that alertness and preparedness are needed to recognise the value of what chance presents. These, moreover, presuppose eagerness or the "besoin de la gloire." And as to this eagerness: "All really normal persons are susceptible of experiencing the same degree of feeling. Their varying determination is always due to the influence exercised on them by the different positions in which they chance to be placed. Each man's general character (as Pascal observes) is but the result of the first habits which he contracted." (p. 228.)

[2] Compare the development of the adult elephant from a germ.

collaborators whose time is not counted, occupied in the aggregate perhaps two hundred and forty hours. And, beyond this, we should bear in mind that collective man is interested in progress but not in its method and that it is therefore the rule to ignore large stretches of strenuous efforts.

An intimate and unbiased study of any subject usually forces on us the above conclusion. Here is, for example, the case of the improvement of *fire arms*. "During his [General Pitt-Rivers'] investigations, conducted with a view to ascertaining the best methods whereby the service fire arms might be improved, at a time when the old Tower musket was being finally discarded, he was forcibly struck by the extremely gradual changes whereby improvements were effected. He observed that every noteworthy advancement in the efficiency, not only of the whole weapon, but also of every individual detail in its structure, was arrived at as a cumulative result of a succession of very slight modifications, each of which was but a trifling improvement upon the one immediately preceding it." (Henry Balfour, in his Introduction to General A. Lane-Fox Pitt-Rivers' *The Evolution of Culture*, Oxford, 1906, p. v.)

General Pitt-Rivers, in the above volume, provides us with a number of pertinent historical illustrations of the above theory. He shows, by living examples, how *navigation* probably had its genesis in the casual use made of floating tree trunks and how these were in time slightly adapted and skilfully employed for river travel. The occasional appearance of a more or less hollow tree suggested the idea of hollowing out trees for purposes of navigation : this constituted a long and complicated task. Finding the breadth of the trunk naturally very narrow, numerous methods were devised for increasing the breadth, *e.g.*, by softening the interior and then stretching it, and by other means. A plank was then added on one side to the same end and gradually, by the aid of systems of planks on both sides and by shaping conveniently the trunk, men sought to achieve all that could be attained by the agency of primitive means and a tree trunk. The further evolution of the ship, as outlined by General Pitt-Rivers, proceeded in the same slow and tentative way, mainly guided by existing means, opportunities, and analogies.

Again. This is how General Pitt-Rivers describes an instance of progress in the direction of *simplification*, of which our alphabet is the classical example. The matter under consideration is "a collection of designs, supposed to be tribal marks, which are drawn upon the paddle blades of the New Irelanders, a race of Papuan savages inhabiting an island on the north-east coast of New Guinea" (p. 41):—

"The first figure you will see clearly represents the head of a Papuan : the hair or wig is stuffed out, and the ears elongated by means of an ear ornament, after the manner of these people ; the eyes are represented by two black dots, and the red line of the nose spreads over the forehead. This is the most realistic figure of the series.

In the second figure the face is somewhat conventionalised : the line of the nose passes in a coil round the eyes ; there is a lozenge pattern on the forehead, representing probably a tattoo mark ; the body is represented sitting in full. In the third figure the man is represented sitting sideways, simply by lopping off an arm and a leg on one side. In the fourth figure the legs have disappeared. In the fifth figure the whole body has disappeared. In the sixth figure the nose has expanded at the base, and the sides of the face are made to conform to the line of the nose ; the elongated ears are there, but the ear ornament is gone : the nose in this figure is becoming the principal feature. In the seventh figure nothing but the nose is left : the sides of the face and mouth are gone ; the ears are drawn along the side of the nose ; the head is gone, but the lozenge pattern on the forehead still remains ; the coil round the eyes has also disappeared, and is replaced by a kind of leaf form, suggested by the upper lobe of the ear in the previous figures ; the eyes are brought down into the nose. In the eighth figure the ears are drawn at right angles to the nose. In the ninth figure the nose has expanded at the base ; all the rest is the same as in the last figure. In the tenth figure the lozenge pattern and the ears have disappeared, and a vestige of them only remains, in the form of five points ; the base of the nose is still further expanded into a half moon. In the last figure, nothing but a half moon remains." (pp. 41-42.)

Numerous series of facts of the foregoing order fortified General Pitt-Rivers in his conviction that the method of progress was unconscionably slow.[1]

His editor, the Curator of the famous Pitt-Rivers Museum, admirably expresses the view which our conception of the distinctive nature of man suggests. He writes regarding *the successive individual units of improvement* :—

" That the successive individual units of improvement, which when linked together form the chain of advancement, *are* exceedingly small is a fact which any one can prove for himself if he will study *in detail* the growth of a modern so-called ' invention.' One reason why we are apt to overlook the greater number of stages in the growth of still living arts is that we are not as a rule privileged to watch behind the scenes. Of the numberless slight modifications, each but a trifling advance upon the last, it is but comparatively few which ever meet the eye of the public, which only sees the more important stages ; those, that is to say, which present a sufficiently distinct advance upon that which has hitherto been in use to warrant their attracting attention, or, shall we say, having for a time a marketable value. The bulk of the links in the evolutionary chain disappear almost as soon as they are made, and are known to few, perhaps none, besides their inventors. Even where the history of some invention is recorded with the utmost care it is only the more prominent landmarks which receive notice ; the multitude of trifling variations which have led to them are not referred to, for, even if they be known, space forbids such elaborately detailed record. The smaller variations are, for the most part, utterly forgotten, their ephemeral existence and their slight individual influence upon the general progress

[1] In view of the above examples and those which follow, it is passing strange to read a sentence like this one : " The first flint axe, the first hut, the first canoe, were each a demonstration and a record of the knowledge acquired by some exceptional individual." (R. Austin Freeman, *Social Decay and Regeneration,* London, 1921, p. 9.) So Roland B. Dixon (*The Building of Cultures,* New York, 1928, p. 36) : " Not until some one man, observing it [glass], had seen its possibilities as a material from which to make beads or other ornaments, or with which the surface of pottery could be made lustrous and smooth, did the discovery of glass or glaze occur." A somewhat similar viewpoint is adopted by G. Elliot Smith, *The Evolution of Man,* London, 1924. Compare with this the admission of the well-known heroist, Gustave Le Bon, in his *Les lois psychologiques de l'évolution des peuples* (Paris, 1894, p. 145) that " if we study the genesis of great discoveries, we shall always find that they are the result of a long series of preparatory efforts ; the final invention crowns the rest."

W. F. Ogburn pertinently remarks : " Human nature with its interest in personalities, its hero-worshipping tendencies, its appreciation of leadership, is more interested in giving recognition of achievement to a human being than to some abstract conception of some social force. Besides, these social forces are not easily seen nor their nature readily known." (*Social Change,* New York, 1922, p. 345.)

being unrecorded at the time, and lost sight of almost at once. The immediately succeeding stage claims for the moment the attention, and it again in its turn becomes the stepping-stone upon which the next raises itself, and so on."[1] (pp. vii-viii.)

In the limited space at our disposal we can only offer a few illustrations of the method of progress.

We shall commence with the *history of the cell doctrine.* The unsuspecting reader is likely to find the truth simpler than it proves on closer examination. In an excellent manual such as Prof. J. Arthur Thomson's *The Science of Life* (London, 1899, p. 102), he may encounter a sentence like the following : "In 1838 Schleiden showed that plants were built up of cells and modifications of cells, and discovered the origin of the plant embryo to be a single cell or ovum. In the following year Schwann extended these two observations to animals, and thus the 'cell-theory' was formulated," and forthwith conclude that, in substance, we owe our views in respect of the nature of the living cell to these two scholars. If he did so, he would be grievously mistaken.

So far as originality is concerned, we find that Schleiden's and Schwann's time vibrated with the "original" idea. Tyson says that "'we must clearly recognise the fact that for some time prior to 1838 the cell had come to be quite universally recognised as a constantly recurring element in vegetable and animal tissues, though little importance was attached to it as an element of organisation, nor had its character been clearly determined.'" (W. A. Locy, *Biology and its Makers,* New York, 1915, p. 242.)

To view, however, Schwann's generalisation in its true perspective, we quote here from *Chambers's Encyclopædia* (edition 1923), a succinct statement summarising the earlier history of the cell theory :—

"In the latter half of the seventeenth century the simple microscope afforded to Malpighi and Leeuwenhoek, to Hooke and Grew, what was literally a vision of a new world. In applying their rough and simple instruments to the study of the structure of plants and animals they became pioneers in the investigation of the infinitely little. Leeuwenhoek (*Phil. Trans.*, 1674) seems to have been the first to observe, what are now so familiar, single-celled organisms. In the eighteenth century Swammerdam and others continued with much enthusiasm to describe the minute intricacies which their 'new eyes' revealed ; Fontana (1784) observed the kernel of the cell—the nucleus—and some of the elements of the tissues ; but the foundation of scientific histology was not laid until the appearance in 1801 of the *Anatomie Générale* of Bichat. . . .

"Early in the [nineteenth] century, however, an improvement in the appliances of observation furnished a fulcrum for a new advance. Fraunhofer discovered the principle of achromatic lenses ; these were combined into the compound microscope, and a new era began. 'Fibres' and 'globules,' 'laminæ,' 'nuclei,' and even 'cells' were described. In 1831 Robert Brown emphasized the normal presence of the nucleus discovered by Fontana, and made the first important advances in the study of the vegetable cell. Isolated discoveries, such as that of the nucleolus by Valentin (1836), occurred in rapid succession during those years. Dujardin in 1835 described the sarcode or living matter of the Protozoan Foraminifera and of some other cells, and thus emphasized, as Rösel von Rosenhof had done many years before (1755) in regard to the 'Proteus animalcule' or Amœba, the most important element to be considered in forming a true conception of the cell. The importance of his description,

[1] See also Henry Balfour's *The Evolution of Decorative Art,* London, 1893, and *The Natural History of the Musical Bow,* Oxford, 1899.

of which he was apparently himself unconscious, had for some time the same fate as that of his predecessor of almost a century before. Observations had in fact to accumulate before any generalisation became possible. The first definite steps towards a co-ordination of results was probably that of Johannes Müller, who in 1835 pointed out the resemblance between the cells of the vertebrate notochord and the elements observed in plants. The cellular nature of the epidermis and the presence of nuclei therein was next ascertained, and similar discoveries were made in regard to several other tissues. Up to 1838 there was in fact a period of research in which cells were observed rather than understood."

According to the well-informed Locy, Malpighi—in the seventeenth century—already "understood that the cells were separable 'utricles,' and that plant tissue was the result of their union." (*Op. cit.*, p. 240.) And Wolff, in 1759, according to the same author, "contended for the same method of development that was afterwards emphasised by Schleiden and Schwann." (*Ibid.*, p. 241.)

To the above we need only add the dramatic touch that the broad generalisation ripened in Schwann's mind when discussing cell problems with his fellow labourer, Schleiden, who had been eagerly canvassing the question of the cellular nature of plants. Schleiden "supposed that the new cell started as a small clear bubble on one side of the nucleus, and by continued expansion grew into the cell, the nucleus, or cytoblast, becoming encased in the cell-wall. All this was shown by Nägeli and other botanists to be wrong; yet, curiously enough, it was through the help of these false observations that Schwann arrived at his general conclusions." (*Ibid.*, p. 243.) "On another point of prime importance Schleiden was wrong: he regarded all new cell-formation as the formation of 'cells within cells,' as distinguished from cell-division, as we now know it to take place." (*Ibid.*, p. 248.)

As we have stated, the unwary reader, hearing that Schwann established the cell-theory in 1838, might infer that the term Cell had approximately the same meaning for Schwann as for us living in the second quarter of the twentieth century. The historian, however, leaves us in no doubt on the subject. "The form in which the cell-theory was given to the world by Schleiden and Schwann," Locy says, "was very imperfect, and contained fundamental errors. The founders of the theory attached too much importance to the cell-wall, and they described the cell as a hollow cavity bounded by walls that were formed around a nucleus. They were wrong as to the mode of the development of the cell, and as to its nature." (*Ibid.*, p. 250.) Schwann (*Mikroskopische Untersuchungen über die Uebereinstimmung in der Struktur und dem Wachsthum der Thiere und Pflanzen*, Berlin, 1839) defined cells as "small hollow bubbles having a peculiar structureless wall" (p. 204), in harmony with Schleiden's erroneous observations—a conception of a most primitive character. And the process of the formation of cells is thus sketched by Schwann: "First there is a structureless substance which lies within or between the already existing cells. In this substance, according to settled laws,

there are formed cells, and these develop themselves in diverse ways into the elementary parts of organisms." (*Ibid.*, p. 196.) What could be more unlike the process of cell-formation as described by recent cytologists? One might, in fact, sum up Schwann's contribution by stating that he brought into the focus what was more or less vaguely or clearly apprehended by botanists and zoologists of his day, namely that "a common principle of development underlies all elementary parts of organisms." (*Ibid.*, p. vi.) Schwann apparently knew nothing positive about cells beyond the general proposition that organisms are composed of minute component parts. He was acquainted with the cell as a unit of structure; but of "the cell as a unit of physiological activity, the cell as embracing all hereditary qualities within its substance, and the cell in the historical [and evolutionary] development of the organism" (Locy, p. 252), he was of necessity profoundly ignorant.

The truth is that, since the cell constituents are microscopically small, progress in ascertaining their nature was intimately bound up with progress in the perfecting of the microscope. For this reason Schwann could observe little and could therefore only report little, and in proportion as more and more minute features could be detected through improvements in the miscroscope, so our knowledge of the nature of the cell advanced. The observational difficulties encountered gave, however, rise to the evolution of two additional observational aids. Cells were killed by instantaneous processes in order that structurally unaltered sections might be fixed and at leisure examined under the microscope. Furthermore, staining was freely resorted to, rendering conspicuous and isolating certain structures and elements.

The advance in cytology since Schwann's day has been almost immeasurable. A fuller and ever fuller meaning has been given to the protoplasmic content of the cell. The nature and the functions of the nucleus have formed the subject of numerous studies, until now the most intricate processes of cell-division are known as regards many details. A new terminology has been found necessary to name the numerous distinct constituents hitherto observed and to describe the karyokinesis of the cell.

Many hundreds, perhaps many thousands, have laboured since Schwann to bring us to the point which we have reached in cytology, as comprehensive works such as those of Hertwig and Wilson well illustrate. But we are yet a long way, indeed, from having a true insight into the statics and dynamics of the cell. Volumes like those of Friedrich Czapek on *Chemical Phenomena in Life* (New York, 1911) and Benjamin Moore on *The Origin and Nature of Life* (London, 1913), amply illustrate our thesis that whilst almost thousands of discoveries are being made by regiments of indefatigable scholars, each contribution, measured by the final conception men will have of the cell,

is an ultra-microscopic one. Lest, however, the value of the several contributions be judged on their individual merit, we must again recall the fact that consecutive thought is conditioned by a pan-humanly developed language; that investigations possess value in proportion to the application of historically evolved scientific methods; that the existing general and special knowledge and instruments are of cardinal importance to the inquirer; and that the condition of society is of equally great moment. Only when these, and similar factors, are eliminated from our calculations, can we speak of the individual's strictly personal contribution.

The *history of the protoplasmic theory,* which is closely bound up with that of the cell-theory above analysed, repeats the features common to all important inventions and discoveries. A single passage from Locy summarises the growth of the protoplasmic theory, at least to the time when protoplasm came to be universally acknowledged as the physical basis of life.

"In 1835, before the announcement of the cell-theory, living matter had been observed by Dujardin. In lower animal forms he noticed a semi-fluid, jelly-like substance, which he designated sarcode, and which he described as being endowed with all the qualities of life. The same semi-fluid substance had previously caught the attention of some observers, but no one had as yet announced it as the actual living part of organisms. Schleiden had seen it and called it gum. Dujardin was far from appreciating the full importance of his discovery, and for a long time his description of sarcode remained separate; but in 1846 Hugo von Mohl, a botanist, observed a similar jelly-like substance in plants, which he called plant *schleim,* and to which he attached the name protoplasma.

"The scientific world was now in the position of recognising living substance, which had been announced as sarcode in lower animals, and as protoplasm in plants; but there was as yet no clear indication that these two substances were practically identical. Gradually there came stealing into the minds of observers the suspicion that the sarcode of the zoologists and the protoplasm of the botanists were one and the same thing. This proposition was definitely maintained by Cohn in 1850, though with him it was mainly theoretical, since his observations were not sufficiently extensive and accurate to support such a conclusion.

"Eleven years later, however, as the result of extended researches, Max Schultze promulgated, in 1861, the protoplasm doctrine, to the effect that the units of organisation consist of little masses of protoplasm surrounding a nucleus, and that this protoplasm, or living substance, is practically identical in both plants and animals." (*Op. cit.,* pp. 250-251.)

Robert Chambers, in Edmund V. Cowdry's *General Cytology* (Chicago, 1924, p. 237), states on the same point: "Numerous investigators identified Dujardin's animal sarcode with von Mohl's plant protoplasm as the fundamental life-substance of the cell. Their conclusions, however, were lost sight of because of the more carefully worked-out theory of Schleiden which relegated the seat of vital phenomena to the cell wall."

Once more we learn that the reputed founder of a given theory is, in the main, only its populariser and that the theory evolves by inappreciable accretions up to that point and beyond.

The same lesson is conveyed by *Pasteur*'s position, as is shown by the following extracts from the article "Bacteriology" in the *Encyclopædia Britannica* (11th edition), contributed by Prof. H. Marshall

Ward : "When Pasteur in 1857 showed that the lactic fermentation depends on the presence of an organism, it was already known from the researches of Schwann (1837) and Helmholtz (1843) that fermentation and putrefaction are intimately connected with the presence of organisms derived from the air, and that the preservation of putrescible substances depends on this principle." "Long before any clear ideas as to the relations of [bacteria] to fermentation and disease were possible, various thinkers at different times had suggested that resemblances existed between the phenomena of certain diseases and those of fermentation, and the idea that a virus or contagium might be something in the nature of a minute organism capable of spreading and reproducing itself had been entertained." "In 1872, therefore, Cohn was already justified in grouping together a number of 'pathogenous' [bacteria]. Thus arose the foundations of the modern germ theory of disease."

On 6th April 1909, Peary, accompanied by Henson and four Eskimo, made the *conquest of the North Pole,* being the first explorer to compass the feat. Theoretically it is conceivable that to Peary alone it occurred to visit the North Pole or the Polar Regions ; that he made his preparations accordingly ; and that he soon afterwards was in a position to announce to the world that he had successfully carried through his extraordinary enterprise.

Let us now scrutinise somewhat closely what actually happened. Already in antiquity attempts to penetrate the North had been made, one traveller proceeding as far as the White Sea in the north of Russia. Also, in the Middle Ages Norsemen lived in Iceland, whence they colonised parts of Greenland and visited the nearest adjoining portions of America.

It was, however, at the close of the sixteenth century that Polar exploration began to be encouraged. Spain, having forcibly monopolised the trade with India, access to that Continent was barred for the more northern countries which highly appreciated the spices and other products of that distant land. Consequently, the suggestion was irresistible to the disappointed that a northern route to India should be discovered. Numerous attempts were accordingly made in the following century and subsequently to accomplish this end. A North-West passage was diligently sought in the then wholly unknown northernmost parts of America. Repeatedly baffled and repulsed by ice, cold, storms, and insufferable privations, explorer yet undauntedly followed explorer, each increasing our knowledge of that region and rendering easier the task for his successors. Step by step explorers forced their way through Hudson Strait into Hudson Bay ; thence out and through Fox Channel and Fox Basin, Fury and Hecla Strait, the Gulf of Boothia, and other straits, into the Arctic Ocean, and thence again, through Bering Strait (discovered by those who searched

for the north-east passage) to China and India. By degrees ever more effective measures were concerted of surmounting difficulties until Polar exploration became a highly developed fine art. Thus at last McClure, following mainly in the wake of his predecessors, succeeded in effecting the North-West passage in 1853, partly with and partly without ship, whilst Amundsen, well acquainted with the geography and climatology of the region through the heroic labours of others, started in 1906 through Lancaster Sound and succeeded in completing the whole North-West passage by water, with little difficulty and within a brief period of time.

The same motive power of trade actuated at first the search for a North-East passage. After three centuries of failures, successes, and methodically closer approaches to the final goal, Nordenskiöld completed the passage in 1879. In the course of these attempts the whole line of the Siberian coast and its islands, including Nova Zembla and Spitzbergen, were studied with care and their principal features ascertained.

Lastly. Prompted also at the beginning by the same practical incentive, the desperate plan was conceived in the seventeenth century of sailing across the North Pole to India. The expeditions were few until the latter half of the nineteenth century when science came to the rescue. The civilised nations vied with one another for the honour of first reaching, or most closely approaching, the North Pole. Austro-Hungarians discovered Francis Joseph's Land. Nansen, carried by the ice drift, as he contemplated, in his famous Fram, reached in 1895 86° 5′ N. The Duke of the Abruzzi's expedition, following in Nansen's traces, one of the party, Cagni, reached in 1900 86° 34′ N. Peary, in 1906, started from Cape Hecla, and beat Cagni's record by reaching 87° 6′ N. At last, in 1909, profiting fully by the discoveries of three centuries of Polar exploration which had laboriously developed ingenious methods of Polar travel adapted to the furthest North, which had determined the geographical positions and physical features of the whole of the extreme north of America to the Arctic Ocean, and with the advantage of twenty-five years of individual effort in the same direction, Peary set out from the northernmost American land, Cape Columbus, and successfully passed over the ice to the North Pole where he spent twenty-four hours. He had thus reached 89° 57′ N. against Cagni's 86° 34′ N.

Theoretically, we might imagine the rush for the North Pole as an exciting race where the most intrepid and the ablest wins. Practically, however, collective experience was the decisive factor in the progress of the Polar discoveries. It was as if one individual had been engaged in these explorations, in each succeeding expedition benefiting richly by his previous expeditions and making therefore steady progress. The subjoined tables clearly trace this historic

advance, the record being automatically improved owing to preceding discoveries rendering further discoveries possible and easier. Save on this assumption, the coincidence of higher northern latitudes with later explorers becomes unintelligible. Here are the tables for the period down to 1906 :—

EASTERN HEMISPHERE.

Commander.	*Date.*	*N. Lat.*	*Long.*	*Locality.*
William Barents ...	14th July 1594	77° 20′	62° E.	Nr. Cape Nassau, N.Z.
Ryp & Heemskerck ... (Barents' 3rd Voyage)	19th June 1596	79 49	12 E.	N. Spitzbergen
Henry Hudson ...	13th July 1607	80 23	10 E.	Spitzbergen Sea.
J. C. Phipps ...	27th July 1773	80 48	20 E.	„ „
William Scoresby ...	24th May 1806	81 30	19 E.	„ „
W. E. Parry ...	23rd July 1827	82 45	20 E.	„ „
Nordenskiöld & Otter	19th Sept. 1868	81 42	18 E.	„ „ highest by ship.
Weyprecht & Prayer ...	12th Apr. 1874	82 05	60 E.	Fr. Josef Land, highest land.
F. Nansen ...	7th Apr. 1895	86 12	95 E.	Polar Ocean.
Duke of the Abruzzi...	25th Apr. 1900	86 34	65 E.	„ „

WESTERN HEMISPHERE.

Commander.	*Date.*	*N. Lat.*	*Long.*	*Locality.*
John Davis ...	30th June 1587	72° 12′	56° W.	W. Greenland.
Henry Hudson ...	20th June 1607	73	20 W.	Off E. Greenland.
William Baffin ...	4th July 1616	77 45	72 W.	Smith Sound.
E. A. Inglefield ...	27th Aug. 1852	78 28	74 W.	Smith Sound.
E. K. Kane ...	24th June 1854	80 10	67 W.	Cape Constitution, Greenland.
I. I. Hayes ...	19th May 1861	80 11	70 W.	Grinnell Land.
C. F. Hall ...	30th Aug. 1871	82 11	61 W.	Frozen Sea.
C. F. Hall ...	30th June 1872	82 07	59 W.	Greenland.
G. S. Nares ...	25th Sept. 1875	82 48	65 W.	Grinnell Land.
G. S. Nares ...	12th May 1876	83 20	65 W.	Frozen Sea.
A. W. Greely ...	13th May 1882	83 24	41 W.	New Land, north of Greenland.
R. E. Peary ...	22nd May 1900	83 54	30 W.	Polar Ocean.
R. E. Peary ...	21st Apr. 1902	84 17	70 W.	Polar Ocean.
R. E. Peary ...	26th Apr. 1906	87 06	70 W.	Polar Ocean.

(A. W. Greely, *Handbook of Polar Discoveries*, London, 1910, p. 185.)

To these records have to be added the subsequent ones which ultimately terminated in the highest possible degree N., there being a little over 3° difference between Cagni's and Peary's record and a little over 14° between John Davis' and Cagni's northernmost record in the Western Hemisphere.

Silvanus P. Thompson (*Elementary Lessons in Electricity and Magnetism*, London, 1915, pp. 610-611) quotes the following experimenters as connected with the invention of the *telegraph* as we know it : Lesage (Geneva, 1774), Lomond (Paris, 1787), Ronalds (London, 1816), Cavallo (London, 1795), Soemmer (Munich, 1808), Coxe, R. Smith, Bain, Ampère (Paris, 1821), Weber (Göttingen, 1833), Cooke and Wheatstone (London, 1837), Henry (New York, 1831),

Morse (New York, 1837), Steinheil (Munich, 1837), Gintl (1853), Stearns (New York, 1870), Stark (Vienna), Bosscha (Leyden, 1855), Heaviside (London, 1873), Edison (Newark, 1874), Varley (London, 1870), Gray (Chicago, 1874), Hughes, Cowper (1876), Gray (1893), and Lord Kelvin.

Another convincing illustration of the method of progress as we conceive it, will be found in the article "Railways" in the *Encyclopædia Britannica* (11th edition).

Above we have advanced a few proofs, of thousand possible ones,[1] of the fact that the most notable achievements of our civilisation represent a species-product and that the single individual, reduced to his strictly personal contribution, adds remarkably little to the common store.

The method of progress consists, hence, of the addition by individuals of microscopic increments to the cultural legacy, the individual's ostensible contribution being greatly augmented where an immense cultural legacy can be drawn upon and where practically a life-time is devoted to progress within one department. The method of progress, in other words, is primarily and essentially social and is determined primarily and essentially by social factors.[2]

6. *The Rate of Progress.*[3]

The rate of historical progress appears to increase geometrically. We do not know what long ages passed before man began to chip flints. We have various reasons for believing that an enormous period elapsed before polished and ground flints began to be substituted for chipped ones.[4] And the neolithic epoch also appears to

[1] The very idea of progress required several centuries to develop, as is ably shown in J. B. Bury's *The Idea of Progress*, London, 1920.

[2] "The collective life is not the secondary, but the primary, condition of progress." (Emile Durkheim, *De la division du travail social*, Paris, 1922, p. 335.) For further evidence, see Appendix A.

[3] On the whole subject, see the chapter on "The Rate of Cultural Growth," in Ogburn's *Social Change*.

[4] Arthur Keith (*The Antiquity of Man*, London, 1929, vol. 2, p. 717) supplies the subjoined conjectural dates of culture periods :—

	B.C.
Bronze	2,000
Neolithic	8,000
Azilian	10,000
Magdalenian	13,000
Solutrean	15,000
Aurignacian	20,000
Mousterian	40,000
Acheulean	80,000
Chellean	120,000
Early Chellean	200,000
Sub-crag implements	300,000
Kentish eoliths	350,000

In this connection it is of importance to learn that "the late Acheulean is seen to present the climax of a gradual and unbroken development from the

stretch comfortably in time.[1] However, as we approach the earliest known civilisations around Egypt and Babylonia, progress seems to have been greatly accelerated and in these last few centuries it has been, comparatively and broadly speaking, phenomenal.

The causes of the substantial differences in the rate of progress have been probably many, of which we would mention the following conjecturally. The prevalent dense ignorance in primeval times was inherently unsuggestive and involved virtual stationariness. With language hardly yet emerged from the stage of inarticulateness, reflection was greatly hampered. Exchange of thought, especially with those far removed in space and time, was rare and healthy mental friction was therefore almost non-existent. Somewhat later error predominated so much over ascertained fact that progress was of necessity exceedingly slow. Later still, the fear of compromising what had been attained led, through custom, to a pitiless discouragement of all efforts to improve on what is given. This is well illustrated in the present-day historic religions which, in the main, are (or have been until recently) relentless opponents of progressive tendencies. In fact, religion, by maintaining that it offered a complete and indisputably true explanation of the Universe and of the nature of man, successfully retarded intellectual advance. Moreover, hidebound custom and economic and political class advantages fought stubbornly on the side of conservatism. With intercommunication largely barred or tabooed, with gross ignorance and subtle error widely obtaining, it was not astonishing that progress should be dishearteningly slow.

early Chellean industries and ideas." (Henry F. Osborn, *Men of the Old Stone Age*, London, 1916, p. 180.) So M. C. Burkitt (*Prehistory*, Cambridge, 1925, p. 85) : "As far as we can judge there seems a steady evolution in France and Britain, from Pre-Chellean to the end of Acheulean times." Speaking of the art of the Aurignacians, Osborn writes : "Their art shows a continuous evolution and development from first to last." (*Op. cit.*, p. 316.) Similarly, tracing back man's history to its earliest date, W. J. Sollas (*Ancient Hunters*, London, 1924, p. 665) says : "Every successive stage brings with it some improvement in methods, some new power over material." "If we take a long view," writes C. A. Ellwood, "we see that there has been a general advance in human culture from the most primitive times, which has been fairly steady in spite of interruptions, retardations, and even reversions." (*Cultural Evolution*, New York, 1927, p. 253.) Ales. Hedlicka, in his "The Neanderthal Phase of Man," argues learnedly in favour of an evolutionary conception of the Neanderthal and the Aurignacian phases of culture. But A. Vayson ("L'étude des outillages en pierre," in *L'Anthropologie*, Paris, June 1922) adopts an extremely critical attitude towards the idea that there was progress in the manufacture of flint tools.

Much light has been shed recently on the transition between the neolithic and the iron or writing age. See W. M. Flinders Petrie, *Prehistoric Egypt*, London, 1920, and Leonard W. King, *A History of Babylonia and Assyria*, London, 1910, etc., and *A History of Sumer and Akkad*, London, 1910.

[1] "The human advance of the last 12,000 years, that is, from the beginning of the New Stone Age until now, is enormously, fantastically greater than that of the whole previous period of human life." (Robert Jones, *A Primer of Social Science*, London, 1922, p. 30.) We ought to remember, however, that "c'est le premier pas qui coûte" and that "we of a later generation, with a fertility of mechanical invention, can little understand the great brain which was necessary to make the first steps towards human civilisation." (Arthur Keith, *Ancient Types of Man*, New York, 1911, p. 112.)

However, there have also been factors powerfully stimulating progress. These may be said to have been the gradual branchings out of human culture in new directions. As the first two we may regard flint implements and language. Next comes, so far as we know, fire. Passing over bone, horn, ivory, clay, and wooden tools, art followed and its near neighbour graphic intercommunication, terminating eventually in our alphabets. The domestication of animals, the tending of herds, agriculture, and spinning and weaving, represented similar steps. Of importance also were pottery, bricks, the wheel, sails, glass, the calendar, irrigation, canals, compass, and astronomically regulated clocks. A radical revolution was wrought by the introduction of the metals, especially of iron[1] and of coinage. The early evolution of government and law was a pre-condition of solid progress. The art of printing opened far-reaching possibilities for the advance of mankind. Science followed, with its study of the heavens and of matter, of organisms and their evolution, and of disease and industrial improvements, as leading motives. Machinery, mechanical transport, and the telegraph hastened the advance. Democracy and humanitarianism exercised a similar effect. The abolition of war will likewise greatly quicken general progress.

With each step forward, advance became easier and consequently the rate of progress became more rapid, until within the historic and modern period it was remarkably accelerated. With comprehensive truths established, intercommunication in space and time approaching completeness, religion and custom somewhat reconciled to steady advance, and strong incentives to the amelioration of the conditions of life and thought evolving, the rate of progress may be expected materially to exceed not only that of the remote past but even that of the present.

7. *The Cause of Progress.*

On a preliminary survey it may appear mysterious that progress should stamp man's entire history—past, present, and future—as if imposed by an inexorable external force.[2] The specio-psychic theory of human nature offers, however, a simple explanation. Within the empire of life, outside man, adaptation normally rules at a given time, each species being nicely adapted to the normal conditions surrounding it. But when we consider the story of the rocks, we find that there is in nature almost infinite adaptability, as expressed by the millions of species which have flourished, or are flourishing, on the earth.

[1] G. B. Phillips, "The Antiquity of the Use of Iron," in *American Anthropologist*, 1924; George F. Zimmer, *The Antiquity of Iron*, London, 1915; and Moritz Alsberg, *Die Anfänge der Eisenkultur*, Berlin, 1886.

[2] "There are, we may suppose, three explanations, theories, or hypotheses of the course of human things, and the power that guides them, shapes them, and controls them. One assigns this supreme mysterious control to Providence; a second to laws of Evolution; a third to a beneficent and steadfast necessity, in which we confidently trust under the name of Progress." (Viscount Morley, *Notes on Politics and History*, London, 1913, p. 82.)

In contradistinction, however, to given animals and plants, man is not adapted by nature to his environment, but must adapt himself to it by cultural means. This, however, since his native intelligence is not much superior to that of the most intelligent animals, can only be effectually achieved by the mental cooperation of all men in all times and places.[1] Whence it follows that human knowledge and insight are bound to grow limitlessly through the ages. Accordingly, human progress necessarily follows from man's mental constitution and as within the plant and animal world, because of the infinity of circumstances in the geological past, progress is almost infinite, so it is, for the same reason, but on the cultural plane, within the single human species.[2]

The specio-psychic nature of man thus appears to offer an adequate explanation of the fact, the method, and the rate of human progress.

Durkheim, in his *De la division du travail social* (pp. 244, 327, and 336) has a peculiarly simple theory of the cause of the development of culture : it is just the growth in the volume and density of societies. However, it would not be too difficult to collect a considerable number of striking historical examples of societies which grow only slowly or not at all in volume and density (France, *e.g.*), and yet advance, and other countries growing rapidly in volume and density and yet showing indifferent signs of progress (Czarist Russia, for instance). It would appear to be perhaps truer to state that progress—the invention of steam power and steam traction, let us say—leads to greater volume and density in societies, although even here it depends on the type or direction of progress.

8. *The Acceleration of Progress.*[3]

We conclude this Chapter with suggestions as to how the rate of progress might be most effectively accelerated.

[1] "An infinity of fractional and unrelated progressive efforts result in an imposing general advance." (Paul Oltramare, *Vivre,* Geneva, 1919, p. 55.)

[2] The limitlessness of progress has been frequently dwelt on. Here are a few citations:

"In whatever state of knowledge we may conceive man to be placed, his progress towards a yet higher state need never fear a check, but must continue till the last existence of society." (Sir John Herschel, *A Preliminary Discourse on the Study of Natural Philosophy,* London, 1831, p. 360.)

"So long as human life continues, the collective life of men may last and progressively perfect itself." (René Worms, *Philosophie des Sciences Sociales,* Paris, vol. 3, 1907, p. 306.)

"There is no reason to fear that a time will come when there will be no scope for human effort. New vistas will open before us, however far we advance." (Emile Durkheim, *De la division du travail social,* Paris, 1922, p. 336.) Already Pascal had, in memorable words, spoken of humanity as resembling "an individual whose life has no term and who never ceases to grow in knowledge."

[3] "It is quite within the range of possibility to lay down certain broad conditions which, if they were present, might prove favourable to social advance. In general, these conditions would reduce to terms of surplus energy. In particular, vigour, health, and leisure are the prime requisites. Moreover, by reason of the limited sum of time and energy at our disposal, and because the human mind is prone to wander and hard to concentrate, vigorous minds not distracted by too meticulous devotion to lichen-grown conventions are indispensable." (Arthur J. Todd, *Theories of Social Progress,* New York, 1918, pp. 110-111.)

"The conception of social progress as a deliberate movement towards the reorganisation of society in accordance with ethical ideas is not vitiated by any contradiction. It is free from any internal disharmony. Its possibility rests on the facts of evolution, of the higher tendencies of which it is indeed the outcome. It embodies a rational philosophy ; it gives scope and meaning to the best impulses of human nature, and a new hope to the suffering among mankind." (L. T. Hobhouse, *Social Evolution and Political Theory,* New York, 1911, p. 205.)

Educational reform embodies evidently the most fundamental and most urgent step forward for our purposes. An imperfect education leaves the individual a prey to fortuitous thoughts, to treacherous emotions, to capricious resolves, and to erratic habits. It also places him at the mercy of economic exploiters, of demagogues and reactionaries, and of crude theorists. In these days of awakening democracy, it is not therefore too much to ask that an education at least equal to the very best secondary education of the socially favoured should be imparted to the children of all sections of the community.

Assuming classes of not more than twenty scholars and drastic improvements in school hygiene, a higher teaching standard than the present should be exacted. In addition, the end in view, the matter taught, and the teaching methods employed, ought to undergo a radical change along the lines suggested in Section 3. Naturally, too, the school and college, by stressing the specio-psychic nature of man and placing equal emphasis on past, present, and future, will ensure due respect for the idea of progress.[1]

However, school education is largely controlled by home education. If the home does not promote an ideal similar to that outlined for the school, bad mental and moral habits will well-nigh frustrate the intentions of the school and greatly lower the possible results. An effective school education accordingly presupposes an effective home education. In conformity with this, the training of the child should be systematically pursued in the home and for this a science and art of home education is necessary.[2]

With home and school education serving progress, much will have been achieved. A crying evil, intimately bound up with the neglect of education in its larger sense, needs also to be dealt with here. Every kind of occupation or interest is trammelled by traditions and customs which ignore that man's specio-psychic nature demands equal respect for past, present, and future. Hence it is desirable that in every occupation and interest whatsoever, each individual should exhibit a settled determination to improve on the past and on his own record. No red tape, no stifling traditions, and no paralysing customs and practices, nor, of course, mere anarchy or sheer love of novelty, such should be every one's motto. This attitude towards occupations and interests should be supplemented by the individual promoting progressive movements wherever practicable and cultivating in himself a love of progress as such.[3]

[1] On the subject of school and college education, see also H. G. Wells' *The Salvaging of Civilisation* (London, 1921, chapter 6), where he pleads for a standardisation of education on a world-wide basis and the liberal employment in teaching establishments of the film and the gramophone. To-day Wells would add, no doubt, wireless, and to-morrow television.

[2] The author has tentatively elaborated the demands on this subject in a popular manual, *The Training of the Child,* revised edition, 1919 ; also American edition, Girard, 1923.

[3] For a vigorous and thoughtful attack on unreasoned conservatism, see James H. Robinson, *The Mind in the Making,* New York, 1921.

Our economic system stands theoretically self-condemned when one considers, on the one side, the gigantic improvements it has engendered in industry and commerce during the last century and, on the other, the existence to-day of an immense number of individuals harassed by poverty and plunged periodically into prolonged unemployment through economic crises.[1] In such a social atmosphere the term Progress describes a conception of immediate interest only to the theorist and the privileged few. We should aim therefore at remoulding our economic system. Fortunately, recent advances have made this comparatively easy. Studies in the scientific reorganisation of industry and commerce have shown, as we have already seen, that a reasonably short working week of, say forty-four or even forty hours, a wage ensuring a health-and-decency standard of living, and a thorough vocational training for all, are economically sound propositions; that unemployment, bad workshop conditions, and undemocratic treatment of employees, reduce wealth; and that the whole of the work, administration, and organisation of industry and commerce can now be radically improved, nationally and internationally, by means of acknowledged scientific principles involving collective action.[2] In these circumstances we may cheerfully labour to develop an improved economic system which shall stimulate, instead of opposing, progress.

Not a few believe that happiness is to be secured through an epicurean diet, through intoxicants, smoking, rounds of amusements, luxuries, sexual libertinism, and through shunning exertion. In these circumstances caprice is bound to govern the inner life and the conduct of many men. What is therefore imperatively required is a true science of mental and physical hygiene, demonstrating that the just mentioned methods of promoting happiness are based on disastrous fallacies.

We have dealt with the most general methods of accelerating progress. To this we would add a special method: that resulting from reducing scientific procedure at its best to a coherent and lucid methodological system which is to be imparted in all schools and colleges, especially in connection with science and history teaching, and in all homes. Only in this more excellent way could Improvement and Progress exercise the paramount influence they are entitled to.[3]

The realisation of the above means of accelerating progress would be, above all, aided by the universal acceptance of the specio-psychic

[1] For a reasoned indictment of the present industrial system, accompanied by constructive proposals, see Patrick Geddes' *Cities in Evolution* (London, 1915), more especially chapter IV., "Paleotechnic and Neotechnic."

[2] See Edgard Milhaud's *Annals of Collective Economy* (Geneva).

[3] On this subject, see the author's life-study, *A New System of Scientific Procedure*, London, 1921. Owing to the lack of such a system, the mental and social sciences are to-day pre-scientific in character and virtually unprogressive, registering frequent changes but no advance.

theory of man, for it alone definitely suggests what man is capable of—directly excluding individual prejudice, sex prejudice, class prejudice, national prejudice, and race prejudice—and what should be the relation between past, present, and future generations.

With these interconnected conditions of progress—more adequate home and school education; the idea of the individual cultivating in himself progressive ways and an all-round progressive outlook; the scientific organisation of industry and commerce along cooperative lines; the removal of health and happiness destroying temptations by exposing their illusory nature; the elaboration of a scientific and applied methodology; and, not least, the establishment of speciopsychism—satisfied, we may hopefully look forward to eras when the rate of progress, especially on the higher planes, will, without haste or restlessness, far exceed that of to-day.[1]

[1]According to Darwin (*The Descent of Man*, p. 143) "the more efficient causes of progress seem to consist of a good education during youth whilst the brain is impressible, and of a high standard of excellence, inculcated by the ablest and best men, embodied in the laws, customs and traditions of the nation, and enforced by public opinion."

Chapter X.

THE LAW OF LIMITLESS GROWTH IN COOPERATION.[1]

THIRD LAW.—*The law of the limitless growth, among peoples generally and through the ages, of cooperation, together with the secondary law of the historic development and subsequent elimination of the spirit of exclusiveness.*

1. *The Meaning of Cooperation.*

WE shall employ the term Cooperation in a broadly general sense. Cooperation, direct and indirect, voluntary and forced, conscious and unconscious, will be regarded as identical for our purpose. By cooperation we shall mean, in fact, assistance of any kind obtained from, or rendered to, others in any way whatsoever.

2. *The Development of Cooperation.*

Some of the anthropoids either live in groups or in families which coalesce into small hordes at certain seasons of the year or under other special circumstances. We may consequently assume that earliest man was in all probability similarly situated in regard to his fellows. This is also demanded theoretically, for if the relations of men to their fellows were typified by feline animals towards their kind or by that of the gorilla where the family appears to constitute the sole social unit, cooperation as a cultural factor would be negligible instead of being, as it is, all-important. Since, moreover, man arrives late at physical and mental maturity—the orang-utan is not fully developed before the age of twelve, it is said, and man not till much later—we may further postulate, again in agreement with anthropoid practice, that the human parents take care of their young for a considerable period. This would enable the offspring to profit by the experience of their parents and their fellow offspring, whereas if the young had at a tender age to shift for themselves, the historical accumulations would remain practically near the zero level. Granted a mind sufficiently developed by nature to be able to learn freely from others

[1] "No man, whether he be a commander of an army or a leader in the state, has ever been able to perform great and salutary achievements without the zealous cooperation of men." (Cicero, *Offices*, book 2, chapter 6.) "What, then, is a man's nature? To bite, to kick, to throw into prison and to behead? No; but to do good, to cooperate with others, to wish them well." (*The Discourses of Epictetus*, book 4, chapter 1.) "We are made for cooperation, like feet, like hands, like eyelids, like the rows of the upper and lower teeth." (Marcus Aurelius, *Thoughts*, book 2, 1.)

and the above conditions will lead us some distance towards comprehending the primeval possibilities of cultural growth. We are obliged, however, to proceed a step further and assume that the families and hordes were not irreconcilably hostile to one another—which the facts justify us in assuming[1]—and were therefore able in some measure at least to benefit by one another's experiences. This conceded, the continuous cultural development of mankind on an imposing scale, follows of itself.

Certain nineteenth century writers on the origin of the family and of society, impressed by certain customs among some primitive tribes, argued that promiscuity prevailed universally in primitive society. A conception of this nature is in such flagrant contradiction with what animal life proffers outside those animal species where sociability is limited to mother and offspring that only the strongest evidence could induce us to entertain it. It would be more correct to regard promiscuity as a degraded custom originating in accident and ignorance.[2] The later stages of man could never have evolved from such an unpropitious beginning and the suggestion was only possible when the distinctive nature of man was seriously misapprehended.

The history of the family only concerns us here so far as the educational opportunities of children come in question. Polyandry and polygamy, monoandry and monogamy, capture or purchase of wife, marrying into the wife's family or buying a husband by dowry, endogamy or exogamy, patriarchate or matriarchate, are all more or less consistent with fair attention being paid to offspring and therefore need not be examined in this Chapter.

In historical time we do not encounter the family plus horde assumed as the first stage of social organisation. Where food is scarce, as in parts of Australia, aboriginal family groups live scattered; but they assemble occasionally and sometimes cooperate in a more or less extensive battue. Here cultural contact is preserved and the separation of the family groups is due to the exigencies of the scanty food supply. As a matter of fact, in the above example we observe the further significant phenomenon of neighbouring tribes standing to

[1]Archeological discoveries have shown that even in the far distant past, when perhaps several species of men existed, there was already rough uniformity in the chipped flint tools used by them. "All the works of early man everywhere present the most startling resemblances, affording absolutely no elements for classification, for instance, during the times corresponding with the Chellean or first period of the Stone Age. The implements of palæolithic man so common in parts of South India, South Africa, the Sudan, Egypt, &c., present a remarkable resemblance to one another." (A. H. Keane, *Man, Past and Present*, Cambridge, 1920, p. 7.) So Arthur Keith: "To retain purity of type, these ancient races [Neanderthal, Eoanthropus, and others] must have lived apart and yet cultural fashions spread from one to another." (*The Antiquity of Man*, London, 1929, p. 725.) "We must infer that from Pre-Chellean days onwards both South Africans and East Anglians were subject to the various cultural waves which slowly crept over the world time after time." (*Ibid.*, p. 364.) See also G. Elliot Smith, *The Migrations of Early Culture*, Manchester, 1915.

[2]On the priority of monogamy, see Chapter VII. (B 2).

one another in a relation analogous to the aboriginal Australian family groups, as is aptly illustrated in another direction by the patriarchal stage recorded in the Old Testament. This allows fairly full scope for the transference and the accumulation of experiences among the various families and tribes.

Whatever may have been the precise form of society in eolithic or paleolithic times, the latter collective aggregates consisted of a comparatively small number of related individuals, small compared with the social aggregates in modern times or with the total number of individuals in any one human generation. A group of consanguinous families, therefore, appears to have been the primitive type of social organisation. This certainly represents an ideal social form for peaceful and fraternal living together and tends to a maximum of desirable cooperation.[1]

To a certain extent a kind of organisation such as is described above, is as conducive to encouraging amity within as enmity without and this has been the case historically in no small measure. Still, neighbouring tribes may be kinsmen or regard themselves as such. Beyond this, the practice of exogamy brought groups into contact. Even war tended to acquaint tribes with one another's diverging experiences and in this way ensured extensive cooperation. In addition, the conversion of prisoners into slaves instead of into food and the friendly meetings of individuals and collectivities further enlarged the possibilities of tribes assimilating cultural experiences. These primarily unintentional contacts explain how at most epochs, right to the earliest, the civilisations of the world astonishingly resembled one another, save where, for instance, wide stretches of sea isolated certain portions of mankind for protracted periods.[2]

A hurried examination suggests that almost each tribe is singular as regards its culture. Moreover, that culture appears at first sight not only exceedingly perfect, but also without beginning in time. Deprecate as we may the exaggeration implied in this view, the solid residue has to be accounted for. This is fortunately not so difficult. Special conditions and circumstances tend to the development of a particular civilisation as to a particular species and if those conditions and circumstances continue for sufficiently long, that civilisation—as in the evolution of species—reaches the point of virtual perfection within its own limits. This reacts on the attitude of men towards the culture of their society, inasmuch as its form of perfection comes to be conceived as perfection *per se* and therefore tends to perpetuate itself indefinitely until a considerable modification in conditions and

[1]Until perhaps the recent neolithic epoch the weapons needed for warfare did not exist, nor, indeed, does the art of even the early neolithic age depict scenes suggestive of warfare. Certainly no booty could have been secured by warfare if we perhaps except stone tools, hunting grounds, and women.

[2]Wilhelm Wundt, "Die Anfänge der Gesellschaft," in *Psychologische Studien*, 8th March 1907.

circumstances compels the development of another slightly diverging civilisation. Besides, since the single individual's possible cultural contribution is microscopic and since individual proposals are frequently subversive of the established social order, a dogged conservatism is primitively the rule in most stable societies as in most religions. Positively, this protects the treasures accumulated by the past, although negatively it places almost insuperable obstacles in the path of progress. It is nevertheless not easy to comprehend how in earlier stages men could adopt any other attitude. The value of the past was patent; the suggestions in respect of the future decidedly problematic. Still, if the equilibrium, when once reached, was difficult to disturb; once it was disturbed, a momentous force, leading to a new type of perfection, was set in motion and did not cease to act until its goal was attained. In a crude way the preservation and the extension of the rich culture produced by cooperation were thus realised.

In Chapter IXA. (Section 5) we learnt that the strictly individual cultural contributions approach negligibility. Accordingly, the smaller the hordes and the fewer the hordes in contact, the more insignificant the cultural additions made in any epoch and since ill-equipped paleolithic man had to fight both for his food and for his life, paleolithic groups were probably small and scattered, contact between the groups more or less accidental, and cultural additions in that immense period therefore relatively small.

However, as tools and processes were invented and improved, as cooking extended the range of edible foods, as domesticated animals and cultivated plants came into being, as man's knowledge of, and consequent command over, his environment grew, so his food supply increased and his sub-human enemies diminished. Hence his race could multiply to such an extent that the small hordes could develop into populous tribes and the tribes could become more numerous. This, in turn, probably led to regular and more intimate relations between groups. In these circumstances cooperation greatly gained in range and intensity and invention and discovery were correspondingly stimulated.

With larger areas more densely populated, a double tribal problem presented itself: potential enemies had to be guarded against and the unwieldy tribe required to be organised and governed. This led, more or less circuitously, to the creation of rulers and this in succession to a new phase of human history—to systematic conquest. Thus a number of tribes came to be under one authority, composite nations were formed, and empires arose. Two far-reaching effects followed, *viz.*, the possibilities of cooperation and the intensive developments of culture were much enhanced, including highly developed governmental and legal machinery. The compact tribe consisting of blood relations was undermined and departed eventually. Henceforth the

unit of the State was the single individual or, more correctly, the single family, the wider species kinship supplanting the narrower family one.

Such, approximately, may be said to have been the evolution of societies from the remotest past to our own age.

The most primitive tribes our epoch has known—the Tasmanians—possessed what one may characterise, by comparison with animals, as a highly developed language and, indeed, of tribes without language we know nothing. As a matter of fact, so far as a man lacks articulate expression, he is almost entirely debarred from learning from his fellows and in these circumstances cooperation is obstructed and retarded to an almost fatal degree. Consequently, at the dawn of man's career, some form of rudimentary speech probably evolved rapidly. Once the beginnings of language existed, they were sure to develop quickly and to heighten incalculably men's power of learning from their fellows and thus accumulating and linking facts. That this priceless power of language could have early developed to a comparatively high degree is to be inferred from the fact that the Tasmanians, who were in the earlier paleolithic stage, possessed what is for all intents a language proper. Even the tool life in the Chellean period is difficult to understand save on the supposition of the existence of a language.

The uncanny slowness in the process of invention is nowhere more forcibly illustrated than in the evolution of tools. That proto-man was not a tool-user in the modern acceptation of the term, is borne out by the fact that pre-Chellean man employed lavishly crudely flaked flints, or eoliths, as tools. Long periods passed and eoliths were replaced by more and more skilfully chipped flints or paleoliths. Many ages, however, elapsed before the paleolith was almost completely superseded by the polished flint, or neolith, and by bone, horn, and ivory.[1] Furthermore, a long period had to pass before baked clay, wood, metals, and other substances were utilised in the making of tools and useful objects. Manifestly, the first steps in the inventive process are the most laborious. However, by slow stages no doubt, but very early, one of man's most fruitful discoveries was evolved, namely the utilising and maintaining, and later the making, of fire. Man was by this agency enabled to transform by cooking and thereby render edible certain potential foods; to resist with greater success the rigours of winter; to keep at a distance wild animals; and, later, employ the same power in the manufacture of tools and tool-made objects. Finally, the whole enormous development sketched above may be traced to innumerable improvements made by innumerable individuals of innumerable social groups

[1]Singularly enough, no distinct vestiges of the pre-neolithic use of wood in connection with flint tools is to be found. Nevertheless, "in all probability the earliest races of man made use also of bone and wooden tools and perhaps shells." (George G. McCurdy, *Human Origins*, New York, vol. 1, 1924, p. 433.)

during innumerable ages. Save for cooperation, for the desire to learn from others near and far, the original darkness would never have lifted.

Now so long as man was toolless or nearly so, division of labour may be said to have been absent in tribes; but when tools came to play an important role in the life of human communities, separate callings probably sprang into being. The virtual homogeneity of mankind was thus destroyed for ever. Henceforth the number of individualised functions was to increase indefinitely and men were to be divided for long ages into countless sections more or less differing in the social esteem. Castes eventually developed. There was the ruling caste. There was the military caste. And there were, broadly speaking, the merchant and industrial castes. *The Laws of Manu* specify four of these groups—the Brahmans who perform the religious rites and legislate, the Kahatryas who represent the military forces, the Vasyas who are agriculturists and traders, and the Sudras, who are servants and workers. Similar divisions are traceable perhaps in all ancient civilisations, including the civilisations of early America, whilst the custom of sons following their father's trade or profession was well-nigh universal. Nor is the existence of castes difficult to comprehend. Prior to the epoch of highly developed cultures, custom ruled every function and it is therefore not surprising that certain leading social functions should have crystallised out in the historic process and have thoroughly organised themselves where the conditions were tolerably definite and stable.

The Guilds of the Middle Ages are the Western counterpart of the Oriental castes. Already in Rome *collegia opificum* existed; but these are not supposed to be the originals of the later Guilds which commenced to develop some time before the tenth century of our era. The Merchant Guilds led the way because trade was rapidly developing. Subsequently Craft Guilds occupied the more prominent place in the social economy. With the secular power weak and unconcerned in the common welfare, men gathered in Social Guilds which, in those turbulent and anarchic times, offered them comradeship at all times and priceless aid and protection in misfortune. The Craft Guilds, which largely replaced these, took over their philanthropic mission. In fact, to an appreciable extent they were practical developments of the former. They comprised those engaged in a certain occupation in a certain locality—master, journeyman, and apprentices, master and journeyman being frequently united in one person. These Guilds regulated prices and by this means protected themselves and the public. They controlled the output with a view to ensuring its high quality. They limited the hours of labour and were responsible for other regulations. They also became influential in municipal government, as is interestingly exemplified in the present position of the Livery Companies in the City Corporation of London.

The Guilds attained their proudest place in the thirteenth and fourteenth centuries owing to the stable industries of those times. However, with inter-local trade developing, individuals moving in fair numbers from locality to locality, domestic industries springing up, and the Governments asserting their authority, the Guilds, with their rigid rules only applicable to settled conditions, became a challenge to the progressive forces of the world. Besides, with power came insolence and tyranny and this hastened the disintegration of the Craft Guilds, although only after the lapse of further centuries did they altogether cease to count as social factors.

Both as regards castes and guilds, we note the significant fact that, to judge by the intimate resemblance of their constitutions, they were a product of widespread collective thought, comprehending well-nigh the world, in the first instance, and Europe, in the second. Conditions comparatively identical favoured their rise; but the identity of conditions was probably itself due to inter-tribal and inter-national intercourse, as were naturally the very similar rules and regulations of the castes and guilds.[1] Like feudalism, they were a world phenomenon.

On the advent of the machine age with its callous disregard of even the rudiments of humanity,[2] the working classes began again to

[1] J. Malet Lambert, *Two Thousand Years of Gild Life*, Hull, 1891; J. Edgcumbe Staley, *The Guilds of Florence*, London, 1906; George Unwin, *The Gilds and Companies of London*, London, 1925; Hosea B. Morse, *The Gilds of China*, London, 1909; Rudolf Eberstadt, *Der Ursprung des Zunftwesens*, Leipzig, 1915; Georges Renard, *Guilds in the Middle Ages*, London, 1918; and Etienne Martin Saint-Léon, *Histoire des corporations de métiers*, Paris, 1922.

[2] Compare Elizabeth Barrett Browning's poem "The Cry of the Children":—

. . . . . .

"For, all day, we drag our burden tiring
Through the coal-dark, underground;
Or, all day, we drive the wheels of iron
In the factories, round and round.

For, all day, the wheels are droning, turning;
Their wind comes in our faces,
Till our hearts turn, our heads with pulses burning,
And the walls turn in their places:
Turns the sky in the high window blank and reeling,
Turns the long light that drops adown the wall,
Turn the black flies that crawl along the ceiling,
All are turning, all the day, and we with all.
And all day, the iron wheels are droning,
And sometimes we could pray,
'O ye wheels,' (breaking out in a mad moaning)
'Stop! be silent for to-day!'"

. . . . . .

They look up with their pale and sunken faces,
And their look is dread to see,
For they mind you of their angels in high places,
With eyes turned on Deity.
"How long," they say, "how long, O cruel nation,
Will you stand, to move the world, on a child's heart,—
Stifle down with a mailed heel its palpitation,
And tread onward to your throne amid the mart?
Our blood splashes upward, O gold-heaper,
And your purple shows your path!
But the child's sob in the silence curses deeper
Than the strong man in his wrath."

develop protective organisations called trade unions. With the existence of a strong and hostile Central Authority to contend against and employers as powerful as they were hard-hearted frequently, progress in working class organisation was slow and much of the advantage resulting from the trade unions was therefore initially of a social or philanthropic order, alleviating the misery often entailed by the cruel working of the economic machine. In time, however, the unions became influential; they were organised locally as well as nationally; related occupations formed federations; the mass of the workers, skilled and unskilled, joined them; until the whole of the workers of to-day in the more highly civilised countries form practically a solidly organised body locally, nationally, and internationally.[1] Cooperation has nearly reached its goal in this direction and its weighty effects are becoming more apparent every year, although it should be remembered that naturally the employers also are now thoroughly organised.

From cooperation among workers and among employers we pass to cooperation in work. Perhaps we can illustrate this most effectively by a single example, bearing in mind, on the one hand, the absence of extensive cooperation in pre-eolithic times and, on the other, the crowd of vocations to-day. We shall construct our story around a typical daily paper of recognised standing nationally and that around the machines whereon it is printed. These machines were ordered from an engineering firm who passed on the order to their works which eventually executed the order. The machines were then despatched in parts to the railway station by vans, thence by rail to their place of destination, thence again by vans to the printing office where a solid foundation was laid whereon the machines were erected for use. Before the machines begin to print, three conditions at least have to be fulfilled. The machine has to be supplied with printers' ink which has to be ordered and delivered by a circumstantial process like the machines themselves; "endless" rolls of paper have equally to be obtained and brought from a paper mill; and the stereo-plates have to be fastened on the cylinders reserved for them. The plates, being prepared on the premises, demand a separate department with its own machinery, its own materials, and its own operatives. For the machines, now ready, to be set in motion, an engine is necessary whose boiler has to be fed with coal transported by rail and van from a distance and with water drawn from a pipe connected with the main water pipe in the street where the printing office is situated. Besides the engine, further machinery is required to connect it with the printing machines. We may now imagine the newspaper being printed under the supervision of machinists. Whilst it does so, we reflect that the

[1]The women workers of the world are as yet imperfectly organised and in times of economic crises trade union membership suffers heavily.

stereo-plates are taken from the lines set up in the densely populated linotype rooms. There the matter to be printed is composed, revised by the correctors of the press, and suitably arranged in columns and pages. In turn the linotype department is dependent on the editorial department. This is itself divisible into several sections, from the editor, sub-editors, and leader writers, downward to the agile messenger boys. We shall silently ignore the pen, ink, pencil, and paper which are indispensable to the staff and leave unnoticed the books of reference, telephones, etc. However, the "copy" is not in the main prepared in the editorial department. Reporters attend meetings, functions, and entertainments; higher types of journalists are out on interviewing missions; reviewers send in criticisms and appreciations of books; the "city" editor surveys the "market"; special contributions written by novelists, scholars, and others arrive; correspondents in the country or abroad send news by post or telegraph; and press agencies furnish the world's latest tidings. Moreover, the newspaper largely depends for its net income on advertisements, and this part of the work is entrusted to a special department which has its own complicated routine and is in touch with the business interests of the country.

These various departments—to which should be added the business, the despatch, and the accountancy sections—must needs be coordinated, controlled, and maintained and this is accomplished through the department representing the proprietors of the newspaper, which department receives its instructions from a board with a separate organisation. Returning to our machines printing a fabulous number of copies per hour, we find that since the paper is printed by night, the printing department is lighted by electricity which is furnished, through the medium of protected wires, from an electric power station some miles distant. As the paper is printed, the copies are removed. Arrangements for distribution are complete and motor vans, trains, planes, wholesale agents, newspaper vendors, newspaper boys, and the post, perform all things needful to render the paper accessible to the country at large, but more especially to the immediate locality and district. The paper is then read by a public more or less impatiently awaiting it and hundreds of thousands of minds are to a certain extent affected by its contents. (One English weekly paper claims a sale of three million copies.)

We have offered above the sketchiest of sketches which, if the reader will suitably supplement it, will show that millions are concerned, in however fractional a degree, in the production, distribution, and reading of a popular newspaper in the larger countries. This example gives an inkling of the interdependence of our civilisation.

The complement of division of labour is combination of labour and the latter is a recent product due to a higher development of the

technique of production and distribution. Thus we find companies in control of hundreds of retail establishments; others in possession of vast general stores whose proprietors characteristically style themselves "universal providers"; others forming a trust or combine, controlling perhaps the whole of a particular trade of a country; other trusts add to the control of a given trade, control as far as practicable of the ancillary trades and other accessories such as railway lines; and certain companies practically transfer the "store" idea to the factory. An almost perfect example of the synthetic class, although unique owing to its democratic basis, is furnished by the cooperative societies which are "universal providers" in a comprehensive sense, the very antipodes of the enterprises beloved of the classical economists, which turned out only hair pins or screws or a particular chemical. On a higher level in the historic spiral, we almost return in this way to the more primitive stages where there is little division of labour.

There is a far cry from tribal to national and international exchange of goods. On Sir Fullman Lovetruth's breakfast table we may find tea from China, coffee from Jamaica, and cocoa from Africa; the wheat from which the bread he eats was made may come from Canada or South America; the butter has been perhaps shipped from Denmark; the oatmeal has been brought from Scotland or from the United States; the marmalade is made from Seville oranges and German beetroot sugar; the raw material of the forks and spoons comes from silver mines in Australia, the table linen from Ireland, and the crockery from Yorkshire, the designs on the last being inspired by their Chinese prototypes; and so on to the end of the chapter. Or, as Norman Angell quaintly expresses the economic interdependence prevailing at present: "A Birmingham ironmaster sells his engines to a Brazilian coffee-planter, who is able to buy them because he sells his coffee to a merchant in Havre, who sells it to a Westphalian town manufacturing rails for Siberia, which buys them because peasants are growing wheat as the result of the demand in Lancashire, which is manufacturing cotton for Indian coolies growing tea for sheep-farmers in Australia, who are able to buy it because they sell wool to a Bradford merchant, who manufactures it becauses he is able to sell cloth to a petroleum-refiner in Baku, who is able to buy good clothing because he is selling petrol to the users of automobiles in Paris." (*The Foundations of International Polity*, London, 1914, p. 22.) Hence it is not surprising that the world trade between nations figures into thousands of millions of pounds. International exchange of goods is an outstanding mark of our epoch.

International cooperation is now common in every sphere. Several hundred international organisations exist, and many of these are federated in a Union. International Conferences are also held regularly by numerous societies and interests. International journals are

likewise multiplying. The Universal Postal Union is, of course, all-comprehensive : it enables the individual not only to communicate with all countries, but to do this at a fixed small charge which ignores distance. The International Agricultural Institute, situate at Rome, collects and collates the data bearing on agricultural output the world over and informs the entire globe of the harvest prospects and of the size of the crops. And Government organisations, similar in scope to the two just mentioned, at the head of them the League of Nations, which also includes the International Court of Justice and the International Labour Organisation, express equally the world-wide co-operation practised to-day. In addition, every interest—official, economic, reforming, educational, artistic, scientific, etc.—studies what the same interests abroad are achieving and the information secured is speedily utilised. These appropriations are so vast in range that they deeply colour the general ideas and activities of most nations. Even during the World War the hostile Powers keenly scrutinised one another's methods of warfare and social schemes and promptly adopted them if at all superior.

We shall turn now to another phase of human life, that of religion. Almost from primeval days men have speculated concerning man's relation to the sum of things and his dependence on the forces surrounding him. Magic, animism, fetishism, polytheism, theism, pantheism, positivism, ethicism, and other religious formulations have been the result. These did not spontaneously and capriciously present themselves to an individual here and there. They were the outcome chiefly of unpremeditated cooperation and imitation widely disseminated and incessantly modified. That is, they were inter-social products gradually developed through the ages. In the later religions we can study at leisure the promulgation and perpetuation of religions. The religious organisations systematically impart to the younger generation the faith which has been bequeathed to them, reminding us of the similar initiation ceremonies among primitive peoples. That younger generation grows to adulthood and repeats the process. In this way religions normally maintain their numbers. Should there be, as has happened during the last few centuries, a vigorous expansion of populations, the number of the faithful is proportionately augmented. However, proselytism forms another method of raising the dimensions of the flock. The wholly peaceful introduction of Buddhism into China at the beginning of our era,[1] where it was widely accepted, is one example of religious propaganda and the other is the imposing of Islam and Christianity by force or pressure on various populations. In our day, however, peaceful persuasion and penetration may be said to be the sole methods followed by religious bodies. It remains only to mention that religious persecution in the past and religious

[1]See S. Beal, *Buddhism in China*, London, 1884, chapter 2.

boycotting in the present have also been instrumental in perpetuating religions. We find here the same unfortunate tendency of idolising the past and treating sacrilegiously the present and the future. The higher synthesis still escapes many thinkers, because they apprehend that reflection may dissolve feeling and plunge men into spiritual anarchy. The situation is almost universally aggravated by the fact that would-be reformers tend greatly to over-emphasise the importance of the views which they hold. When men and women will be soundly and roundly educated and venerate the stream of time as a single unity, this fear, which has obsessed mankind from its cradle and has seriously obstructed cooperation, will vanish.

The problem of conduct is no less interesting than that of religion. Hastily examining the facts involved, we may be tempted to perceive kaleidoscopic changes only and the absence of continuity. A minuter scrutiny, however, will enable us to discern a thread running through the curious diversity of what is observed and in this way reconciling what appear to be unconnected and contradictory facts. This end seems to be secured to a certain extent by applying what may be called the principle of Superiority. From this principle it follows that (a) as the race advances ethically, an approved social act which requires no effort is regarded as "natural"; (b) what well-nigh everybody practises is regarded with virtual indifference; (c) only that approved social act which is at any time accomplished with some difficulty by most men, is regarded as moral; whilst (d) that which chances to lie quite beyond the powers or vision of the average man of the day is looked upon as eccentric or visionary.

The moral life, narrowly interpreted, hence always remains something arduous and the attainment of virtue is therefore rightly compared to the ascent of a steep hill. For this reason the modern man has no merit ascribed to him because he does not over-eat, does not overdrink, or does not commit murder. This abstention, because of social conditions, is natural to him. Decency, good manners, conventional truthfulness, and a certain degree of honourableness fall nearly within the same category. Not to be dishonest, not to take advantage of or deliberately injure another, would not evoke praise nowadays among self-respecting persons. Similarly with a father labouring for his family, a mother elevating her offspring, citizens defending their country—these "only do their duty," whilst those would be judged monstrous and unnatural, rather than bad, who neglected what parents and citizens commonly and as a matter of course do. Manifestly, then, the self-control shown by the selfish man and the forethought displayed by the prudent man only command respect in ages when men are as a rule too impulsive to be selfish or too improvident to be prudent. The wiles of Odysseus and the ingenuity of Aesop's and Grimm's heroes were admired because few individuals possessed then

these qualities to a notable degree, and in portions of the Old Testament, in Hesiod, in Shakespeare, and even in more recent times, prudence is admired for the same reason. To-day, however, the prudent man is comparatively common and therefore he is nearly despised as being over-solicitous for his welfare.

We should therefore draw a sharp distinction between relative or practical morality which takes past achievements for granted and absolute or theoretical morality which ignores the state of social advance. Unless we make this distinction, a scientific ethics would have to be ever turning somersaults, practically modifying much of its content with every age, with every individual, and with every situation. If, then, the principle of Superiority[1] explains the shifting of moral values historically, the principle of Cooperation explains the historic broadening of the moral basis.

Accordingly, divergence in social conditions and the respective amount of cooperation involved in an act will largely explain the apparent eccentricities of history in the matter of conduct. We ought not to ask what our age or what absolute morality postulates as right, but what social act at a given time has become normally, as the result of cooperation, not intolerably difficult to perform in a given society or layer of society.

In this spirit let us examine the celebrated summary of the virtues, the one which we find in Plato, in Aristotle, among the Greeks of the Classic period generally, in Philo, in Thomas Aquinas, Dante, and the Roman Catholic Church as a whole, *i.e.,* Courage, Temperance, Prudence, and Justice.

As a comprehensive formula of great personal qualities it would be difficult to imagine anything more complete or perfect. A *courageous* man can live his own life and is the slave of no person and no passion; danger does not cow him and painful consequences leave him unperturbed. Whatever his ideal, he will live it or else retire from life's stage. A *temperate* man, in the ancient Greek sense, will possess a beautiful and harmonious soul. He does not allow himself to be controlled by turbulent passions; he ignores all glamour and clamour; excess of any kind is foreign to him; and licence, luxury, and idleness, he despises. The temperate man possesses himself; he is in himself an ordered commonwealth; he is fair to his own nature and to his whole life; and peace, serenity, and dignity distinguish him. A *prudent* man, as the Greeks understood the term prudent, was one who knew the perils involved in acting precipitately and unreflectingly and who, therefore, in deciding on action, always calculated that the means should be such as to lead to the end desired. A prudent man

[1] In his essay "On the Dignity or Meanness of Human Nature" (*Essays,* edition 1804), David Hume dwells on the importance of this principle. Aristotle, in his *Ethics* (book 2, chapter 3), appears to stress the same viewpoint.

never has to repent of not achieving his object because of avoidable ignorance or careless reasoning and he is fully conscious of the importance of acting intelligently. However, the courageous, temperate, and prudent man has not only to consider himself, nature, and natural consequences; he has also to take into consideration his fellow-men. He wishes to live his life; they wish to live theirs. How, then, are the frequently conflicting interests to be reconciled? Why, by *justice*: by an agreement with his neighbour that there will be no unnecessary interference one with another and that if social living should require the curtailment of liberty, the principle of curtailment shall favour or prejudice no one. In short, we are to live among others and yet possess the advantages of the life of the recluse, save for occasional compromises on the basis of equality.

The four cardinal virtues, as interpreted by the ancients, imply no necessary respect for, or interest in, others. Given these virtues and, strictly construed, my neighbours may die from want or disease; they may live in ignorance or be unhappy; they may exterminate or devotedly serve one another, without my being in the least cheered or depressed, roused to helpful actions or to indignant protests. Assume that men live in a sparsely populated country on isolated farms, as Hesiod's contemporaries apparently did; that their farms yield almost everything required, so that what contact does exist, is mainly with neighbours—with those living on neighbouring farms—and excludes intimacy. Then such an ideal as is embodied in the four cardinal virtues would roughly conduce to what happiness was obtainable in the circumstances and especially would justice be praised as ensuring a balance of power in the community and as protecting the individual against his most formidable potential foes, *i.e.*, those who have similar aims to his own and possess the advantage of numbers. Justice is therefore wisely regarded as the mistress and queen of all virtues by Cicero (*Offices*, book 3, chapter 6); the farmer of early Greek times might well have inspired Aristotle's words that justice is more beautiful than the morning and evening star (*Ethics*, book 5, chapter 1); and most men would, on reflection, probably agree that rather should the world perish than that justice should be abrogated.

The four cardinal virtues can be therefore conceived as egocentric and non-altruistic. They assume other men, not fellow-men; strangers, not brothers; co-existence, not sympathy; love of individual liberty, not a desire that our fellows should be free. Other men need be no more to him who practises these virtues than the road whereon he treads or the tool which he manipulates.

Nevertheless, we can fully appreciate the suggestion that at a certain period of history the four cardinal virtues represented a high and reasoned level of morality, arrived at unquestionably after a protracted series of tentative collective efforts to establish a guide to conduct.

Without doubt lower motives enter not infrequently into the composition of an ethical phase, as when economic exploiters are determined to perpetuate the state of society which fills their purses. Even in these instances, however, the mentality, and the social circumstances which produced that mentality, should be taken into account. Viewed in this fuller light, we detect both nicer adaptations to a stated environment and the slow development of surroundings which make ever more exacting and higher demands on individuals and groups. And both the adaptations and the development presuppose cooperation on an increasingly broadening foundation.

What is more, non-altruistic in spirit as these virtues are, they have nevertheless a wide-reaching and highly favourable social effect. They involve self-control; they imply serenity and far-sightedness; and they assume non-aggressiveness—virtues from the absence of which our civilisation sadly suffers. In fact, we have here mainly an attempt to organise the individual life or build up an individual ethics and a method of preventing encroachments on individual liberty.

There is no need to pursue any further the aspect of cooperation in the historic process. Undoubtedly, whichever direction we might take, we should encounter the same fact of growing cooperation. We may, therefore, turn now to the wider implications of our problem.

First, we note the cooperation of generations from the beginning to the end of human time. This constitutes so prominent a feature that it is practically impossible to realise it even faintly. Among animal species, as we have learnt, each generation starts for all intents *de novo* and therefore the number of generations placed to the credit of the species are culturally negligible, let the generations extend to thousands. With man this is fundamentally different. Generation by generation, save for aberrations (which are, however, only too frequent), the cultural treasure swells, until it assumes such gigantic proportions that it is difficult to connect the two termini in the imagination. When pre-man became man, there was no perceptible cultural difference between man and anthropoid; now there is an immeasurable difference. Moreover, this difference has been steadily growing from the initial stages of man's emergence from apehood, the increments being, comparatively speaking, exceedingly small. Were man incapable of learning from others or uninterested in his fellows, he would be now, so far as culture is concerned, where earliest man was half a million years ago. In this endlessly repeated cultural bequest of one generation to another, we find the general explanation of the teeming cultural world of to-day.

Yet if each generation is to bequeath to its successor an amount of culture perceptibly greater than that inherited from its predecessor, this will be only possible on the assumption of each generation not only conserving what had been entrusted to it, but augmenting it

sensibly. In fact, the total cultural treasure will be only vast if the separate generations appreciably increase it. This brings us to cooperation within a given generation. Where something like a stable equilibrium has been reached and the circumstances are such that the equilibrium readily remains stable, the cultural treasure is only indifferently augmented in successive generations. Frequently, however, the equilibrium is unstable and remains so for protracted periods, as in all complex and free societies, and then, through cooperation, the cultural legacy increases appreciably from generation to generation. The last three centuries of European civilisation impressively exemplify this trend.

What, however, do we mean by a generation? Each individual might think by himself and for himself and bequeath the fruits of his cogitations to his children. In these circumstances thought would be generally arrested in its incipient stages. It is only when ideas freely circulate, when one person freely supplements another, that ideas have an opportunity of developing to their full stature.[1] Collective thinking stimulates, vivifies, allows of the exploitation of the most diversified circumstances and experiences. Collective reasoning, accordingly, not only mechanically adds to the quantity of bequeathable culture, but increases it out of all proportion to the number of individuals involved, improving materially the quality as well. Needless to state that actual thinking, if it is not to prove barren, presupposes more or less thorough knowledge of the cooperatively created presuppositions.

Does, then, a generation cover only the aggregate called a people or nation? Not in our day, nor scarcely ever at any time, historic or prehistoric. Virtually every age exhibits distinct traces of at least some of its collective units having assimilated a portion of the culture of their co-existent collective units. Babylonian influence in Judea, Greek influence in India, Indian influence in China, Egyptian influence in Greece, and even the cultural influence of one human species on another in early paleolithic times, illustrate our contention in relation to the past. At the present day the educated man's reflections are primarily international in composition and origin. His newspaper acquaints him with the chief current events in every country and other channels bring to him almost every idea of value in all the civilisations of his day. The cultivated man's mind is in essence intrinsically cosmopolitan and even those in the highest civilisations who are indifferently educated are unconsciously impregnated with the spirit of their age as a whole. Scholars, students, and travellers saturate themselves with what they can learn from every people and popular writers absorb this knowledge and disseminate it broadcast without making express references to their sources. Consequently, a

[1]The contents of innumerable scientific papers illustrate this contention, *e.g.*, the paper on "The Analysis of Line Spectra," by A. Fowler, in the *British Association Report for 1926*, which the present author just happened to be reading, after writing the above.

man's outlook is a composite product, its parts comprising the contributions of many individuals, of his nation as a whole, of other nations, and of the ages generally.

If it be conceded, then, that, broadly speaking, the minds of individuals and groups all over the globe are in a ferment, acting and reacting on one another, each modifying each, we understand how each generation bequeaths not only the general treasure of human culture, but a modest contribution of its own besides.

Even so our problem is left in an unsatisfactory condition until we ascertain the potential magnitude of the individual's cultural contribution, for the total will rise or fall indefinitely with the relative importance or unimportance of this factor. Now general considerations regarding man's precursors and nearest relatives suggest, as we have learnt in Chapter V., that in sheer force of inventiveness man can only measurably excel the highest man-like apes, *i.e.*, that a man's strictly individual contribution is almost infinitesimal. Nor do the data contradict this. The enormous length of the paleolithic periods testifies to the extremely diminutive increments by which the cultural stock was increased and improved in the far past. Only as time rolled by and the number of inventions and improvements appreciably increased, was there as a result an appearance, progressively intensified, of considerable cultural contributions by individuals. Close study, however, proves this appearance to be a subtle pyschological illusion. As Appendix A. will show, the original contributions of even those who are honoured with the appellation of "man of genius," appear to touch the border lines of negligibility when we strain out from their works what they palpably owe to others. This holds true of every province of endeavour—science and art, morals and religion, government and law, medicine and economics, education and reform, and invention and discovery generally. Perhaps in no other respect has the World War so emphatically placed its seal on this judgment as in the case of the airplane. Literally tens of thousands of individuals, with the encouragement of countless millions, strenuously strove for several years to perfect this comparatively novel conveyance, with no amazing results however. Indeed, notwithstanding all the care and ingenuity exercised, accidents to airplanes are still—a dozen years after the War—alarmingly frequent when compared with the number of railway and steamship accidents. And the exciting story of the slow perfecting of the airplane is, as we saw in the last Chapter, but a faithful example of the sluggishness of the inventive process in every department of action and thought, to-day as a hundred thousand years ago.[1]

[1] "The progress of *man* requires the cooperation of *men* for its development. That which any one man or any one family could invent for themselves is obviously exceedingly limited." (Walter Bagehot, *Physics and Politics*, London, 1873, p. 212.) Another telling example of the sluggishness of the inventive process is the painfully meagre result of the world-wide intensive research into the cause and cure of cancer.

The enormous cultural treasure of our epoch argues therefore the active cooperation of numberless individuals in all preceding human ages of practically all territorial groups.

3. *The Calculable Future of Cooperation.*

Abstractly, the progress of cooperation may be conceived as following a single straight line. The initial terminus of this line is the infant whose interest is captivated by the moment and who is indifferent to everything not concerned with the gratifying of each craving as it emerges. The selfish man is in this respect greatly in advance of the infant. His interest centres in his present welfare as a whole. This involves the cooperation of numerous impulses and ideas at the expense of short-sighted desires. The decidedly prudent man goes further. He is bent more on ensuring a happy life as such than on gratifying a passing whim or a narrow interest and, accordingly, he organises his entire life in such a way as to attain this end. His experiences, his reflections, and his feelings cooperate to realise a relatively comprehensive ideal. However, the self is difficult to define. To be solicitous concerning one's marriage partner, one's children, the family beyond, and friends and closer acquaintances, can easily be made to fall within the range of so-called self-interest. Even one's country is frequently regarded as only a larger self and few are those who are unwilling to die for it. Lastly, this trend of reasoning is not satisfied until mankind and all life and the outlying Universe are claimed as intimate parts of one's self, or the self as a partial expression of the Great Phenomenon, the All. With the passing, therefore, of the stage of blind impulse and unheeding passion, cooperation begins to play a progressively increasing part until, on the moral plane, the entire mental constitution is directed to the realisation of an all-comprehensive ideal. At this juncture the whole individual and all human groups in combination cooperate systematically towards attaining a certain distant goal—first and foremost, the perfection and happiness of the human race.

The future, accordingly, like the past, will witness a progressive accentuation of the factor of cooperation. The tendencies in this respect are visible already, as in the remarkable growth of hierarchically organised associations of every type. Furthermore, scientific reorganisation will completely unify and unite the industries and the commerce of the world until economic individualism and anarchy will have been entirely superseded.[1] Scientific reorganisation will act similarly in the domain of science and art, of morality and education, and of the domestic life and politics, improving these indefinitely through ever more intimate and systematised cooperation. The nations,

[1] On cooperation in the economic realm, and also in scientific work, see the author's *A New System of Scientific Procedure*, 1921, pp. 211-215.

too, will be organised in a world State, the filibustering methods of wrangling and warfare being replaced by a heartily supported international legislature, courts of justice, and administration. Moreover, as in the physical organism, de-volution will proceed concurrently with e-volution, to ensure that the cooperation shall be intimate and complete. Not a world State and so many individual citizens, but a world State and, hierarchically organised, innumerable subsidiary "States," from the nation to the neighbourhood, will satisfy the analogy from the plant and animal organism. In truth, if the world State is to fulfil its functions adequately, it must become an organism in the strict sense and should be therefore built up in conformity with the principles ruling organic life. In other words, the world State should not be analogous but homologous to the plant and animal, not a world of nonentities ruled by a President and his minions but one consisting of numerous coordinated authorities so organised by the individual citizens as to serve the good of each and all of the living and self-conscious cells of the present and, its offspring, the future.

Deliberate, well-planned, and coordinated cooperation, welding together every province of life and thought and every social group, large or small, will mark the further end of the calculable future.

4. *The Goal of Cooperation.*

Mankind, on the relatively highest reaches of development, will be a spiritual organism, the exact counterpart of the physical organism, only on an almost infinitely more exalted plane, a plane however where individuality is enhanced and not obliterated.

5. *The Cause of Cooperation.*

Since natural man is only indifferently advanced beyond the highest man-like apes, he can accomplish by himself little more than they. Hence pre-eolithic man could not have been readily distinguished from the ape. Lacking language and tools and living a wild and narrow family and horde life, he was infinitely nearer to the apes in culture than to modern man. However, since he had reached the evolutionary stage where he could readily profit by the experiences of his fellows, he became an essentially assimilative or cooperative being. Insignificant by itself as the cultural contribution of the individual may be, the number of individuals was so great that pools were soon converted into lakes and lakes into illimitable oceans. Self-satisfied man could have achieved nothing; cooperating with his fellows near and far in space and time, there was almost nothing which he could not achieve. The indispensability of cooperation for realising the human self which can only be ideally satisfied by an ideally developed cultural heritage is, accordingly, the cause of cooperation; and if cooperation is still

frequently neglected, or sometimes even derided, this is owing to the fact that men learn slowly how impotent they are as individuals and how their strength lies solely in linked efforts. Indeed, only cooperative thought reveals to man his own distinctive being and raises man above the animal.

6. *The Acceleration of Cooperation.*

Man's crucial dependence on world-wide cooperation is not even yet adequately recognised by the majority of men. Accordingly, no effort should be spared to enlighten the mass of mankind on this head and to convince the leaders of thought of its focal importance. The teachings of scientific history should be pondered in this connection, for these demonstrate how liable man is to error and to aberration when he trusts to any considerable extent to unaided individual effort or to the exertions of the few. The great problems facing humanity can only be solved by great collective enterprises which can never have too broad a base. Assuming that the individual exerts himself to the utmost and for a prolonged period, he should likewise be conscious that only the combined exertions of numberless individuals will produce material results.

The indispensability of whole-hearted and systematic cooperation needs to be stressed in every province of life. Industry and commerce require to be socialised. The international life has been inexpressibly injured because it has not been organised on a more definitely co-operative basis. In morals, owing to the absence of decidedly cooperative thinking, pitiful confusion reigns. The individual and collective life have suffered greatly owing to the subject having been left unstudied. We should learn the laws of the formation of habits, discover what are the desirable habits to acquire, and ascertain how these may be easily formed and rooted. Only earnest cooperation will succeed in realising this.

Similarly with other problems. The intellect of man will only begin to act scientifically after the methods of conducting the operations of the mind have been perfected through wide cooperative efforts. Short of this, men are liable to race from one illusion or half-truth to another and only to grow wiser at the expense of long and bitter experience.

The problem of health likewise demands special attention. At present the generality of men are sick animals, suffering from multitudes of more or less serious ailments. Not genius, talent, or common sense, will help us here, only the admission that great truths are solely discoverable by a determined and long-continued cooperative search. There is probably no fundamental reason why the overwhelming majority of men and women should not enjoy a splendid physique and delight in strenuous labour.

The beautiful calls for more intensive cultivation. Too often it is assumed that man can live by bread alone and that beauty should only be thought of after necessaries and comforts have been secured. The truth, however, is that beauty is also a necessary of life. We ought, accordingly, to advance the arts in every possible way. Men should seek to discover cooperatively what is best in the arts and render this best universally accessible by the same means. Art galleries might be further developed and also multiplied. Travelling art exhibitions and visits to the world's great galleries could be systematically organised. Architecture should become instinct with beauty. Literature should be a joy for ever. The decorative arts should aim at the highest refinement. Practically all household and other articles should bear the impress of art. Every home should possess its garden and every room its flowers. And deportment and conduct should be also transfigured by genial refinement. Whilst promoting originality in taste and workmanship generally, the utmost should be attempted in the direction of bringing superb reproductions of the most admired works of art, including the finest musical records, into the homes of all. Loving converse with nature should crown the rest.

Much is already being done in the above directions. All should cooperate in the task of socialising the economic and the international life and of producing a more advanced stage of conduct, intelligence, hygiene, and art, by stressing the cooperative factor. Readiness to do one's best and willingness to cooperate in what is best, should go hand in hand : these constitute the supreme method of accelerating cooperation.

CHAPTER XI.

THE LAW OF LIMITLESS INDIVIDUAL PERFECTIBILITY.[1]

FOURTH LAW.—*The law of the limitless perfecting, among peoples generally and through the ages, of the individual as a whole, together with the secondary law of the historic development and subsequent elimination of individual imperfections.*

1. *The Meaning of Perfectibility.*

IN this Chapter the meaning of the perfectibility of the individual will have placed on it the most obvious construction. To be perfectible will signify for us that human beings are potentially perfect or, expressed differently, that they are capable of becoming perfect when environmental circumstances, assuming a normal constitution, are ideally favourable. All men and women, according to this interpretation, are supposed to possess the germ of perfection, which, with proper nurture, develops into fair blossom and fruit.[2]

[1] For certain practical reasons, this Chapter will deal pre-eminently with the development of *moral* perfection.

[2] "From his reading of history, Condorcet concluded 'that there are no bounds to the perfecting of the human faculties and that man's perfectibility is truly without limit.' And he endeavours to determine its threefold law of development—1. Growth of equality as between nations; 2. growth of equality as between individuals; and 3. growth of the individuals themselves in intellectual, moral, and physical perfection." (*La grande encyclopédie*, 1900, article "Progrès.")

In his *Esquisse*, Condorcet seeks to prove that "man's moral faculty which is an integral part of his mental constitution, is, like all his other faculties, susceptible of being endlessly perfected" and that, in fact, "nature, by an unbreakable chain, links truth, happiness, and virtue" (p. 286). And, more emphatically, "there is no limit to the perfectibility of man." (p. 296.)

According to F. S. Marvin (*Progress and History*, London, 1916, pp. 14-15), "Turgot, before the Revolution, declared that 'the total mass of the human race marches continually, though sometimes slowly, towards an ever-increasing perfection.'"

Here is one example taken at random of the general moral possibilities of the most unpromising members of society. "The Poor Law Inspector in Glasgow, Mr. J. R. Motion, sends every year to Kirkcudbrightshire in the south of Scotland, to Ross-shire and Inverness-shire in the North, and to the remote islands of Iona and Islay, numbers of little children found in the streets, 'picked up selling newspapers between the knees of drunkards in public houses.' On being asked by the writer how far these children, born almost invariably of the worst parents, suffered from their inheritance, his startling reply was 'Provided you get them young enough, they cannot be said to suffer at all from that cause.' He supported his conclusion by statistics which showed that out of some 630 children sent out by him and kept under close observation for years, only some 23 turned out bad. 'A smaller proportion,' it was playfully added, 'than if they had been the sons of ministers or professors.'" (Henry Jones, *The Working Faith of the Social Reformer*, London, 1910, p. 57.) See also the chapter on Human Equality in Edward Holmes, *The Cosmic Commonwealth*, London, 1920.

Darwin approached the same problem from a different angle. He reasoned that through the struggle for existence and the resulting process of selection more and more perfect races are developed and that in this way the distant future may present a race of practically perfect human beings. He writes : "Looking to future generations, there is no cause to fear that the social instincts will grow weaker, and we may expect that virtuous habits will grow stronger, becoming perhaps fixed by inheritance. In this case the struggle between our higher and lower impulses will be less severe, and virtue will be triumphant."[1] (*The Descent of Man,* p. 125.)

Manifestly, the two views, whilst converging in results, assume totally different forms of development, the one dependent on cultural and the other on organic factors, the one plastic and the other rigid.

The conception advanced in this Chapter is also in vivid contrast with the so-called common-sense conception of men as diverging widely in innate capacity : some men being by nature of low calibre, many mediocre, others decidedly promising, and a few prepared for the highest flights of seraphic perfection. In this connection it is interesting to note that the Christian religion appears to be in complete agreement with the conception of the perfectibility of man. It assumes, in fact, that perfection is within the range of all, its founder having stated : "Be ye therefore perfect, even as your Father which is in heaven is perfect." (*St. Matthew,* 5, 48.)[2]

2. *The Growth in Perfection.*

The fluctuations in men's moral standards and performances are so violent and apparently so capricious that we can only hope to comprehend them in the light of basic principles. For instance, how dare we speak of growth in perfection through the ages, and this on a gigantic scale, when in our time poignant stories of negro lynchings are published with alarming frequency ?

Our perplexity becomes desperate when we think, by contrast, of the humanitarian teachings of a Buddha over two thousand years ago. Far and wide he preached a gospel of love for every creature above, below, and around, and he not only preached it, but lured thousands to its practice. Addressing himself to Vasettha, and speaking of the

[1] A passage reflecting presumably the same viewpoint is to be found in Herbert Spencer's *Social Statics* (London, 1892, p. 31) : "Progress is not an accident, but a necessity. Instead of civilisation being artificial, it is a part of nature ; all of a piece with the development of an embryo or the unfolding of a flower. . . . As surely as the tree becomes bulky when it stands alone, and slender if one of a group, . . . so surely must the human faculties be moulded into complete fitness for the social state ; so surely must evil and immorality disappear ; so surely must man become perfect."

[2] "When the wise thinkers of the early Church were asked whether man was created perfect, they answered, 'No. He was created with a capacity to acquire virtue and to move towards perfection.'" (Bishop Gore, *The Fall of Man,* London, 1921, p. 10.)

initiated individual, Gautama Buddha said, "Now wherein is his conduct good ?" and replied to his own question as follows :—

"Herein, O Vasettha, that putting away the murder of that which lives, he abstains from destroying life. The cudgel and the sword he lays aside ; and, full of modesty and pity, he is compassionate and kind to all creatures that have life !

"This is the kind of goodness that he has.

"Putting away the theft of that which is not his, he abstains from taking anything not given. He takes only what is given, therewith is he content, and he passes his life in honesty and in purity of heart !

"This, too, is the kind of goodness that he has.

"Putting away inchastity, he lives a life of chastity and purity, averse to the low habit of sexual intercourse.

"This, too, etc.

"Putting away lying, he abstains from speaking falsehood. He speaks truth, from the truth he never swerves ; faithful and trustworthy, he injures not his fellow man by deceit.

"This, too, etc.

"Putting away slander, he abstains from calumny. What he hears here he repeats not elsewhere to raise a quarrel against the people here ; what he hears elsewhere he repeats not here to raise a quarrel against the people there. Thus he lives as a binder together of those who are divided, an encourager of those who are friends, a peacemaker, a lover of peace, impassioned for peace, a speaker of words that make for peace.

"This, too, etc.

"Putting away bitterness of speech, he abstains from harsh language. Whatever word is humane, pleasant to the ear, lovely, reaching to the heart, urbane, pleasing to the people, beloved of the people—such are the words he speaks." And so forth. (*Buddhist Suttas,* translated from Pali, by T. W. Rhys Davids, Oxford, 1900, pp. 189-190.)

As if to mock our view of moral progress, the religion of the lynchers, established nearly two thousand years ago, embodies the very antithesis of their revolting conduct. Note the reported words of the great Nazarene :—

"Blessed are the poor in spirit, for theirs is the kingdom of heaven.

"Blessed are they that mourn, for they shall be comforted.

"Blessed are the meek, for they shall inherit the earth.

"Blessed are they that hunger and thirst after righteousness, for they shall be filled.

"Blessed are the merciful, for they shall obtain mercy.

"Blessed are the pure in heart, for they shall see God.

"Blessed are the peacemakers, for they shall be called sons of God.

"Blessed are they who have been persecuted for righteousness' sake, for theirs is the kingdom of heaven.

"Blessed are ye when men shall reproach you, and persecute you, and say all manner of evil against you falsely, for my sake. Rejoice, and be exceeding glad, for great is your reward in heaven."

"Ye have heard that it was said to them of old time, Thou shalt not kill, and whosoever shall kill shall be in danger of the judgment ; but I say unto you that every one who is angry with his brother shall be in danger of the judgment ; and whosoever shall say to his brother, Raca, shall be in danger of the council ; and whosoever shall say, Thou fool, shall be in danger of the hell of fire. If therefore thou art offering thy gift at the altar, and there rememberest that thy brother hath aught against thee, leave there thy gift before the altar, and go thy way, first be reconciled to thy brother, and then come and offer thy gift."

"Ye have heard that it was said, Thou shalt love thy neighbour and hate thine enemy ; but I say unto you, love your enemies, and pray for them that persecute you ; that ye may be sons of your father which is in heaven ; for he maketh his sun to rise on the evil and the good, and sendeth rain on the just and the unjust." (*St. Matthew,* chapter 5.)

With such flagrant extremes before them, men readily conclude that, as a race, man is inherently a medley of baseness and nobility and that mere chance decides which of these characters shall distinguish a given individual or people. Thus we reach a simple theory, adequate roughly to account for the facts, although heartbreaking to the reformer.

Now, in conformity with the general conception advanced in this work, the individual, as individual, is by nature a being full of possibilities and no more. From the evolutionary viewpoint we cannot regard man as constitutionally much more or much less depraved or noble than the anthropoids who are not remarkable for any conspicuous moral or immoral qualities. From the particular standpoint of man's evolution, we are further inclined to assume that the outfit of fixed emotional impulses and directive responses was originally weakened to the point of being indefinitely adaptable to educational and environmental contingencies. The individual is hence ethically somewhat in the position of the "clean slate," various conditions determining what shall be written there. Since these conditions are ruled by a series of social factors and since these factors may almost endlessly vary, the individual is potentially capable of the basest as of the noblest conduct, without necessarily being by nature either disposed to be base or noble. Accordingly, we may imagine, given certain conditions, any human being as corrupt or as conscientious as we please. Consequently the active principles governing individuals and groups of individuals are explicable without having recourse to the depressing theory, biologically inadmissible, of vast congenital and uncontrollable divergences and of natures almost incalculably departing from those of man's precursors.

On the theory here advanced we should expect men to be in the same potential position intellectually and æsthetically as ethically and this is borne out by the facts. Men do differ intellectually to an indefinite extent. By the side of scholars and thinkers of the first rank, we find men who are completely illiterate and whose intellectual horizon is almost immeasurably more contracted than that of their most illustrious compatriots. The stupidity, errors, and inefficiency of individuals and groups of individuals are not less prominent than are the corresponding moral defects in men; and in both cases an identical explanation—man's complete cultural dependence on his fellows—appears to apply. Nor would the student of æsthetics find less extensive and eccentric differences in his department of culture.

The apparent contradictions have been therefore resolved. Another embarrassing obstacle requires, however, to be removed. It will be asked, How is it that at a comparatively early stage in the later history of man, lofty moral sentiments were expressed and that man, in the mass, has been so slow in realising them? The contrast between precept and practice appears so grave here that this difficulty should

be also disposed of before we proceed further. For instance, saturated as the Egyptian *Book of the Dead* is with the grossest superstitions, it yet contains a strain of morality so pure that what the future has added is intrinsically not very novel. Listen to the words of the priest :—

"The scribe Nebseni, triumphant, saith :—Hail, thou whose strides are long, who comest forth from Annu (Heliopolis), I have not done iniquity. Hail, thou who art embraced by flame, who comest forth from Kher-aha, I have not robbed with violence. [Omitting hails] I have not done violence [to any man]. I have not committed theft. I have not slain man or woman. I have not made light the bushel. I have not acted deceitfully. I have not purloined the things which belong unto God. I have not uttered falsehood. I have not carried away food. I have not uttered evil words. I have attacked no man. I have not killed the beasts [which are the property of God]. I have not acted deceitfully. I have not laid waste the lands which have been ploughed (?). I have never pried into matters [to make mischief]. I have not set my mouth in motion [against any man]. I have not given way to wrath concerning myself without a cause. I have not defiled the wife of a man. I have not committed any sin against purity. I have not struck fear [into any man]. I have not encroached upon [sacred times and seasons]. I have not been a man of anger. I have not made myself deaf to the words of right and truth. I have not stirred up strife. I have made no [man] to weep. . . ."

"O grant ye that I may come to you, for I have not committed faults, I have not sinned, I have not done evil, I have not borne false witness ; therefore let nothing [evil] be done unto me. I live upon right and truth, and I feed upon right and truth. I have performed the commandments of men [as well as] the things whereat are gratified the gods, I have made the god to be at peace [with me by doing] that which is his will. I have given bread to the hungry man, and water to the thirsty man, and apparel to the naked man, and a boat to the [shipwrecked] mariner." (*The Book of the Dead,* translated by E. A. T. W. Budge, vol. 2, London, 1901, pp. 366-372.)

The Babylonian Hammurabi Code offers us parallel passages to the above :—

"Hammurabi, the protecting king, am I. . . . The flesh of the land I have made rejoice : the resident people I have made secure ; I have not suffered them to be afraid. It is I that the great gods have elected to be the Shepherd of Salvation, whose sceptre is just. I throw my good shadow over my city. Upon my bosom I cherish the men of the lands of Sumer and Akkad. By my protecting genius, their brethren in peace are guided : by my wisdom are they sheltered. That the strong may not oppress the weak ; that the orphan and the widow may be counselled ; in Babylon, the city whose head has been lifted up by Anu and Bel ; in E Sagila, the temple whose foundations are as solid as heaven and earth : to proclaim the law of the land, to guide the procedure of the lands and to sustain the feeble, I have written my precious words upon my pillar, and before my image as King of Justice I have placed it."

"In after days and for all time, the ruler who is in the land shall observe the words of justice which are written upon my pillar. . . . He shall root out of the land the perverse and the wicked, and the flesh of his people he shall delight.

"Hammurabi, the king of justice, am I, to whom Shamash has granted rectitude. My words are well weighed, my deeds have no equal. . . . If that man heeds my words that I have engraved upon my pillar, departs not from my laws, alters not my words, changes not my sculptures, then may Shamash make the sceptre of that man to endure as long as I, the king of justice, and to lead his people with justice." (Chilperic Edwards, *The Hammurabi Code,* London, 1921, pp. 45-48.)

And the earliest Chinese records breathe a spirit of sane, sweeping, and statesmanlike morals such as could scarcely be excelled to-day :—

"When you hear words that are distasteful to your mind, you must inquire whether they be not right ; when you hear words that accord with your own views, you must inquire whether they be not contrary to what is right." (*The Shu King.*) (About 18th century B.C.)

(The king to the new minister.) Ordinary men, while they have not yet seen a sage (are full of desire) as if they should never get a sight of him ; and after they have seen him, they are still unable to follow him. Be cautioned by this ! You are the wind ; the inferior people are the grass. In revolving the plans of your government, never hesitate to acknowledge the difficulty of the subject. Some things have to be abolished, and some new things to be enacted'; going out and coming in, seek the judgment of your people about them, and, when there is a general agreement, exert your own powers of reflection. . . . Do not make use of your power to exercise oppression ; do not make use of the laws to practise extortion. Be gentle, but with strictness of rule. Promote harmony by the display of an easy forbearance. When any of the people of Yin are amenable to punishment, if I say ' Punish,' do not you therefore punish ; and if I say ' Spare,' do not you therefore spare. Seek the due middle course. Those who are disobedient to your government, and uninfluenced by your instructions, you will punish, remembering that the end of punishment is to make an end of punishing. . . . Do not cherish anger against the obstinate, and dislike them. Seek not every quality in one individual. You must have patience, and you will be successful ; have forbearance, and your virtue will be great. Mark those who discharge their duties well, and also mark those who do not do so (and distinguish them from one another). Advance the good, to induce those who may not be so to follow (their example). (King Khang, end of his reign, 1079 B.C.) (*Ibid.*, pp. 232-234.) (*The Sacred Books of the East.*)

We submit the following interpretation of the concrete antithesis between preaching and practice, historically considered. The problem of moral realisation is exceedingly complicated. An individual or a group of individuals here and there may be favourably situated for living in agreement with a comparatively exalted moral ideal. For example, he who happens to be well nurtured, who is removed from degrading temptations, inspired by high conceptions of conduct, and well placed economically, may live a life on a markedly high moral plane. Yet countries generally, and most individuals within a country, are rarely in such an enviable position. Hence the preachings of a pattern man move most of his fellow creatures little, if at all.

The general moral problem is, in fact, as we have argued before, largely a problem in social organisation, affecting societies as a whole and humanity as a whole. Men want to live ; they naturally desire to live in comparative affluence ; but the general solution of the problem of how this is to be accomplished for all, is not likely to be found until cultural evolution has reached a greater elevation than at present. Perhaps with rationalisation in command of the economic life and of home and school education, the conditions will be given for a general realisation of the finer moral ideals which have so long haunted the mind and conscience of man.

In order to have an advanced state of morals, we must have an advanced moral State. Such a State, however, has not yet been devised, as is palpable when we contemplate the shoals of incompatible social theories which have been thrust upon men's attention during the historic period. Thus believers in anarchism, individualism, conservatism, partial socialisation, socialism, and communism, all regard themselves as the champions of the noblest and most practical social ideal. What is more, social amelioration is a fine art and many a well-meant social innovation—say, a legislative measure—has had

disastrous consequences because of our ignorance of its distant effects. Merely plausible generalities cannot be therefore trusted to realise the moral goal of a high-minded section of mankind.

Leaving aside, then, certain secondary aspects, we can readily understand that solid reasons exist for the discrepancy between comparatively highly developed ideals and comparatively lowly developed societies.

Another consideration is also of vital importance. We ought not to assume that the teachings which we have quoted are as transcendent as they seem. Right and justice, truth and goodness, pity and altruism, signify different things to different ages and their extension and intension cannot be deduced from mere general statements. Historically, this is readily proved. The Hammurabi Code, for instance, when it descends to particulars[1] is, according to our twentieth century conception of legal punishments, barbarous in the extreme. The Old and the New Testaments, as we shall learn below, contain much that is revolting to us. And many of the legal, military, and domestic penalties in the higher ancient civilisations appear to us outrageous.

If any doubt should remain on this point, we have only to compare men's moral opinions to-day with what those opinions mean to the individuals who hold them. In most cases it will be found that men grow sincerely eloquent about right, truth, and kindness, but that the circle of their moral interests is, compared to what it might be, surprisingly small. Other races and nations, opponents, rivals, the working classes, domestic servants, the employing classes, criminals, or future generations, too often fall conspicuously outside the circumference. Indeed, the most morbidly introspective moralist of to-day is, in many matters, unconsciously flouting the moral conceptions of to-morrow, although his formulæ are immaculate.

The reader will be now in a better position to understand the actual course of moral development in history without being confounded by seeming contradictions. He should be prepared to discover in the moral realm the counterpart and complement of the monstrous intellectual errors which necessarily precede the evolution of master truths; nor would he be far wrong if he attributed many of men's moral failings and failures to the difficulty of discovering the truth and to the casually acquired habits and emotions that tend to paralyse every attempt to move onward and upward.

The warning sounded in the last paragraphs needs to be particularly heeded in regard to the comparatively earlier stages of man's moral evolution. When men lived in small and relatively isolated tribes consisting of those nearly related and when grave errors were yet impossible because of the narrowness of experience, the moral problems were necessarily much simpler and moral defects relatively venial, in

[1]For an illustration, see the Section below dealing with the development of law.

certain directions at least. War itself may be, for instance, one of the bitter fruits of advancing civilisation.[1]

We shall now turn to a departmental investigation of the facts.

(a) *Warfare.*

Letourneau, in his *La guerre dans les diverses races humaines* (Paris, 1895), insists that war is never justifiable and that there is no evolution in the ethics of warfare. We feel obliged to dissent from both these positions.

The causes of warfare are certainly not invariably selfish, in the ordinary sense of this term. A hunting or pasturing region may be exhausted. Migration becomes then a stern necessity and yet this may clash with the interests of neighbouring tribes. Or the population may have grown to such proportions that the territory can no longer maintain the inhabitants in elementary comfort. Misunderstandings and disputes may also occasion strife with adjoining communities, as they do with individuals within a community. And if the ensuing conflict is brutal, it is to no small extent because the civil life of such peoples is barbaric, the abominations of war merely underlining the abominations of peace. In fact, the interdependence of the different domains of life suggests that between two communities of men highly developed morally, war is as inconceivable as its absence when communities are on a low moral level and its individual members fly to spear, dagger, or pistol on the slightest provocation.

Letourneau's second contention, that concerning the non-existence of moral progress in warfare, is contradicted by history. In this place we cannot of course undertake a complete, nor even a compressed, historic survey of the laws and customs of war. We may, however, satisfy ourselves that war has become greatly humanised in the course of the ages. The Old Testament will furnish us with apt examples of war as conducted by barbaric civilisations. Revolting as these specimens of warfare may appear to us, we should nevertheless remember that the ancient Hebrew warriors were not only not the most savage of fighters, but were more humane than those of many other peoples of their time. They at least only infrequently indulged in refined tortures and ghastly mutilations, as was so often the case in ancient warfare, and the cannibalistic orgies and human sacrifices of still lower civilisations were happily absent. Our examples from the Old Testament, therefore, only indicate a low level of warfare virtually universal in earlier ages. We shall let the Bible speak for itself: —

[1] On this point see W. J. Perry, *The Growth of Civilisation*, London, 1924. Also C. A. Ellwood (*The Psychology of Human Society*, New York, 1925) who writes: "The lowest people in point of culture, even at the present time, we find to be essentially peaceful. Prehistoric archæology shows no clear evidence of warlike instruments or weapons until we come to upper paleolithic times." (p. 67.)

"So the Lord our God delivered into our hand Og also, the king of Bashan, and all his people: and we smote him until none was left to him remaining. And we took all his cities at that time; there was not a city which we took not from them; three score cities, all the region of Argob, the kingdom of Og in Bashan. All these were cities fenced with high walls, gates, and bars; beside the unwalled towns a great many. And we utterly destroyed them, as we did unto Sihon king of Heshbon, utterly destroying every inhabited city, with the women and the little ones. But all the cattle, and the spoil of the cities, we took for a prey unto ourselves." (*Deuteronomy*, 3.)

"When thou drawest nigh unto a city to fight against it, then proclaim peace unto it. And it shall be, if it make thee answer of peace, and open unto thee, then it shall be that all the people that is found therein shall become tributary unto thee and shall serve thee. And if it will make no peace with thee, but will make war against thee, then thou shalt besiege it: and when the Lord thy God delivereth it into thine hand, thou shalt smite every male thereof with the edge of the sword; but the women, and the little ones, and the cattle, and all that is in the city, even all the spoil thereof, shalt thou take for a prey unto thyself; and thou shalt eat the spoil of thine enemies, which the Lord thy God hath given thee. Thus shalt thou do unto all the cities which are very far off from thee, which are not of the cities of these nations. But of the cities of these peoples, which the Lord thy God giveth thee for an inheritance, thou shalt save alive nothing that breatheth." (*Deuteronomy*, 20.)

"And Joshua took Makkedah on that day, and smote it with the edge of the sword, and the king thereof; he utterly destroyed them and all the souls that were therein; he left none remaining: and he did to the king of Makkedah as he had done to the king of Jericho. And Joshua passed from Makkedah, and all Israel with him, unto Libnah, and fought against Libnah: and the Lord delivered it also, and the king thereof, into the hand of Israel; and he smote it with the edge of the sword, and all the souls that were therein; he left none remaining in it; and he did unto the king thereof as he had done unto the king of Jericho." And so with the kingdoms of Lachish, Eglon, etc. (*Joshua*, 10.)

Here is an extreme illustration:—

"And he brought forth the spoil of the city, exceeding much. And he brought forth the people that were therein, and put them under saws, and under harrows of iron, and under axes of iron, and made them pass through the brickkiln; and thus did he unto all the cities of the children of Ammon." (*II Samuel*, 12.)

These quotations cannot be considered complete without certain Biblical Psalms which admirably express the implacable spirit of both the barbarous civilian and the barbarous warrior. It is not only true that, as Buddha said, hatred does not cease by hatred, but that hatred progressively intensifies hatred. Here are the Psalms referred to:—

"Let their table before them become a snare; and when they are in peace, let it become a trap. Let their eyes be darkened, that they see not; and make their loins continually to shake. Pour out thine indignation upon them, and let the fierceness of thine anger overtake them. Let their habitation be desolate; let none dwell in their tents. For they persecute him whom thou hast smitten and they tell of the sorrow of those whom thou hast wounded. Add iniquity unto their iniquity, and let them not come into thy righteousness. Let them be blotted out of the book of life, and not be written with the righteous." (*Psalm* 69.)

"Set thou a wicked man over him; and let an adversary stand at his right hand. When he is judged, let him come forth guilty; and let his prayer be turned into sin. Let his days be few, and let another take his office. Let his children be fatherless, and his wife a widow. Let his children be vagabonds, and beg; and let them seek their bread out of their desolate places. Let the extortioner catch all that he hath; and let strangers make spoil of his labour. Let there be none to extend mercy unto him; neither let there be any to have pity on his fatherless children. Let his posterity be cut off; in the generation following let their name be blotted out. Let the iniquity of his fathers be remembered with the Lord; and let not the sin of his mother be blotted out. Let them be before the Lord continually, that he may cut off the memory of them from the earth." (*Psalm* 109.)

The extreme inhumanity in war common among primitive peoples survived to some degree in special circumstances among the more civilised. The Athenians, for instance, completely destroyed Mitylene

in 427 B.C. The same year Platæa was captured by the Spartans who massacred all the defensive force which had survived the first onslaughts. In the campaign just noted the Athenian army which besieged Syracuse was beaten and seven thousand prisoners were thrown into stone quarries where they miserably perished. An outstanding example of ruthlessness was the total destruction of Carthage, with its population of over half a million, by the victorious Romans in 146 B.C.

However, these were striking exceptions to the rule. Already the pacifically-minded Egyptians soared high above the common practice of primitive peoples and Greece and Rome permeated the martial atmosphere with the comparatively high conceptions of conduct which prevailed among them in civil life. Raving frenzy was converted into reasoned motivation and the latter softened in every direction the cruelties inseparable from war. It was no longer a question of sheer destructiveness or of annihilating populations and remorseless looting. Prudence dictated the policy in warfare and thus indiscriminate slaughter and spoliation were converted, first, into carrying into slavery a portion of the vanquished population and, afterwards, exacting a heavy tribute and annexing the conquered State. The soldier, likewise, came to acquire a code of honour and although much remained admissible which constitutes a travesty of honourable dealings, yet numerous practices, once universal, were unreservedly condemned. A memorable instance of this may be found in the early Mahommedans who, where suasion failed, disseminated their tenets by the sword. The soldiers of Islam were, however, forbidden to injure women, children, the old, and cripples, whilst mutilation, poisoning of wells, attacks on the enemies' emissaries, perfidy, and unauthorised plundering, were one and all prohibited.[1]

The migrations of the uncivilised Goths, Vandals, and Huns brought a recrudescence of ancient barbarism, but contact with higher civilisations gradually tempered the ferocity of these peoples.

With the passing of the Middle Ages the struggle *against* war began in earnest and many schemes were canvassed and practical ideas on the subject multiplied. Out of these tentative efforts arose Inter-National Law. Primitive people would have been amazed at the suggestion of bringing their grievances against neighbouring tribes before a tribunal whose verdict should be binding on them; but, then, we should remember, the very conception of law would have appeared to them scarcely less grotesque. In fact, the conquest of anarchy within the State suggested the conquest of anarchy in the relations between States; and since law is the means of compassing the one, law was naturally regarded as the instrument for securing perpetual and universal peace.[2] Hence we are not surprised that the

[1] See H. R. v. Frisch, *Der Krieg im Wandel der Jahrtausende*, Munich, 1914.

[2] See chapter 3 in J. R. B. Muir's *Nationalism and Internationalism*, London, 1916.

Napoleonic wars, and the wars subsequent to them, were as a rule regulated by a hundred tacit and overt conventions and were infinitely less inhuman than the wars waged by savage tribes or by the ancient semitic peoples.

If we desire to measure the ethical progress made in warfare, we may do this by contrasting the texts we have quoted from the Old Testament, with the texts of the Hague Convention on the manners and customs of war. In that case, we shall recognise that the progress recorded up to our time is gigantic and is the certain prelude to the total abolition of warfare as a monstrous anachronism in an age where law, and not anarchy, rules the internal affairs of nations. Of the sixty Articles of the Convention regarding the laws and customs of War on Land we have only space for quoting Article 23 :—

"In addition to the prohibitions provided by special Conventions, it is especially forbidden (a) To employ poison or poisoned weapons ; (b) To kill or wound treacherously individuals belonging to the hostile nation or army ; (c) To kill or wound an enemy who, having laid down his arms, or having no longer means of defence, has surrendered at discretion ; (d) To declare that no quarter will be given ; (e) To employ arms, projectiles or material calculated to cause unnecessary suffering ; (f) To make improper use of a flag of truce, of the national flag or of the military insignia and uniform of the enemy, as well as the distinctive badges of the Geneva Convention ; (g) To destroy or seize the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war ; (h) To declare abolished, suspended, or inadmissible in a court of law the rights and actions of the nationals of the hostile party. A belligerent is likewise forbidden to compel the nationals of the hostile party to take part in the operations of war directed against their own country, even if they were in the belligerent's service before the commencement of the war." (*The Hague Conventions and Declarations of 1899 and 1907*, edited by James Brown Scott, New York, 1915, pp. 116-117.)

The World War, through which we recently passed, may appear to have given the lie to the elaborate humane provisions embodied in the Hague and Geneva Conventions. The appearance is, however, largely illusory. Comparing deliberately the Biblical texts we cited with the conduct of the World War, we shall find that, save for a few exceptions, primitive warfare knows no restraints and modern warfare a thousand and one.

Now what does moral progress in warfare, terminating eventually in its abolition, point to, except the limitless perfectibility of the race of men ? Contemplating a world such as is revealed to us in the earlier Biblical texts, itself a vast improvement on what had preceded, we should be tempted to despair of man. Yet time exhibits a steady elevation of men's feelings until warfare, in its mildest form even, is generally regarded as a detestable aberration which we must seek to destroy root and branch. That is, individual perfectibility has presumably no limits.

(b) *Law.*

In law also we may anticipate that the line of historic development will be from callous anarchy to humane law. Accordingly, we are not surprised to find that private and unrestrained vengeance was the

original rule of civil strife. The individual was a law unto himself and reacted to an offence as his anger prompted him. Naturally, complications ensued. Other individuals were often involved and the punishment of the offence gave rise to new offences, the quarrel frequently spreading like an epidemic. Individual differences became in this way family differences and families waged feuds against one another through many generations. Custom, however, soon began to regularise private strife. It became both a right and a duty to avenge a wrong and families were expected to pronounce sentence and take action in any given case. Later, the tribe as such gradually asserted its authority and became, by circuitous routes and slowly, umpire, judge, and executioner in succession.[1] Custom, again, hardened into law and laws were indefinitely multiplied. The sacred books of the earlier civilisations abound in injunctions invested with a legal character. The Hammurabi Code and the Hindu and Hebrew Scriptures illustrate this fact. When States grew in dimension and in civilisation, a corresponding development in law took place. The Twelve Tables of early Rome expanded thus into elaborate legal codes. With the submergence of the Roman power, civilisation received a check and lawlessness came consequently again to a certain extent into its own. Time, however, exercised its healing power; a new and higher civilisation developed in Europe; the laws of Rome were studied and largely re-enacted; and legal codes were eventually framed far surpassing those of the ancient world in comprehensiveness and humaneness.

Vast and dense as modern populations are, they are enmeshed in a fine network of laws. Property, life and limb, reputation, are protected in a hundred ways; marriage and the fundamental matrimonial relations, the care of the children and their education, birth and death, the treatment of animals even, are minutely controlled by a maternal law. Free like the wind as we may feel, it is the freedom rendered possible and organised by law. In numberless directions our wills are limited; but we are unconscious of the limitations because we are reared in them and, above all, because we welcome them.[2] Life in our time is immensely more organised than it could have been in primeval days. Caprice, heedlessness, impulsiveness, passion, have been driven by law from almost every important department of thought and action. Life becomes in this way composed, social, humane. And such highly organised communities demonstrate that men are not brutes, unresponsive to everything save the gratification of passing whims and emotions, but that they are capable of cheerfully subordinating their entire existence to an ideal which strives to do justice

[1] See E. Sidney Hartland, *Primitive Law*, London, 1924; also J. C. Carter, *Law: its Origin, Growth, and Function*, New York, 1907.

[2] "Das Gesetz nur kann uns Freiheit geben."—*Goethe.*

to mankind in general. The limitless improvement historically in law argues the limitless moral potentialities residing in specio-psychic man.

The concrete aspect of law is constituted by the nature of the punishments meted out under its auspices. These punishments are in the earlier stages extraordinarily brutal, indeed almost fiendish. What is even more strange, is the tardy development of humane feelings in regard to punishments. This is generally explained by the low stage of morals prevalent in the social life of a period. Such a view, however, overlooks two important aspects. Law, by the mere fact of its existence, strongly tends to resist change and is thus apt to buttress and perpetuate within a community a comparatively antiquated morality. Secondly, there may be considerable moral progress in a people and yet the law remain almost unaffected by it in a more or less bureaucratic age. The latter is illustrated by the appearance of Beccaria's enlightened *Essay on Crimes and Punishments* in the eighteenth century, a book which passed through three editions in six months and through six editions within eighteen months, being at the same time translated into the other leading European languages and meeting with an enthusiastic reception everywhere. Voltaire's fame, too, was largely owing to the expression of his passionate indignation against the wrongs and cruelties of his day.[1] Had Voltaire not voiced his age in this matter, his denunciations would have remained unheeded and his appeals would have evoked no appreciable response. Bentham's domination of the world of law for a century has likewise to be attributed to growth in humaneness and Howard's and Elizabeth Fry's historic standing are equally due to the eagerness of the modern world to abolish callousness and cruelty.

Even profounder in regard to the harshness of the punishments, is the influence of another factor. Men are too apt to assume that the ingenuity employed in devising painful punishments is to be ascribed to moral depravity. In this they are probably wide of the mark. In various directions it is difficult to conjecture the main results of a course of action and this is peculiarly so in respect of punishments. It is customary to reason that pain is disliked and that therefore the infliction of pain will act as a notable deterrent. So feasible is this contention that to mankind generally it has for ages appeared as a self-evident proposition. Now the infliction of a certain amount of pain soon proves to be inadequate to attain the end contemplated. Accordingly, by stages, the amount is insensibly and indefinitely augmented, men naïvely reasoning that the greater pain will exercise the desired salutary effect. Hence, eventually, the institution of innumerable penalties of an outrageous character. The same conviction induced the authorities to execute sentences in public to the

[1] See John Morley, *Voltaire*, London, 1872.

end of duly impressing all and sundry with what was in store for them if they strayed in forbidden paths.

The effect of this tissue of illusions was tragic. The brutal punishments brutalised the offender, rendered him more callous, and made him apt for more odious crimes than he had committed before. The authorities were also brutalised in the process and inclined consequently to increased ruthlessness. Lastly, the public which witnessed the degrading punishments was brought nearer to the criminal and to crime. The cumulative effect of this error pursued through the centuries, was ruinously to depress the moral level of humanity both in the social and in the individual sphere.

Even the nineteenth century, conspicuous for the growth of sweet reasonableness, did not lack advocates of the gospel of frightfulness. Among these may be counted so eminent a jurist as Sir James Fitzjames Stephen, who unmistakably reasoned in favour of a relentless severity worthy of the well-meaning founders of the Inquisition. Here are his words :—

"My opinion is that we have gone too far in laying [capital punishment] aside, and that it ought to be inflicted in many cases not at present capital. I think, for instance, that political offences should in some cases be punished with death. People should be made to understand that to attack the existing state of society is equivalent to risking their own lives." (*A History of the Criminal Law of England*, vol. 1, 1883, p. 478.)

"If by a long series of frauds artfully contrived a man has shown that he is determined to live by deceiving and impoverishing others, or if by habitually receiving stolen goods he has kept a school of vice and dishonesty, I think he should die." (p. 479.)

"I suspect that a small number of executions of professional receivers of stolen goods, habitual cheats, and ingenious forgers, after a full exposure of their career and its extent and consequences, would do more to check crime than twenty times as many sentences of penal servitude. If society could make up its mind to the destruction of really bad offenders, they might, in a very few years, be made as rare as wolves, and that probably at the expense of a smaller sacrifice of life than is caused by many a single shipwreck or colliery explosion ; but for this purpose a change of public sentiment would be necessary, of which there are at present no signs." (pp. 479-480.)

"There are in the world a considerable number of extremely wicked people, disposed, when opportunity offers, to get what they want by force or fraud, with complete indifference to the interests of others, and in ways which are inconsistent with the existence of civilised society. Such persons, I think, ought in extreme cases to be destroyed.

"The view which I take of the subject would involve the increased use of physical pain, by flogging or otherwise, by way of a secondary punishment. It should, I think, be capable of being employed at the discretion of the judge in all cases in which the offence involves cruelty in the way of inflicting pain, or in which the offender's motive is lust. In each of these cases the infliction of pain is what Bentham called a characteristic punishment. The man who cruelly inflicts pain on another is made to feel what it is like. The man who gratifies his own passions at the expense of a cruel and humiliating insult inflicted on another is himself shamefully and painfully humiliated. This principle is recognised in a partial and unsatisfactory way in reference to robbery with violence, and attempts to strangle with intent to commit a crime. I think it should be extended in the manner stated. . . .

"I think, too, that the punishment of flogging should be made more severe." (*Ibid.*, vol. 2, pp. 91-92.)

Our author did not perceive that the only certain result of accepting his well-meant proposals would be that the community as a whole would be debased and that crime would therefore flourish more than ever.

In fact, the entire subject of punishment was beset with pitfalls. For instance, what was more natural and equitable apparently than the doctrine, almost universally acted on in certain historic periods, of a tooth for a tooth and an eye for an eye? Again, in our day punishment for serious offences and imprisonment are almost synonymous; but in less advanced and decidedly turbulent times the maintenance of proper prisons would have been impossible. Continuity of government even was not assured. Accordingly, physical penalties of one kind or another, crudely adapted to the nature and the gravity of the offence, became the one great weapon against offenders.[1] Prisons came gradually and tentatively into vogue; but the revelations of Howard and Elizabeth Fry rendered it manifest that prisons, unscientifically organised, may not only be hotbeds of disease but demoralise still further their populations. As a matter of fact, the ideal prison has not yet arrived and prisoners to-day are certainly not reformed as a rule by their prison experiences. Still, the increasingly careful classification and discriminating punishment of delinquents according to age and other circumstances; the institution of Children's Courts and probationary systems; the assistance rendered to discharged prisoners by various agencies; the determined search for, and grappling with, the causes of crime; and the recognition of social responsibility for the existence of much of the crime, are good omens. We must remember that even the object of punishment has been debated, some thinkers reasoning that it should be retributive, others that it ought to be deterrent, and still others that it should be reformatory. There is no end to the complications caused by the complexity and subtlety of the problem.

Facing now the question of the judicial penalties inflicted within the last millenium, we cannot but be aghast at their severity. Death, for instance, was one of the commonest of penalties. This is well illustrated by the legislation incorporated in the Old Testament.

Leaving aside more primitive methods, hanging and capitation—varied by offenders being broken on the wheel, or drawn and quartered, or drowned in water or boiling oil, etc.—were resorted to. To ascertain the innocence or guilt of the person charged, the ordeal was instituted. This might assume the form of carrying uninjured a red-hot piece of iron a certain distance; walking uninjured through fire or over red-hot ploughshares; eating or drinking, without being

[1] "Crime is no doubt far less important than it formerly was, and the means now available for disposing of criminals, otherwise than by putting them to death, are both more available and more effectual than they formerly were. In the days of Coke it would have been impossible practically to set up convict establishments like Dartmoor or Portland, and the expense of establishing either police or prisons adequate to the wants of the country would have been regarded as exceedingly burdensome, besides which the subject of the management of prisons was not understood. Hence, unless a criminal was hanged, there was no way of disposing of him. Large numbers of criminals accordingly were hanged whose offences indicated no great moral depravity." (James Fitzjames Stephen, *op. cit.*, vol. 2, p. 92.)

adversely affected, certain poisonous or non-poisonous substances; not attempting to rise to the surface when being submerged in water; taking a stone out of boiling water without being scalded; accepting the wager of battle where the defeated was regarded as the culprit; taking the oath or eucharist without ill consequences; compurgation by witnesses, etc., etc. In England, fortunately, apart from political and religious offences, it was in later times incumbent on the plaintiff to substantiate his charges and the ordeal was therefore abolished.

Torture also was prevalent until recent times.[1] It already existed in an ill-defined form among primitive peoples and it was unhappily acclimatised in ancient Rome. In that empire it came to be modified by various rules restricting its exercise and its extent. In the Middle Ages, however, the example set by Rome not only acted infectiously, but most of the safeguards were removed. Torture was general for many centuries in Europe and was most prominent in connection with the activities of the Holy Inquisition. The rack, the thumb-screw, agonising prison treatment, and literally hundreds of atrocious devices were employed to wring a confession from those charged with an offence. Here, again, we have to deplore a fatally false psychology—men ignoring the fact that under the stress of the unsupportable pains inflicted, the innocent would be induced to confessing guilt in order to escape further torture. In England alone—where the onus of proof lay on the plaintiffs, as we have seen, save in State and religious trials—was torture only occasionally applied. Its horrors threw entirely into the shade the punishments which followed on conviction.

The ducking-stool, the cucking-stool, and the timbrel were frequently resorted to. The repulsive custom of ear-lopping, nose-slitting, branding, and of the amputation of limbs, widely prevailed. Offenders were condemned to the galleys or to transportation for long periods or for life. They were enslaved, employed on forced labour, or banished. Sentence of death, as we have already seen, was decreed for all but the most venial offences. To aggravate and confuse matters, the law was decidedly a respecter of classes. "Towards the end of the 17th century the following crimes were excluded from benefit of clergy, and were thus capital whether the offender could read or not: high treason (which has always been so), petty treason, piracy, murder, arson, burglary, housebreaking and putting into fear, highway robbery, horse stealing, stealing from the person above the value of a shilling, rape and abduction with intent to marry. In the case of persons who could not read, all felonies, including manslaughter, every kind of theft above the value of a shilling, and all robbery were capital crimes." (Sir James Fitzjames Stephen, *op. cit.*, vol. 1, p. 467.) In the earlier Middle Ages the gradation of punishments in accordance with the social rank of the offender was, of course, universal.

[1]Franz Helbing, *Die Tortur*, Berlin, 1913.

European law up to recent times was not the outcome of moral degeneracy in the race. The Hammurabi Code, compiled some 4,000 years ago for the "benevolent" Rameses III., was even sterner. Here are some of the provisions of that Code :—

"192. If the [adopted] son of a servitor, or the [adopted] son of a hierodule, has said to his foster-father or his foster-mother, 'Thou art not my father,' or 'Thou art not my mother'; his tongue shall be cut out.

"193. If the [adopted] son of a servitor, or the [adopted] son of a hierodule, has come to know his father's house, and he despises his foster-father and his foster-mother, and goes to the house of his father, his eyes shall be torn out.

"194. If a man has given his child to a nurse, and the child dies in the hand of the nurse, and the nurse without the knowledge of his father and his mother substitutes another child, she shall be prosecuted, and because she has substituted another child without the knowledge of his father and his mother, her breasts shall be cut off.

"195. If a son has struck his father, his hands shall be cut off.

"196. If a man has destroyed the eye of a Freeman, his own eye shall be destroyed.

"197. If he has broken the bone of a Freeman, his bone shall be broken.

"198. If he has destroyed the eye of a plebeian, or broken a bone of a plebeian, he shall pay one mina of silver.

"199. If he has destroyed the eye of a man's slave, or broken a bone of a man's slave, he shall pay half his value.

"200. If a man has knocked out the teeth of a man of the same rank, his own teeth shall be knocked out.

"201. If he has knocked out the teeth of a plebeian, he shall pay one-third of a mina of silver.

"202. If a man strike the body of a man who is great above him, he shall receive sixty lashes with a cowhide whip in the assembly.

"203. If a Freeman strike the body of the son of a Freeman of like condition, he shall pay one mina of silver.

"204. If a plebeian strike the body of a plebeian, he shall pay ten shekels of silver.

"205. If a man's slave strike the body of the son of a Freeman, his ear shall be cut off."[1]

A vast space divides primal anarchy from modern law. In the earlier epochs man appears an animal more truculent and vindictive than any other. Judging him solely by his earlier wars and laws, we should be tempted to stigmatise him as an irredeemable savage. Yet time passes and he readily adapts himself to an attitude towards life which differs in practically every one of the salient features characterising him at an earlier stage and shows him eager for an order of society almost infinitely superior morally. There is, clearly, no need to despair of man's higher possibilities.

Here are a few recent works relating to crime : Edwin H. Sutherland, *Criminology*, Philadelphia, 1924 ; Heinrich Oppenheimer, *The Rationale of Punishment*, London, 1913 ; and Charles R. Henderson, *The Cause and Cure of Crime*, London, 1914. See also James Drever, "Psychological Aspects of our Penal System," in *British Association Report for 1926*.

[1] Chilperic Edwards, *The Hammurabi Code*, London, 1921, pp. 37-39.

(c) *Religion.*

The history of religion runs a parallel course to that of warfare and law, with this difference that for long ages religion tended to be both more idealistic and more callous than either. In brief, religion over-emphasised the good as well as the evil. In its inception moral factors of a noticeable character were wanting. Fetish worship did not appeal to the gentler emotions. Terror and propitiation were the two pivots of the earlier religions, as of the earlier despotisms. When in the passage of time offerings came to be made, religion demanded more substantial ones than those exacted by mundane rulers.

Human sacrifices were common at various epochs among the ancient Hebrews who, in this matter, were manifestly following in the wake of neighbouring tribes. A notable passage in *Genesis* presents a vivid picture of the procedure at this ghastly rite. The particular point of interest in this account is the matter-of-fact way in which Abraham receives and strives to execute the order of his deity to make a burnt offering of his son Isaac :—

"And it came to pass after these things, that God did prove Abraham, and said unto him, Abraham ; and he said, Here am I. And he said, Take now thy son, thine only son, whom thou lovest, even Isaac, and get thee into the land of Moriah ; and offer him there for a burnt offering upon one of the mountains which I will tell thee of. And Abraham rose early in the morning, and saddled his ass, and took two of his young men with him, and Isaac his son ; and he clave the wood for the burnt offering, and rose up, and went unto the place of which God had told him. On the third day Abraham lifted up his eyes, and saw the place afar off. And Abraham said unto his young men, Abide ye here with the ass, and I and the lad will go yonder ; and we will worship, and come again to you. And Abraham took the wood of the burnt offering, and laid it upon Isaac his son ; and he took in his hand the fire and the knife ; and they went both of them together. And Isaac spake unto Abraham his father, and said, My father : and he said, Here am I, my son. And he said, Behold, the fire and the wood : and where is the lamb for a burnt offering ? And Abraham said, God will provide himself the lamb for a burnt offering, my son : so they went both of them together. And they came to the place which God had told him of ; and Abraham built the altar there, and laid the wood in order, and bound Isaac his son, and laid him on the altar, upon the wood. And Abraham stretched forth his hand, and took the knife to slay his son. And the angel of the Lord called unto him out of heaven, and said, Abraham, Abraham : and he said, Here am I. And he said, Lay not thine hand upon the lad, neither do thou anything unto him : for now I know that thou fearest God, seeing thou hast not withheld thy son, thine only son, from me. And Abraham lifted up his eyes, and looked, and behold, behind him a ram caught in the thicket by his horns : and Abraham went and took the ram, and offered him up for a burnt offering in the stead of his son." (*Genesis*, ch. 22.)

Ancestor worship equally claimed its victims. The chieftain had his suit immolated with him, in order that he should be well attended in the other world. The widow followed her husband, as in Suttee. And, to avert tribal and other disasters, hecatombs of victims were sacrificed on the altars in order to propitiate the angered and blood-thirsty spirits and gods. Cannibalism was also practised to the end of endearing oneself to the dead, of rendering them innocuous, or of acquiring their virtues.

Religious offences were held in abhorrence and no crime was so severely punished as heresy. The devout Socrates had to drain the cup of hemlock because of his alleged atheism and before and since

his time, until recently, the lot of the free thinker was, but for the consolations of his conscience, the saddest to be contemplated. The Old Testament contains numerous illustrations of the relentless passions unchained by religious differences. Here is one of these :—

"When the Lord thy God shall bring thee into the land whither thou goest to possess it, and shall cast out many nations before thee, the Hittite, and the Girgashite, and the Amorite, and the Canaanite, and the Perizzite, and the Hivite, and the Jebusite, seven nations greater and mightier than thou ; and when the Lord thy God shall deliver them up before thee, and thou shalt smite them, then thou shalt utterly destroy them ; thou shalt make no covenant with them, nor show mercy unto them ; neither shalt thou make marriages with them ; thy daughter thou shalt not give unto his son nor his daughter shalt thou take unto thy son. For he will turn away thy son from following me, that they may serve other gods : so will the anger of the Lord be kindled against you, and he will destroy thee quickly. But thus shall ye deal with them : ye shall break down their altars, and dash in pieces their pillars, and hew down their Asherim, and burn their graven images with fire." (*Deuteronomy*, 7.)

However, the classical example may be said to be the Inquisition which not only terrorised the West for centuries, but was the cause of hundreds of thousands being tortured or burnt at the stake. Yet to our forefathers the Inquisition appeared to be a highly commendable institution. To them its horrors seemed incidental to the paramount duty of purging the community of heretics who endangered the eternal happiness of the faithful by tempting them to leave the rock of the true Church. Listen how the Grand Inquisitor of the Kingdom of Arragon, Nicolas Eymeric, if we may trust our authority, coolly discusses the question of the auto-da-fé :—

"Everybody agrees that heretics should suffer the penalty of death, but the question remains as to the form this should take. Alfonsus Castrus . . . thinks that it is really immaterial whether they perish by the sword, by fire, or in some other way ; but Hostiensis Godofredus, Covarruvias, Simanoas, Roïas, and others, maintain that they must absolutely perish by fire. In fact, as Hortiensis very well expresses it, the stake is the penalty appropriate for heresy. . . . Simanoas and Roïas add that they must be burnt alive, but in burning them one precaution should always be taken, namely to fasten their tongue or stop their mouth, to avoid their scandalising the spectators by their impieties." (*Le manuel des inquisiteurs*, written about 1358 and translated into French by A. Morellet, Lisbon, 1762, pp. 143-144.)

The trials of "witches" formed a pendant to the Inquisition. For centuries these unfortunate women were pitilessly tortured and then burnt at the stake. This constituted a special toll paid by womankind to the insatiable moloch of superstition.[1]

Implacably persecuted on earth for their unorthodoxy—and the smaller the divergence of opinion the more dangerous did it appear to the Church, seeing that the faithful were thus the more easily entrapped,—heretics were doomed to eternal torments in the never-ending hereafter. All graver crimes and all graver offences against ecclesiastical regulations entailed the same irreversible consequences. Even the innocent babe who died without being previously baptised and the "heathen" who returned to mother earth unregenerated, were consigned to the infernal regions where, it was said, the intensity of their sufferings would be only exceeded by the everlastingness of

[1]George Ives, *A History of Penal Methods*, London, 1914.

their punishment. The doctrine of hell is dramatically presented to us in the story of the rich man and Lazarus in the New Testament :—

" Now there was a certain rich man, and he was clothed in purple and fine linen faring sumptuously every day : and a certain beggar named Lazarus was laid at his gate, full of sores, and desiring to be fed with the crumbs that fell from the rich man's table ; yea, even the dogs came and licked his sores. And it came to pass, that the beggar died, and that he was carried away by the angels into Abraham's bosom : and the rich man also died, and was buried. And in Hades he lifted up his eyes, being in torments, and seeth Abraham afar off, and Lazarus in his bosom. And he cried and said, Father Abraham, have mercy on me, and send Lazarus, that he may dip the tip of his finger in water, and cool my tongue ; for I am in anguish in this flame. But Abraham said, Son, remember that thou in thy lifetime receivedst thy good things, and Lazarus in like manner evil things ; but now here he is comforted, and thou art in anguish. And beside all this, between us and you there is a great gulf fixed, that they which would pass from hence to you may not be able, and that none may cross over from thence to us. And he said, I pray thee therefore, father, that thou wouldst send him to my father's house ; for I have five brethren ; that he may testify unto them, lest they also come into this place of torment. But Abraham saith, They have Moses and the prophets ; let them hear them. And he said, Nay, father Abraham : but if one go to them from the dead, they will repent. And he said unto him, If they hear not Moses and the prophets, neither will they be persuaded, if one rise from the dead." (*St. Luke,* 16.)

The torments of hell were regarded as never-ceasing. For instance, in *St. Matthew* 18 we read :—

"And if thy hand or thy foot causeth thee to stumble, cut it off, and cast it from thee : it is good for thee to enter life maimed or halt, rather than having two hands or two feet to be cast into the eternal fire."

This is emphasised, defining also some of the offences, in *St. Matthew* 25 :—

" Then shall he say also unto them on the left hand, Depart from me, ye cursed, into the eternal fire which is prepared for the devil and his angels : for I was an hungered, and ye gave me no meat : I was thirsty, and ye gave me no drink : I was a stranger and ye took me not in ; naked, and ye clothed me not ; sick, and in prison, and ye visited me not. Then shall they also answer, saying, Lord when saw we thee an hungered, or athirst, or a stranger, or naked, or sick, or in prison, and did not minister unto thee ? Then shall he answer them, saying, Verily I say unto you, Inasmuch as ye did it not unto one of these least, ye did it not unto me. And these shall go away into eternal punishment : but the righteous into eternal life."

Yet the pictures of hell presented in the Bible pale before the later teaching on the subject of future punishment. Until about a generation ago, it was the preacher's weird delight to stress the sufferings of the damned and to impress on his hearers that they were every moment in danger of dying and passing to hell. For creating mental agony, without a compensating moral elevation of the individual and social level, it would be difficult to parallel this teaching. Honest John Bunyan, in his *A Few Sighs from Hell* (London, 1658), developing the New Testament fable which we quoted, paints many a lurid picture of the sufferings inflicted in hell. Here is one of these pictures :—

" Set case you should take a man, and tie him to a stake, and with red-hot pincers pinch off his flesh by little pieces for two or three years together, and at last, when the poor man cries out for ease and help, the tormentors answer, ' Nay, but besides all this you must be handled worse. We will serve you thus these twenty years together, and after that we will fill your mangled body full of scalding lead, and run you through with a red hot spit,' would not this be lamentable ? Yet this is but a flea-biting to the sorrows of those that go to hell ; for if a man were served so, there would ere it were long be an end of him. But he that goes to hell shall suffer ten thousand

times worse torments than these, and yet shall never be quite dead under them. There they shall be ever whining, pining, weeping, mourning, ever tormented without ease, and yet never dissolved into nothing. If the biggest devil in hell might pull thee all to pieces, and rend thee small as dust, and dissolve thee into nothing, thou wouldst count this a mercy. But here thou mayest lie and fry, scorch and broil, and burn for ever."[1] (pp. 95-96.)

Excessive and extravagant as were the punishments inflicted or threatened by religious fraternities or by the secular powers acting in their behalf, it would be unjust to assume a corresponding overdose of original sin. It is rather false inferences leading to lamentable conduct, which we have to deplore here as elsewhere.

Leaving now the past of religion, we welcome with an inexpressibly deep sense of relief the plane of religious development which we have reached. The growing spirit of humaneness has deeply penetrated the modern religious consciousness and most of the grossness and brutality accompanying religious tenets have disappeared. Generally speaking, human service, not human sacrifice, is at present demanded and the demon of persecution and the threatened punishments after death are but the shadows of their prototypes. No sacrificial pile marks the sanctuary now; no Inquisition stifles free thought and its expression,[2] no hell torments the heart of the sensitive believer or outrages the conscience of the humanist;[3] and men holding widely differing religious beliefs frequently meet and cooperate in a spirit of amity.

We are therefore justified in supposing that a study of religious development amply bears out our contention of the perfectibility of man, of his feeling at home in an atmosphere of geniality and fraternity so critically dissimilar to the atmosphere of the religious consciousness and life of earlier human stages.

(d) *Economics and Daily Life.*

In Chapter IX. we already sketched the moral advance characterising the history of man in the department of economics and in that of daily life. In the circumstances we need not pursue the subject further. Suffice it to state that the amelioration traceable historically in the three leading institutions of Warfare, Law, and Religion, is

[1] On the subject of hell, the reader may consult: Anonymous, *Hell*, 1863; J. Octave Delepierre, *L'enfer*, essai philosophique et historique sur les légendes de la vie future, London, 1876; William R. Alger, *A Critical History of the Doctrine of a Future Life*, with bibliography, New York, 1878; Joseph Bautz, *Die Hölle*, Mainz, 1905; *Is there a Hell?* A Symposium by Leaders of Religious Thought, London, 1913.

[2] It must be admitted, however, that we are yet far removed from religious tolerance. On the significance and development of toleration see John Locke, *Four Letters on Toleration*; John Stuart Mill, *On Liberty*; John Morley, *On Compromise*; William E. H. Lecky, *History of . . . Rationalism in Europe*; and John B. Bury, *A History of Freedom of Thought*.

[3] The author recently heard a Roman Catholic Evidence lecturer identify heaven and hell with a feeling of nearness to and aloofness from God and, basing himself on the merciful nature of God, he reasoned that neither unbaptised infants, nor non-Christians as such, nor non-Roman Catholics as such, nor average persons, would be likely to be consigned to hell.

visible with no less distinctness in practically all departments of conduct. The reader who wishes to examine other sides of the subject may, for instance, study the following five aspects—the history of amusements including sports, of physical retaliation and corporal punishment, of eating and drinking habits, of sex relationships, and of secular tolerance, where he will find the same remarkable exemplifications of the tendency to limitless progress in individual perfection.

Thus we are passing, roughly, from indiscriminate slaughter to amicable settlement, from brutish vengeance to humane law, from human sacrifice to social service, from slave labour to cooperation, and from reckless self-indulgence and selfishness to reasoned self-control and fraternal considerateness.

(e) *Intelligence and Taste.*

Modern scientific methods are first and foremost a historic product. The primitive man freely accepts hearsay as truth ; indulges in bold speculations on the flimsiest pretext ; assumes that he has penetrated to the core of truth when only an infinitesimal portion of a fact is imperfectly known to him ; generalises, or neglects to generalise, without the slightest compunction ; builds up an airy fabric on mere hopes and fears ; confidently roams from subject to subject, as if omniscience dwelt in him ; and is emphatic and dogmatic, when the very rudiments of a solution are unknown to him. Compare with the picture just drawn the physicist or chemist of to-day, at least so far as his subject is concerned. He distrusts and deprecates hearsay ; he only speculates within the narrowest boundaries, that is, where the facts are well known to him and where he can easily test his speculations ; he professes only to know what he is thoroughly acquainted with ; he generalises cautiously and tentatively and is alert in order not to miss opportunities for generalising when a suitable occasion presents itself ; hopes and fears do not sway his intellect, save in so far as these have an objective basis ; he limits himself to a small portion of reality in his researches and only makes necessary excursions into other fields ; and he is never emphatic or dogmatic, however closely he may have studied a subject. We recognise best this progress in method by observing, for instance, an astronomer or a cytologist at work and comparing his infinite circumspection and diffidence with the reckless manner of the uncultivated individual in whom unrestrained speculation and unshakable self-confidence dominate every avenue leading to truth. Without this profiting by race experience, modern science would be indistinguishable from primitive "science." Not only, however, have refined scientific methods developed, but multitudes of students apply them in their special spheres and there is every reason to believe that with universal training, these methods would be applied by all in all spheres of life.

Similarly with art. Here gradual growth is so clearly illustrated in history that it would be superfluous to enter into particulars. We have yet to find a primitive tribe that can rival the sculptures of Periclean Athens, the Gothic architecture of medieval times, the paintings of the sixteenth century, the music of the centuries following, or the poetry and literatures of the great civilisations of the last three thousand years. Each of these arts, on the contrary, has an interesting history of development, implying throughout cooperation or interdependence of the most intimate character. Art is decidedly a historic product and, as we saw in Chapter IX., even the fine sketches of Cromagnon man were the culmination of a long process of artistic development. Moreover, the wide diffusion of certain art and craft tastes in certain lands and at certain epochs equally argues the artistic perfectibility of individuals generally in favourable external circumstances.

The limitless perfecting of the intelligence and of æsthetic taste appears therefore to be solely a matter of cultural development and opportunity.

Our brief survey of the historic growth of human perfection should remove any grave apprehensions regarding man's perfectibility, especially in view of the crucial part played by removable ignorance, error, and illusion in retarding advance. Indeed, when one reflects that mankind has passed through stages where appalling inhumanity, ignorance, and grossness, scarcely conceivable to-day, prevailed and that our own age registers in many directions an incalculably great advance on the more or less far-off past, it becomes almost self-evident that man's capacity for the higher life knows no bounds.[1]

3. *The Calculable Future.*

Warfare has already become irreconcilable with the general degree of inter-national and intra-national development we have reached. It constitutes an ugly survival, a sad reproach to our time, a menace to our civilisation. Complex and perplexing as the problems yet to be solved are, the outright abolition of warfare should be assumed as inevitable and certain, if not imminent. This new condition of things will lead to a higher form of international life and a keen desire to understand other peoples and cooperate with them.

Many are the signs of the gradual advent of a higher conception of law. The sinister influence of alcohol, of debauchery, of ignorance, of illusions, of fortuitously contracted habits, of certain pathological states, and, above all, of poverty and the hunt for wealth, in forming

[1] "The human species can teach itself to think for truth alone and to act for the good of all men." (Edward L. Thorndike, *The Original Nature of Man*, New York, 1913, p. 312, being the last words in the volume.)

criminals, will be fully recognised. Even a superficial examination of social statistics in relation to crime renders it manifest that in certain strata of society crime is virtually absent. This fact the future will grasp and act on and reduce delinquencies to negligible proportions. Serious offences will disappear for all intents and purposes and venial ones will be reduced to near the vanishing point. On the other hand, as many experiments have already shown, the offender will be dealt with in such a manner that in practically all cases a complete moral cure or disillusionment will be effected. Recidivists will be accordingly phenomenally few in number[1] and habitual criminals, even of a mild type, will have ceased to exist. Scores of present tokens and the whole of history point to a future social condition when cases of lawlessness will be exceedingly rare.

The humanisation of religion will proceed apace on the lines foreshadowed by history. Religious persecution and intolerance will be superseded by religious fraternising and friendly exchange of opinions and religious fears in respect of a life after death will be abandoned as groundless and be replaced by a deep reverence for the human past and a solicitous concern for the unborn generations. The spirit of many thinkers, in the old Churches even, is already touched to fine moral issues.

In economics the chaos of private and competitive enterprise should quickly pass now that the principles of scientific management are being developed. Men will learn to cooperate and to cherish cooperation. The tasks imposed on the individual will be such as he will cheerfully and eagerly execute and work will be for all the joy it is now for the few who are favourably situated. The future economic condition of society will, in this way, contribute substantially to deepen the moral sense of individuals and of communities.

The daily life will be raised beyond anything we can imagine to-day. The rational and moral constitution of societies will afford opportunities for noble living such as are impossible to-day when men are divided into numerous widely differing economic castes and when marked differences in upbringing and schooling further estrange individuals and communities. A true system of moral, intellectual, hygienic, vocational, domestic, and æsthetic education will develop a finer individuality in all men.[2] Mental and physical disorders, having become rare, will not breed the virus of ill feelings. A joyous temperament will be each one's spiritual heritage. A system of hygienic living will preclude countless aberrations relating to the

[1] See the chapter entitled "Prison Ethics," in Herbert Spencer's *Essays*, vol. 3, London, 1891.

[2] "I too acknowledge the all-but omnipotence of early culture and nurture : hereby we have either a doddered dwarf-bush, or a highly-towering, wide-shadowing tree ; either a sick yellow cabbage, or an edible luxuriant green one." (*Sartor Resartus*, book 2, chapter 2.)

appetites and to comforts and luxuries. Violence, callousness, and intolerance, will have been definitely superseded by sweet reasonableness, sympathy, and profound respect for others' opinions and ways. The nature and importance of good habits will be adequately appreciated and such habits will be universal. The moral life will not only be on the whole easy to live, but men will acquire moral strength equal to practically all contingencies. The moral ideal itself will have outsoared the most advanced moral ideal of our age. The generality of men will resemble our leading artists and foremost men of science who are conscious of doing excellently well, but yet strive to do better.

In a word, we are justified in anticipating that our somewhat remote posterity will excel us as much in all matters pertaining to morals, scientific thinking, hygiene, and æsthetics, as we do the distant past in this respect.

4. The Goal.

We may limit our conceptions of the goal we are steering towards by the sanest present-day ideals. In this sense humanity will reach a stage when all men and women will be eager to serve their kind and will know how to accomplish this most effectually. In all human affairs everyone's supreme concern will be to carry out promptly and intelligently, in a sympathetic, genial, and tactful manner, what a thoroughly enlightened conscience demands.

These descendants of ours appear to us miraculously perfect; but their vision will disclose to them vistas fading away before them in a far-off future. Of all men and women one would be then able to say what Wordsworth in his "Ode to Duty" declared of a few in his time:—

> "There are who ask not if thine eye
> Be on them; who, in love and truth,
> Where no misgiving is, rely
> Upon the genial sense of youth;
> Glad hearts! without reproach or blot;
> Who do thy work, and know it not."

5. The Cause of Man's Limitless Perfectibility.

There is scarcely a subject where the value of an appropriate theory is so indispensable as in the one before us in this Chapter. Being, as he thinks, an animal among other animals, man constantly compares himself to animals and draws conclusions accordingly. The tiger is ferocious, the lamb gentle, and interspersed between these extremes he notes various grades of temperaments in animals. In all these cases he believes that the attitude is innate. This concept of congenitality he transfers to man and reasons that, broadly, men's temperaments also are inborn. To imagine that he who is gentle as

a lamb would be, in other circumstances, fierce as a tiger, appears to him to contradict all his experience outside mankind. Consequently, there is the utmost reluctance to ascribe the moral attitudes of individuals, which so greatly and profoundly vary, to social factors. To the generality, sinner and saint seem to be poles apart by nature.

The specio-psychic theory, however, explains the widely diverging moral characteristics of man. Since he is a specio-psychic being, man is infinitely adaptable. In direct proportion to cultural influences acting on him, his moral being differs. Grant a minimum of historic development and a maximum of error, ignorance, and complexity, and his moral nature will be sub-bestial; concede a maximum of historic development and a minimum of error, ignorance, and complexity, and his moral nature will appear super-human. Nor need we be surprised at this, for his intellect and his sense of the beautiful are equally subject to the same specio-psychic law. That is, given sufficient historic development and men will not only be incredibly perfect morally, but also intellectually and æsthetically. Sterling goodness, intellectual capacity, and refinement, are the outcome of the collective experiences and labours of countless generations.

At first sight it may appear that historically not only morality but also immorality is evolved. To a certain extent this is so. The complications which follow on enlarged experience lead to grave errors and to sharp antagonisms. This, however, like complications generally, represents, as we have seen, a transitory phase. Eventually, this immorality, since it is opposed to the well-being of humanity, is bound to be eliminated altogether.

The theory proposed has apparently another implication which men cannot readily reconcile themselves to. After all, it is said, the morally ideal man is not morally ideal in himself, for had his environment been morally degrading, he would have been a repulsive figure. This is true and, happily, untrue. It is true as a fact; but the implications are the opposite of being true. *The practical object of specio-psychism is not manifold, but single. Its aim is the fullest satisfaction of the nature of man*[1] *and inasmuch as this nature can only be fully satisfied by an ideal stage of personal and social culture, the highest moral life alone is natural to man.*[2] So far therefore as a man is immoral, he is in an abnormal condition physically or mentally.

[1] "The real *unum necessarium* for us is to come to our best at all points." (Matthew Arnold, *Culture and Anarchy*, chapter "Porro unum est necessarium.")

[2] The Stoics, for example, were fully convinced of this. Epictetus writes: "What, then, do you wish to be doing when you are found by death? I for my part would wish to be found doing something which belongs to a man, beneficent, suitable to the general interest, noble." (*Discourses*, book 4, chapter 10.)

"None of those things ought to be called a man's, which do not belong to a man, as man." (Marcus Aurelius, *Thoughts*, book 5, 15.) "There is nothing good for man, which does not make him just, temperate, manly, free." (*Ibid.*, book 8, 1.)

To sum up. Since man depends first and foremost on pan-human culture for satisfying his nature, his nature is only satisfied in proportion to the amount of culture his circumstances permit him to assimilate. Whence it follows that full satisfaction can only come to men through a rounded ideal culture. Man is therefore constrained by his nature to press historically towards general cultural perfection. The cause of man's limitless perfectibility lies, accordingly, in his being primarily dependent on, and hence capable of, an ideal all-round culture for fully satisfying his nature.

6. *The Acceleration of Moral Perfection.*

The duties falling on the present generation in regard to the direct acceleration of man's moral perfection are, by implication, outlined in the Section dealing with the calculable future.

With regard to international relations, each nation should bind itself constitutionally to a peaceable settlement of all external disputes whatsoever, quicken the full development of the League of Nations, and intensively promote cordial international cooperation in all public and private spheres.[1]

The reorganisation of the law on a basis harmonising with modern conceptions and sentiments should be hastened. The social causes of offences should be laid bare and removed and means of reclaiming delinquents should be determinedly sought for.

Leaving aside controversial matter, a leading task of our time is to raise the extant ancient religions to the breeziest levels of the present. This should comprise, among other things, the conversion of these religions to the view that the cause of individual and social advance is sadly hampered by their direct or indirect interference with education,[2] with freedom of thought and research, and with the onward march of humanity, and by their looking backward and upward instead of around and before them.

The immediate duties relating to the economic and to the daily life have been amply treated in Chapters VII. and IX. For our present purposes, however, stress should be laid on the rule that in all human affairs every one's supreme concern should be to carry out promptly and intelligently, in a sympathetic, genial, and tactful manner, what a thoroughly enlightened conscience demands. Coupled with this injunction should be the broader one, of each one attempting to live, as far as circumstances permit, in the light of the ideal of the good, the true, the healthful, and the fair.

[1] See G. Spiller, *The Abolition of Aggressive War by Comprehensive Legislation*, London, 1928.

[2] The well-known educationist, W. Rein, in his *Pädagogik* (Leipzig, 1902, p. 13), ventures neither on a rash statement nor on one referring to Germany only when he avers that the Churches insist that the schools should train believing church members.

This Chapter has shown that most of humanity's defects to-day are largely due to the incomplete examination of theoretical and practical problems, to superficial and hasty reasoning, to ignorance of human nature, to backward institutions, and to a medley of casually acquired habits and emotions of an undesirable character. Nothing would be therefore more likely to accelerate progress in individual perfection than an unshakable determination to probe problems to their depths, remorselessly to check inferences by facts and results, invariably to postulate that important problems can be only solved satisfactorily when almost super-human efforts have been made by a large number of individuals for a prolonged period, at all times to insist that the highest life alone is natural to man, to improve defective institutions, and to allow fully for the need of furthering from earliest youth the acquisition of habits and emotions consonant with enlightened ethical, scientific, hygienic, and æsthetic demands.

Chapter XII.

REASONED SUMMARY.

The following general facts, to be explained in the sequel, suggest that mentally man is for all intents immeasurably removed from the animal world.

(1) *Animal and human tools compared.*—It has been said that man is distinguishable from animals by his use of extra-organismal tools. Darwin, in his *Descent of Man,* refuted this by showing that, for example, certain of the Primates sometimes make use of sticks and stones. Since his day, again, it has been noted that a few insect species have regularly recourse to extra-organismal tools. Man, therefore, cannot be defined as the tool-using animal. But this does not affect the point we desire to stress here. In every instance where animals use tools, and no animal species appears to use more than one or two tools, it is a question of what may be called natural or unfashioned tools. Now compare these with some human tools or sets of human tools—a rotary newspaper printing press, a high-class railway locomotive, a great ocean liner, a fully equipped physiological laboratory, a large-scale engineering works. Some of these are virtually hundreds of millions of times more complex in character than any extra-organismal tool we find in the animal kingdom. The difference, in fact, is so great that it becomes for all intents infinite. We have spoken of material tools. But mental tools should not be forgotten. Thus among the mental tools of man may be mentioned a series of mathematical manuals rising from the elements of arithmetic to the infinitesimal calculus, a text-book of methodology, a comprehensive atlas of the world, a university, or a monumental encyclopedia. On the other hand, no animal's environmentally derived mental tool appears to occupy a higher level than does an unfashioned stick or stone on the material tool plane.

(2) *The evolution of tools.*—The tools of animals, since they are unfashioned and do not vary for any given species, can have no history. As we have stated more than once in the course of this volume, the ape's extra-organismal tools of a hundred thousand years ago and of to-day are identical. Now this is fundamentally different with man. We begin with eoliths difficult to distinguish from many unfashioned flints and end, in the passage of time, with most elaborately fashioned tools. Accordingly, among animals, no evolution of tools at all and, among men, a measureless evolutionary process leading, broadly speaking, from the infinitely simple to the infinitely complex.

(3) *Evolutionary levels in contemporaneous tools.*—Again, whereas among the different groups (or individuals) constituting a given animal species at a given time the tools, since they are unfashioned, are necessarily marked by a total absence of evolutionary levels, among the different human groups in an age like ours the tools may be said to differ almost limitlessly as regards such levels. Thus the present-day material and mental tools of the Australian aboriginals take us back to almost mid-paleolithic times, whilst other extant human groups present us with practically all the intermediate stages between these tools and the immeasurably more highly developed ones of the most up-to-date countries. (This is also largely true of the material and especially mental tools used by the different social sections in the most advanced human groups.) The evolution of tools is thus to no small extent reflected in the corresponding range of later contemporaneous tool levels.

(4) *The unity of mankind.*—Animals are solitary, semi-gregarious, or gregarious. However, judging by the available evidence, no animal "society" exists which is not strictly circumscribed in space and time. As Chapter IV. has shown, groups of bees and of other social animals do not communicate or collaborate and for all intents each group is only germinally connected with the generations that preceded it. Now this is entirely different with mankind, for the human species as a whole consists of a single civilisationally interrelated group. The evolution of tools proves the unity of mankind in time. Its unity in space is directly evidenced by such bodies as the Universal Postal Union and the all but universal League of Nations; but anthropologists also assure us that group contact on a considerable scale was already common in early prehistoric days. Consequently, just as there is no evolution whatever of extra-organismal tools among animal species, so animal species do not manifest anything however distantly approaching the broad civilisational unity of the human species in space and time.

(5) *Diversity in mental status.*—We have spoken of the indifferent superiority of the eolith over the ape's stone or stick and we have seen that from such unpromising beginnings almost infinitely complex tools were developed by man in the course of the ages. The same relation subsists with regard to the mental status of human beings and of apes. Eolithic man was, so it seems from the fact that he used eoliths only, not greatly superior mentally to the highest apes of the period; but gradually man's mental status rose until it came to be almost infinitely above that of the ape tribe whose mental powers do not appear to have noticeably advanced during this immense interval. Moreover, the observable mental differences in contemporaneous human groups to-day are almost as great as those between

the most distant human epochs; within some of these groups there are differences almost as marked; and this holds, in certain cases, even of parents and children (*e.g.*, Immanuel Kant and his parents). Whilst, therefore, we do not find in any animal species, either in space or in time, differences in mental status exceeding, say, the ratio of 1 to 5, we may observe in man, both in time and in space, differences ranging, say, between 1 and 500.000.000 (*e.g.*, compare earliest Aurignacian man and an encyclopedic scholar).

Two other crucially important differences are that man has tens of thousands of tools as against individual animal species which have never more than one or two tools and that whilst man's tools are virtually without exception tool-made, animals' tools are never tool-made. To which may be added that man uses sometimes perhaps thousands of tools to produce a given object (*e.g.*, an ocean liner), whereas animals never use more than one for such a purpose and that the number of man's distinctive tool-made products almost infinitely exceeds the number of the distinctive tool-made products of any given animal species.

All animal species hence agree in never employing fashioned tools, in (as a consequence) never evolving tools, in never (as a consequence) resorting in one and the same generation to tools representing different evolutionary stages, in being broken up into solitary individuals or into relatively insignificant living groups, and in their members only departing slightly from one another in observable mental capacity through space and time, whilst man differs from them in these respects well-nigh to an unlimited extent.

How is this incalculably great and almost infinitely far-reaching difference between the animal world and the human world to be explained? Darwin and numerous biologists reply: By biological selection, as in the case of all notable differences among animal species. The answer seems perplexing. Physically man is closely allied to the Primates and, in particular, to the higher apes and yet, as we have seen, he differs from them almost infinitely in certain vital respects. If no animal fashions tools, how are we to explain the almost infinitely elaborated tools of man? If no animal possesses any evolved tools, how are we to explain man's almost infinitely evolved tools? If no animal species of a given generation resorts to tools representing different evolutionary stages, how are we to explain contemporary man resorting to tools representing countless evolutionary stages? If every animal species is broken up into solitary individuals or into diminutive living groups, how are we to explain that through space and time the human species forms for all intents a single civilisationally interrelated group? And if the members of given animal species, regardless of space and time, vary in observable mental status as 1 to 5

say, how are we to explain men historically, geographically, and communally varying in this matter as 1 to 500.000.000, say? There is not the faintest biological precedent for such a colossal difference between closely related species; in fact, such a difference, if biological in origin, would throw the whole evolutionary scheme into confusion. If men as well as their tools differ almost infinitely, why should the members of any given animal species and their tools agree in only differing almost infinitesimally?

Darwin and other biologists tacitly assume that the vast differences we have enumerated are useful to man and that therefore they evolved. But might not similar vast differences be useful to other species? Why should man be the first species where such enormous and altogether unprecedented differences occur, where mental stability and homogeneity, universal in animal kinds, are for all intents completely wanting?

It may be said that we are not able as yet to offer a biological explanation of this almost infinite difference between man and all animal species, but that we must abide by facts. There is, however, the prior question whether the facts, so far as known, justify the hypothesis that the explanation is bound to be of a biological order.

Darwin, as was his wont, faced the problem squarely and contended that human beings and human groups do vary immensely in innate mental status, at the one end connecting roughly with the animal world and at the other with ideal humanity. He claimed that primitive peoples had keener senses than Europeans, that their temperaments were different, and that in intellect and ethical quality they fell immeasurably below the finest specimens of the European race. Comparative psychologists are, however, now agreed that apart from non-biological causes, the senses and temperaments of primitive peoples differ in no appreciable way from the senses and temperaments of Europeans and they criticise, moreover, the suggestion that we may legitimately infer that the remaining mental differences between Europeans and primitive peoples are inborn. We have therefore no direct scientific evidence that among men actual differences in mental status are due to congenital differences and yet such evidence, if the biological theory is justified, should forcibly obtrude itself on every side.

There is a consensus of opinion among anthropologists that the modern human species dates back to the beginning of the Aurignacian period, some forty thousand years ago, and that its innate mental status has probably not changed since then. Now the achievements of earliest Aurignacian man were considerably below those of the civilisationally least significant man of to-day, the Australian aboriginal. Accordingly, if our anthropologists are correct, we are bound to assume that all mental capacity above that displayed by earliest Aurignacian

man (who, we may observe, already profited by a relatively extensive cultural heritage) is due to a non-heritable factor. Thus, consistent with the theory of evolution, modern man's innate mental capacity, as distinguished from his observable mental capacity, would stand only measurably above that of man's immediate animal precursor, being perhaps equal (if we judge by Aurignacian man) to improving slightly the equivalent of a primitive tool during a life-time.

Analytical considerations lend support to this contention, as we shall see in the fully documented Appendix A. A comparatively exhaustive examination of the facts irresistibly suggests that strictly of themselves not even historic celebrities make any notable civilisational contribution ; that is, that if we allow for what they have absorbed from their environment, surprisingly little of what they have achieved remains unaccounted for. In Chapter IXa. (Section 5) we examined a series of leading modern discoveries, with the same result. A perusal of scientific monographs confirms this conclusion. And, lastly, if we think how slowly, for example, the motor car, the airplane, the airship, or any given science is being perfected to-day through the direct and indirect collaboration of countless individuals, we shall be inclined to admit that the anthropological theory of the innately humble and innately non-progressive mental status of the modern human species is not only presupposed by the general doctrine of evolution but is amply vindicated by the facts. This line of argument is further reinforced by noting how historical records and traditions act as ever-growing reservoirs of knowledge and sentiments and how all but the most primitive feelings and methods of procedure are a specio-social product post-natally acquired by the individual.

The biological theory seeks to explain all observable mental advance by reference to germinal changes. Yet history generally, and modern history most especially, indicates that vast cultural transformations may take place *within* a given generation. Thus frequently, as the result of general civilisational developments, great masses of older people gradually come to hold, for instance, views on religion, on art, on conduct, on politics, on customs, widely differing from those they held when young ; indeed, as men grow older, their general intellectual and emotional attitude towards life, in agreement with the broad social trend of a progressive period, often undergoes a profound revolution. That is decidedly true of the last few centuries in the West and even truer, of course, of the Far East in our day. This means that civilisational developments are not necessarily preceded by germinal changes.

Finally, conclusive direct evidence is forthcoming to-day to prove that we need not suppose that any human being in our age is by nature more highly evolved mentally than was earliest Aurignacian man. We

have seen what were Darwin's views of the innate mental outfit of primitive peoples. The world, however, has educationally advanced since he wrote and accordingly elementary schools are to be found at present practically the world over. For example, in an official report we read that "age for age and opportunity for opportunity" the children of the Australian aboriginals equal the average white children in attainments and mental powers. To express this concretely and in a universalised form : in some instances the children of the most primitive and of the most advanced peoples are, broadly speaking, being taught to-day by the same Western teachers the same subjects, in the same classes, by the same methods, with the same rapidity, and with the same quantitative and qualitative results. Nor is this true only of elementary schools, for in Western universities the above also applies to the students of Far Eastern and African descent. Moreover, it is not a question of a few non-Western students here and there, but of thousands and tens of thousands of these. (No animal, we should remember, could pass as much as the entrance examination to a kindergarten.) In other words, from a purely scientific point of view we have, on the evidence before us, no right to claim that mentally one race is by nature more highly endowed than another. As therefore the Australian aboriginal, whose civilisation is the lowest extant, appears to be by nature for all intents the equal mentally of the Caucasian and as he already benefits by a relatively highly developed culture, we may assert with some confidence that the native ability of any human being to-day does not surpass the actual ability exhibited by earliest Aurignacian man who, as we have said, seems only to have been capable, *at best,* of slightly improving a primitive tool or idea in the course of a life-time.

It is frequently contended that certain races, peoples, classes, individuals, and sexes, are "obviously" inferior or superior "by nature" and, also, that children brought up in a home under "identically similar conditions" often differ considerably. Scholars will dismiss with a smile these naïve arguments from "obviousness" and "identically similar conditions," for only an exhaustive enquiry could prove innateness in the first case whilst a brief investigation in the second case will dispel the illusion of the existence or persistence of identically similar conditions in any home. There could be, scientifically, no more untrustworthy criterion than that of "obviousness."

Our examination has disclosed a positive and a negative fact—on the one hand, that men's innate mental capacity places them only moderately above the higher apes (as general biological and evolutionary principles imperatively demand) and, on the other, that the observable immense mental differences between man and the animal world and between men themselves are not, and cannot be, biologically conditioned.

One non-biological factor has been widely acknowledged during the last two generations, namely the social or cultural heritage. But, as a rule, belief in this factor was regarded as consistent with belief in almost illimitable differences in innate mental capacity and, furthermore, this belief left the dynamics of the cultural heritage entirely unexplained. For scientific purposes, therefore, the current cultural conception throws no light on the problem we have raised. Still, the terms "culture" and "cultural" are too deeply rooted in language and too convenient to be discarded, nor, indeed, is it necessary to contemplate such drastic action since a definite connotation may be readily given to these terms by scrupulously delimiting, as we have done, the respective spheres of nature and culture. (Climatic conditions cannot, of course, be the factor we are in quest of, seeing that the most radical cultural changes may be produced whilst these conditions remain unchanged.)

A factor, however, exists which adequately and circumstantially explains the series of facts under discussion. Its utter simplicity probably accounts for its having been slurred over. It is summed up in men's capacity to learn freely—that is, almost limitlessly—from their fellows. The elementary school, compulsory for all children in civilised countries, typifies this factor. Here the young acquire within a few years the elements of what it has taken countless ages of men and women to discover, invent, or improve. That is, the thought of unnumbered millions, gradually more or less purged of errors, irrelevancies, and superfluities in the course of time, is in this way absorbed by the modern child and, *a fortiori,* by the modern university student and professor. If, on the one hand, we study, for instance, the extremely slow evolution of the lower and higher mathematics and, on the other, remark how the general result of this evolution is compressed in a number of manuals and is systematically assimilated by those who desire to become proficient in the subject, we see how the human individual, in the most favourable historical, social, and individual circumstances, may be almost infinitely removed from the animal world, whilst, in the most unfavourable circumstances when, say, his fellows cannot count at all, he may be scarcely removed from that world at all.

Thus, as we shall now see, our five general facts are readily explained and prove to be so many aspects of one fact—*the ability to learn freely from others.* The fully equipped physical laboratory is almost infinitely removed from the stick and stone of an animal because the former is an expression of the compressed thoughts of thousands of millions, whilst the latter represents for all intents what one member of a species is capable of. So with the evolution of tools and thoughts: as human beings can learn from their fellows and can infinitesimally improve on what they have learnt, the possibility is given, in contrast

with animals, of unending cultural evolution. Likewise with the evolutionary levels in contemporaneous tools : favourable and unfavourable cultural circumstances determine whether a group or individual of to-day will have recourse to tools representing one or another of countless evolutionary stages. Similarly with the unity of mankind : since man is able to learn freely from his fellows, he learns from all his kind and his whole species becomes therefore one "great society." Lastly, since innately the modern individual is no further advanced mentally than Aurignacian man, historical, environmental, and subtle psychological circumstances will decide how much he will learn from his fellows near and far in space and time ; hence follow in any advanced age vast differences between groups and scarcely less vast differences between individuals within certain groups, differences expressing themselves now in virtual animality and now in virtual godhood. And so with other general facts of equal importance.

The reasoning in the preceding paragraph assumes that members of animal species are for all intents unable to learn from their fellows. In support of the justice of this supposition we shall only mention here that the late L. T. Hobhouse conducted a comprehensive series of experiments to settle this issue and arrived at the conclusion that it was doubtful whether individual animals can profit by any experience but their own. Twenty-five years' further study of the results obtained by animal psychologists left him in the same divided state of mind, although he had no theoretical predilections in favour of any particular view on the subject. Professor Hobhouse's conclusion only confirms the general evidence presented in Chapter IV. There can be therefore no reasonable doubt that *for all intents individual animals are individuo-psychic or confined to profiting by their own experience and individual human beings are specio-psychic or able to profit also by the experience of their whole kind present and past.* In the former case, the individual is the thinker (individuo-psychism) ; in the latter, the thinker is for all intents the species as a whole (specio-psychism).

In an earlier portion of this Summary a biological explanation of the series of general facts under discussion was regarded as practically inadmissible because, among other things, it involved a violent break with the general biological past. Yet here we posit that up to man, including man's nearest animal relations, the ability to learn freely from others was entirely absent and that, with the advent of man, this ability suddenly sprang into being.

The capriciousness of the emergence of the new factor is fortunately more apparent than real, for, as we shall see now, this factor was the final and inevitable outcome of an evolutionary process extending over incalculable ages. With the lowliest forms of animal life, senses, instincts, and intelligence began to develop. This development

continued until the wonderful senses, instincts, and intelligence of the highest animals had evolved. Now on the side of the intelligence the greater apes form the culminating point of this development. Here, as close observation will readily suggest, the mental stage reached was so high that a slightly further mental advance, equivalent say to the mental distance separating the higher monkeys from the higher apes, was bound to produce an intelligence just sufficiently evolved to be able to profit by others' experience and thought. Moreover, this necessarily led to a relative disintegration of individuo-psychic instincts (as superfluous or obstructive) and to the development of certain specio-psychic or inter-learning instincts. Hence men's unique power of learning freely from their fellows. Accordingly, the sudden emergence of man's potentially almost infinite powers, is not only not incredible but was, as we learn, inevitable if we assume an appreciable evolutionary advance beyond the greater apes. (It is difficult not to connect the higher intelligence of the greater apes with their semi-erect posture. If so, man's mental superiority over these apes should be presumably connected with his completely erect posture and all that this involves.)

We shall turn now to an examination of the systematic value of the distinctively human stage of life. This is best revealed by the development of human culture. If we examine the nature of this development, we learn to our surprise that it repeats the process of organic evolution as a whole, only on a different and higher plane. This process represents a method of adaptation to a great variety of circumstances—developing and perfecting senses, instincts (of which the human equivalent is methods), and intelligence; diverse ways of obtaining food and shelter and ensuring the continuance of the race; different modes of progression suitable for underground, land, water, and air, and for varying conditions in each; acquisition of strength, swiftness, and convenient size, form, and coloration; sundry methods of defence and attack; adaptation to hotter and colder climates and seasons and to all types of weather; tending and protection of the young; family and group cooperation and communication; satisfying of curiosity; play and utilisation of leisure; æsthetic appearance and love of the beautiful; and much else. Now in the single species, man, cultural adaptation through cultural development accomplishes all this—only, as a rule, far more effectively.

The principle of cultural development thus replaces in the world of man the principle of organic development in the world of plants and animals. Differently expressed, whereas each substantial adaptation in the plant and animal kingdoms involves the creation of a new species, the cultural mode of adaptation—however far-reaching the adaptations, as in the evolution of the ultra-microscope or of the

airplane—exacts no biological change in the human species. Consequently, within the one species, man, cultural changes proceed in every way homologous to the totality of the organic changes perceptible in the course of animal evolution generally. Hence the infinitesimally varied and graded, non-progressing modes of life of the members of any and every given animal species and the almost infinitely varied and graded, endlessly progressing modes of life found in mankind. Such a profound and far-reaching revolution in the animate world—a revolution even more profound and far-reaching than that due to the appearance on the earth of integral locomobility which ushered in the animal kingdom with its wealth of highly developed organisms, senses, instincts, and individual intelligence—imperatively requires that we place man in a kingdom by himself. However, if, contrary to this conclusion, biologists have tended to place man among the Primates and to consider the systematic difference between him and the higher apes as comparatively trivial, this has been solely because they have overlooked the fact that the specio-psychic human world marks a new and critical departure in animate nature, cultural development and evolution superseding organic development and evolution.

The conception of man which emerges from our enquiry also furnishes a foundation for a science of sociology. Seeing that the individual is dependent on his fellows near and far in space and time for rising above the eolithic stage and that he can only do full justice to his nature by identifying himself with his kind as a whole, it follows that he is distinctly a social, or more correctly a specio-social, being. Moreover, whereas the enormously great differences in innate mental capacity supposed to exist among human beings, made all calculation and prediction futile and therefore a sociology impossible, the new view claims that every socially important mental achievement is a complex social product forming part of a complex social and historical, and therefore calculable and predictable, trend. Lastly, the fact that geographically and historically the inborn mental capacity of all normal human beings is virtually equal and virtually infinitesimal, immensely simplifies the task of the sociologist in understanding and explaining human life; in fixing the position of science, education, institutions, democracy, and internationalism in the human economy; and in tracing the vast historic growth in cultural diversity, progress, cooperation, and perfection.

The practical conclusions which flow from the specio-psychic theory may well be considered as of supreme importance for the conduct of life. They show, to mention one main conclusion, that the individual isolated from birth or nurtured in a cultureless environment, would be just a super-ape, but that the same individual leagued with his whole kind through assimilating the substance of the best of the

present-day cultural heritage becomes a self-conscious personality capable of reading the secrets of nature and guiding his life by world-embracing ideals. Cordial, intimate, and universal cooperation is accordingly of paramount importance and hence all individual and collective exclusiveness and selfishness is bound to prove anti-human and suicidal sooner or later. For this reason, too, broadmindedness, modesty, and readiness to learn and serve, as well as the complementary virtues conditioning the growth of the cultural heritage—originality, initiative, enterprise, and progressiveness,—are cardinal demands.

Nor is the other main conclusion which we should like to stress in this place less significant. Since man depends specifically on culture, he will satisfy his nature the more adequately the more he possesses of culture and therefore, it seems, only the ideally good, true, hale, and fair will yield him the highest and completest satisfaction. This is confirmed by a collateral consideration, namely that the trend of progress is plainly in the direction of rounded perfection and also by the fact that since numerous individuals among numerous peoples have lived a practically ideal life, such a life, on biological grounds, is within the reach of human beings generally under certain circumstances. If the present stage of cultural development seems to belie this optimistic view in various ways, further reflection may render it probable that defective social, economic, and educational organisation, retarded development of the social and moral sciences (because of their greater complexity), ignorance, error, and anti-progressive habits and customs—all of these sure to be overcome as the ages pass—fully explain (a) the comparatively low standards which are still widely prevalent, (b) the common anti-social and anti-biological belief that individuals, families, classes, nations, races, and the sexes prodigiously or markedly differ from one another in inborn mental capacity, and (c) the imperfect recognition of the equal respect due to past, present, and future as representing in their efforts at improvement the one flowing and growing stream of specio-collective and ever-progressing culture.

Indeed, our conception of man, once clearly grasped, offers a general method of rationalising life by substituting scientific for haphazard or dogmatic guidance. Furthermore, in demonstrating that the individual by himself is a mere brute and that wisdom, power, goodness, and beauty are humanity's creation, this conception vindicates the supreme religious postulate of the complete dependence of the individual on a higher power for the higher life.

To sum up the fundamentals of the subject. Evolutionary considerations imperatively demand that man's inborn mentality shall be only moderately higher than the inborn mentality of the greater apes to whom man is nearly related. In their turn, biological considerations

demand as imperatively that human beings, like the members of all animal species without exception, should only moderately differ among themselves in innate ability. How, then, accepting unreservedly these two imperative demands, are we to explain the incalculably great mental differences and changes traceable among men and groups of men in all lands and all ages? The answer is, by fully allowing for the distinctively human inter-learning factor: the ability to learn freely from others near and far in space and time, whereby the individual, according to historical and other circumstances, may rise from virtual animality to virtual godhood. But, lastly, what explains this uniquely human factor which places man in a kingdom by himself because it removes him measurelessly from the plant and animal worlds? It is that the intelligence of the greater apes—who are by far the most intelligent of animals—is so highly advanced that a moderate mental advance beyond them inevitably gives rise to an intelligence—man's—just equal to learning freely from all intelligent beings and thus enabling men, by assimilating the consolidated experiences and thoughts of their whole kind, to multiply their mental powers almost infinitely. Here, accordingly, we have at last a theory in closest accord with fundamental evolutionary, biological, historical, and educational facts, one which solves the bewildering riddle of man being at once intimately related to the animal world and yet infinitely removed from it, one indeed which ought to give the completest satisfaction to the uncompromising evolutionist and biologist, on the one side, and to the believer in the potential nobility and grandeur of man, on the other.

FINIS

APPENDICES.

Appendix A.

THE CAUSES OF GREATNESS.

In a vague, general way there is little reluctance among men of science to accept the theory of the specio-psychic nature of man. As this volume abundantly testifies, the specio-historic origin of the accumulations of knowledge has been repeatedly affirmed by scholars. It is, however, in its concrete aspects, as with most theories, that difficulties are encountered. Men are said to be decidedly and eminently unequal in native capacity: the average man is sometimes flouted as almost a fatal obstacle to progress; the ranks of the talented follow next, whose contributions are said to be mainly practical and executive; and then, *longo intervallo,* come the few men of genius, to whom virtually everything of value is said to be owing. Thus interpreted, the specio-psychic theory loses all meaning and significance. Instead of a definite and calculable cultural unit, we have presented to us a prodigious mass of practically negligible units, a fair number of varying units of some consequence, and a few capriciously distributed units exceeding the average millions of times in value. If this conception of man is valid, there is room only for the recording historian, not for the man of science.

However, we have found reasons for suggesting a less startling theory, one in accord with general biological data. The species *Homo* appears thus as one among a multitude of species where, as regards native capacity, the individuals fluctuate slightly around a highly efficient norm, instead of resembling an anti-biological lottery where most individuals draw blanks, a certain number small benefits, and one or a few gigantic prizes.

Critical analysis has suggested in the preceding Chapters that the innate capacities of different human races do not measurably vary and this is coming to be admitted, even among eugenists. In this Appendix we hope to trace the cultural causes of individual greatness.

Carlyle did not conceive the world of men as a sea of nullities, with a rare island projecting here and there. He writes: "'Hero-worship,' if you will,—yes, friends; but, first of all, by being ourselves of heroic mind. A whole world of heroes; a world not of flunkies, where no hero-king can reign: that is what we aim at!" (*Past and Present,* Chapter VI.) An earlier writer, no less racy than Carlyle, saw no reason why men should be divided into fundamentally different categories: "Nature hath made men so equal, in the faculties of body and mind; as that though there be found one man sometimes manifestly stronger in body, or of quicker mind than another, yet when all is reckoned together, the difference between man and man is not so considerable, as that one man can thereupon claim to himself any benefit, to which another may not pretend, as well as he." (Thomas Hobbes, *Leviathan,* Chapter XIII.) William Godwin writes with conviction: "Give me all the motives that have excited another man, and all the external advantages he has had to boast, and I shall arrive at an excellence not inferior to his." (*The Enquirer,* London, 1823, p. 12.) And the founder of the Ethical Movement, Felix Adler, thus expresses himself on this theme: "Though great personalities are few and exceptional, nevertheless, since human nature is essentially the same, we may infer that what was explicit in them is implicit in the rest of us." ("The Sources of Undying Inspiration," in *The Standard,* New York, May 1926, p. 273.)

On the physical side our view is also supported by facts. "As the case stands to date, it seems not improbable that the brains of a selected group of eminent men when compared with those of a non-selected group of men, would not show any significant differences in size and weight." (Alexander A. Goldenweiser, *Early Civilisation,* New York, 1923, p. 5.)

In tracing the causes of individual greatness, we shall take for our first and leading example Raphael, who is styled "the divine painter," and see what his career may teach us. He was born in the spring of 1483, about 450 years ago, and died thirty-seven years later, in 1520. Within that brief spell an enormous output was crowded, many hundred productions being attributed to him.[1] Inasmuch as his father, Giovanni Santi, was a painter, Raphael may have been initiated into the mysteries of the painter's craft in childhood, but, on the other hand, since his father was not an artist of note, it may have been fortunate that he died when Raphael was only eleven years of age. In any case, when Raphael had reached his majority, he was an independent painter and by the time he was twenty-five, a painter of mark outdistancing many of his prominent rivals. When, twelve years later, he suddenly succumbed to a malignant fever, Italy mourned the death of a master whose works evoked the profoundest admiration.

(a) When we scrutinise Raphael's life-story, we are, contrary to what the current genius theory would lead us to expect, first impressed with his immense industry. Not only do we find him astonishingly productive, but there are countless proofs that he made the most painstaking and multifarious studies and preliminary sketches for his pictures. Furthermore, he minutely examined the works of other painters. He copied from nature. He engaged in anatomical researches. And he made himself intimately acquainted with the science of painting. From first to last—during his whole career—he was not only a sheer painter of pictures, but an eager learner and an indefatigable student. It has been accordingly said that his early death was primarily due to his having prematurely exhausted his physical and mental energies.

Raphael was, then, a tremendous worker. Still, most of us know to our cost that not everybody who is a great worker, is great. Unremitting industry *may* be a part of the secret of greatness, but it cannot be the whole. Yet, granting this, Raphael's life suggests that greatness is not to be confounded with facile achievement.[2]

[1] Critics, however, suspect that "the greater part of the pictures attributed to Raphael, even those signed, are the work of pupils." (Vilhelm Wanscher, *Raffaello Santi da Urbino,* London, 1926, p. 4.)

[2] Sir Joshua Reynolds develops this view in detail in his *Discourses* (1924 edition). "Labour," he states, "is the only price of solid fame" (p. 6), and continues: "When we read the lives of the most eminent painters, every page informs us that no part of their time was spent in dissipation. Even an increase of fame served only to augment their industry. To be convinced with what persevering assiduity they pursued their studies, we need only reflect on their method of proceeding in their most celebrated works. When they conceived a subject, they first made a variety of sketches; then a finished drawing of the whole; after that a more correct drawing of every separate part,—heads, hands, feet, and pieces of drapery; they then painted the picture, and after all re-touched it from the life. The pictures, thus wrought with such pains, now appear like the effect of enchantment, and as if some mighty genius had struck them off at a blow."

(b) The second trait which we observe in Raphael's character is one which, on the genius theory in vogue to-day, dumfounds us. We find him an inveterate and incorrigible imitator. He largely uses others' figures and others' compositions and is generally what would be called to-day a plagiarist. In fact, compared with many second-rank painters, he is decidedly unoriginal. What is, however, immensely more significant is that he especially profits by others' style. For some years, in his earliest stage, he is so entirely Peruginesque that the layman would find it difficult to distinguish between his paintings and those of his master, Perugino : it is as if Raphael desired to obliterate his own individuality and to assume that of his teacher. Visiting later, about the age of twenty-three, Florence, a change comes over him and he is critically influenced in his style by Leonardo da Vinci and Fra Bartolommeo. Called by the Pope to Rome, about the age of twenty-six, he capitulates to Michael Angelo's influence and instead of being all languid repose, as he had mostly been, his pictures become primarily expressions of nervous vigour. Nor, indeed, is it easy to name one eminent painter of the second half of the fifteenth century from whom he did not deliberately adopt something. Raphael is, therefore, an epitome of his age : he is practically his fellow-painters rolled into one.[1]

(c) Thus Raphael is far removed from the "superior" individual who scorns to learn from others. In fact, instead of being independent of his

(p. 7.) Again, "Excellence is never granted to man, but as the reward of labour." (p. 20.) He warns his students : "You must have no dependence on your own genius. If you have great talents, industry will improve them : if you have but moderate abilities, industry will supply their deficiency. Nothing is denied to well-directed labour : nothing is to be obtained without it. . . . I will venture to assert that assiduity unabated by difficulty, and a disposition eagerly directed to the object of its pursuit, will produce effects similar to those which some call the result of *natural powers*." (p. 22.) And what could be more pointed than this. Speaking of the well-grounded painter, he avers : "Without conceiving the smallest jealousy against others, he is contented that all shall be as great as himself, who have undergone the same fatigue." (p. 24.) Francis Bacon had said that the painter must achieve his purpose "by a kind of felicity." Upon which Reynolds remarks : "If by felicity is meant anything of chance or hazard, or something born with a man, and not earned, I cannot agree with this great philosopher." (p. 31.) Michael Angelo, according to our author, "was distinguished even from his infancy for his indefatigable diligence. . . . I have no doubt that he would have thought it no disgrace that it should be said of him, as he himself said of Raffaelle, that he did not possess his art from nature, but by long study. He was conscious that the great excellence to which he arrived was gained by dint of labour." (p. 279.)

[1] "When we have had continually before us," writes Sir Joshua Reynolds, "the great works of art to impregnate our minds with kindred ideas, we are then, and not till then, fit to produce something of the same species." (*Discourses*, 1924 edition, p. 85.) Of course, bare imitation is not everything. "Consider [the great masters] as models which you are to imitate, and at the same time as rivals with whom you are to contend." (*Ibid.*, p. 102.) Or, otherwise expressed : "Instead of treading in their footsteps, endeavour only to keep the same road." (p. 17.) Reynolds expatiates on the dangers involved in self-satisfied ignorance : "A student unacquainted with the attempts of former adventurers, is always apt to over-rate his own abilities ; to mistake the most trifling excursions as discoveries of moment, and every coast new to him, for a new-found country." (p. 13.) Again, "a man who thinks he is guarding himself against prejudices by resisting the authority of others, leaves open every avenue to singularity, vanity, self-conceit, obstinacy, and many other vices, all tending to warp the judgment, and prevent the natural operation of his faculties." (p. 122.)

environment, he appears utterly unintelligible without it. Judged by him, the great man seems to be, in the first instance, not an innovator but an imitator. In effect, Raphael's career suggests that the great man's superiority resides largely in that his energies are concentrated on improving on others' work rather than on experimentation and innovation.

(d) However, nothing can be more obvious than that not everybody who follows in others' footsteps is great. We must therefore enter into some corrective detail. Raphael did not imitate indiscriminately. Far from it. He only adopted and adapted what struck him as being the best of its kind. By reason of this, he was no one's disciple in any narrow sense, but wherever, in his restless search, he discerned something of superior quality, he was quick to recognise and assimilate it. Hence his life-long progress. Hence practically a minimum of defects and a maximum of virtues. It appears, therefore, that the aspirant to greatness follows, and seeks to equal, the best masters.

(e) Moreover, Raphael went a step further. He not only followed and endeavoured to equal what is best, but ever strove to surpass it.

(f) And, lastly, he never rested satisfied with his own best, but ever tried to better it.

According to this analysis, then, the great man is immensely industrious and relies to a crucial extent on searching for and assimilating all his life long the best in his environment, improving on that best, and ever bettering his own best. In other words, the great man not only labours hard, but, presumably, he first follows precedent indiscriminately, then the best precedents, then seeks to equal and eventually to improve on the best precedents, and, lastly, he strives continually to better his own best precedents.

But even this dynamic explanation is incomplete, for we can imagine, as we shall see, some individual exhibiting the above qualities, without being esteemed great.

(g) Raphael was not in this predicament. He lived in an age when the art of painting had virtually reached the stage when the ideal of the painter, which had been more and more closely approached for some three centuries, was on the verge of being fully realised. In these circumstances, therefore, it required only preternaturally concentrated efforts such as Raphael's to reduce the ideal to fact. Accordingly, we have also to assume the tantalising proximity of a historically evolved ideal. Indeed, the ideal was so near that it was flittingly realised by more than one painter, his master Perugino, among them, whilst Raphael himself more than once failed to attain it. The passionate devotion, the frenzy in men of genius—leading often to eccentricity and sometimes to a clouding of the mind—seem thus to be explained by the haunting conviction that, in their circumstances, if they made something like a superhuman effort, the ideal[1] would be realised. We learn, then, that first-rank greatness is only attainable where, in a particular domain,

[1]The effective ideal is generally a relative ideal. Thus the painter's ideal in Raphael's time did not comprehend correct painting of landscape, of the seasons, of sunrise and sunset, of mountains, and much else. (See, however, (i).)

a historic epoch is nearing its final consummation and that even second-rank greatness and eminence are out of reach where, in a particular domain, the social heritage is meagre.

(h) But Raphael's life suggests another condition to which greatness is subject. His environment keenly appreciated relatively perfect pictures. Had it not done so, he would, *ipso facto,* not have been esteemed great. Greatness is thus ultimately an honour conferred by society or, more correctly, by humanity.

(i) Greatness, as we have already hinted, is only connected with a critically important advancement of a very widely and exceptionally valued cause. As the critical importance of the advancement lessens, so greatness shades into eminence, noteworthiness, and mediocrity. And where the cause is not very widely and exceptionally valued, as in the case of a decided improvement in a game or in a particular instrument of no extraordinary importance, it would be fatuous to speak of greatness or eminence, even though the labour and thought expended should equal that put forth by the great man. In fact, values may shift historically, leading now to high appreciation and now to indifference. Finally, the expression "very widely" should be understood to comprise many generations and many peoples. The village hero may not be the nation's hero and the nation's hero may not appeal to other nations and to subsequent ages nor does immense popularity at a given moment, such as that of a film actor, by any means forebode abiding fame.

(j) It might be imagined that anybody, given favourable circumstances, could desire to be great and, acting on the above intimations, become great. This, however, would be only possible on the further presupposition, already suggested in (g), of the existence of a passionate love of the objective end in view. A Raphael indifferent to the painter's ideal would be a third-rate painter and a Newton, in similar circumstances, a third-rate physicist. On a humbler level we see this aspect strikingly illustrated in dealers in art and other beautiful objects, whose financial success depends in part on their disinterestedly loving and admiring the articles they trade in. Fortunately, it is easy to love what is lovable and natural to love passionately what is supremely lovable. Once this passionate love has been evoked in some one under favourable circumstances, he will almost spontaneously turn to the best, follow it, seek to equal and surpass it, and ever try to improve on his own best performances.

(k) Large allowance has also to be made for a conjunction of individual and social circumstances favourable to greatness, some of which we have already referred to. In the absence of these, the individual may be world-removed from the likelihood of becoming great. More often than not, no quite exceptionally situated individual appears, in which case the ideal is also commonly realised, but not so dramatically. Still, it may be that the gigantic internal pressure under which the great man works, enables him to realise the given ideal more completely than would otherwise be possible and it may also be that as soon as the given ideal is found to be readily realisable,

men may become inclined to proceed in search of new ideals and thus, for the time being, tend to fall more or less below that ideal.

(l) Possibly a wholly individual factor, the great man's innate superiority and natural aptitude, should be added to the above ; but in view of the foregoing analysis and of what follows, we should not be warranted in stating that we have here an influence of any consequence. Favourable individual, social, and historical circumstances offer, it appears, the principal explanation of the attainment of greatness. Indeed, a theory which assumes born cooks and born dukes ; born merchants, financiers, manufacturers, and mechanics ; born physicists, chemists, botanists, zoologists, psychologists, and metaphysicians ; born painters, sculptors, architects, poets, and musicians ; born statesmen, politicians, lawyers, and journalists ; and born cricketers, chess players, dandies, and society hostesses, is perilously like an excuse for intellectual indolence, the more inadmissible if we think of the changing needs and interests of the ages.

What, then, is the secret of greatness ? It seems to be this. *Given that* (i) *some very widely and exceptionally valued idea has* (g) *historically evolved to the point of being almost within full grasp and that* (h) *its complete realisation would be socially welcomed, then a man may attain to greatness if* (j) *he passionately loves that idea and* (a) *will make an almost superhuman effort* (k) *under favourable individual and social circumstances to realise the idea through* (b) *profiting fully by what has been already accomplished by his fellows and remaining for ever bent on* (c) *following,* (d) *rivalling, and* (e) *surpassing the best that has been produced and* (f) *ever bettering his own achievements.*

Here are some opinions on Raphael :—

" It was, in fact, the peculiarity of Raphael to alter his style in accordance with his surroundings." (Eugène Müntz, *Raphaël,* Paris, 1902, p. 23.) " Fra Bartolommeo . . . taught him to group his figures and to make living masses of his groups." (*Ibid.,* p. 32.) " Numerous sketches, dispersed throughout the galleries and collections of Europe, proclaim the care which he lavished on preparing his pictures." (*Ibid.,* p. 51.)

"Suffice it to say that we know of no master of the fifteenth century whose traces cannot be found in Raphael's paintings." (Theodor Lessing, *Madonna Sixtina,* Leipzig, 1908, p. 17.)

" With astonishing rapidity Raphael shook off the mannerisms of Perugino, and put one great artist in painting or sculpture after another under contribution for some special power of drawing, beauty of colour, or grace of composition in which each happened to excel. The Carmine frescoes of Masaccio and Masolino taught this eager student long-remembered lessons of methods of dramatic expression. Among his contemporaries it was especially Signorelli and Michelangelo who taught him the necessity of a thorough knowledge of the human form. From da Vinci he learnt subtleties of modelling and soft beauty of expression, from Fra Bartolommeo nobility of composition and skilful treatment of drapery in dignified folds." (John H. Middleton, article "Raphael," in *Encyclopædia Britannica,* fourteenth edition, p. 982.)

Let us now examine—not in detail, of course—the careers of some other painters in order to test our broad generalisation.

Leonardo da Vinci's case is instructive. An older contemporary of Raphael, he was in a somewhat similar position. That he was a tremendous worker is too well known to need stressing. What is stated of Raphael in this respect is amply confirmed by a study of da Vinci. But at first we may be inclined to think of him as markedly original. Still, when the elusive,

mysterious smile of so many of his women is found in some of his master's, Verrocchio's, works; when we discover that this absence of originality extends to his most characteristic women's faces, children's heads, and landscapes, and that his learning and versatility are also noticeable in his master, it is not difficult to class him with Raphael. The differences are secondary. He fixed his attention more especially on perfecting the rules for producing beautiful figures and irreproachable pictures.[1] Accordingly, he experimented and paid the penalty for this. He was so determined to give only to the world what was superlative that he ended by bequeathing very little to posterity and even endangered this by his technical experiments both in frescoes and easel pictures. Leonardo thus offers in his art both a positive and a negative proof of the view of genius put forward here. That is, as a perfecter he triumphed; as a pioneer he achieved nothing remarkable. (This does not mean that the work of the obscure pioneer is not socially valuable. Only one cannot be both truly great and truly a pioneer.)

Here are some confirmations of our views on Leonardo da Vinci :—

"The indefinable smile of the Mona Lisa plays already on the lips of [Verrocchio's] David, the fantastic rocks are already suggested in the lanscape of the Baptism. The mysterious blending of natures, man with beast and beast with plant, had its origin in the brain of Verrocchio." (Maud Cruttwell, *Verrocchio,* London, 1904, p. 22.)

"It is no easy task to distinguish the drawings of the pupil from those of the master. More especially we find that the exquisite heads of children and women with lovely masses of hair and locks and bewitching expression, which are frequently regarded as the distinctive contribution of Leonardo, are already to be traced in unmistakable beauty in Verrocchio's work." (Hans Semper, on "Andrea del Verrocchio," p. 24, in *Kunst und Künstler des Mittelalters und der Neuzeit,* 2te Abt., 1ter Band, Leipzig, 1878.)

"Even in his men—take for instance, St. Thomas—we find a sad and disillusioned smile, the leonardesque smile. What is feminine, one might say effeminate, in Leonardo's style, the delicacy, the morbidity, the suavity, may also be found, although often in germ only, in Andrea Verrocchio." (E. Müntz, *Léonard de Vinci,* Paris, 1899, p. 25.)

"Leonardo . . . found in Verrocchio's painting and sculpture, faint and chill, the adumbration of the jasper landscapes, the winding water and distant wood, the dreamily-inclining heads with broad lids and convoluted hair, the expressive hands, that have already been clearing into shape within the cloudy mirror of his young fancy." (Rachel A. Taylor, *Leonardo the Florentine,* London, 1927, p. 55.) "He found in Verrocchio even some tentative gleams from the unearthly emotional states in which he was to plunge his imagery. He found also a sceptical, curious intelligence, anxious, like his own, to pry into anatomy and the laws of movement, as well as a kindred love of geometry and music. . . . The fantastic monsters, gorgons and dragons, drawn with scintillating line, in which Leonardo, with insouciant grace, yet reveals a certain psychic distress, are the haughtier descendants of heraldic beasts in Verrocchio's masterpieces in metal." (*Ibid.,* p. 56.)

"He [Verrocchio] is said to have been a musician and a mathematician of note; he had been trained as a goldsmith; he was a famous engineer and metal worker; and as a sculptor, both in bronze and marble, ranks with the greatest." (C. J. Holmes, *Leonardo da Vinci,* London, 1919, p. 4.)

Nor is it different with the third outstanding contemporary painter, Michael Angelo. As one writer says, "his history is one of indomitable will and almost superhuman energy." (Sidney Colvin, article "Michelangelo," in *Encyclopædia Britannica,* eleventh edition, p. 365.) His

[1] "Leonardo taught that light and shade, colour and solidity, figure and position, distance and propinquity, and motion and rest were the ten matters which a painter had to care for." (J. A. Crowe and G. B. Cavalcaselle, *Raphael,* 2 vols., London, vol. 1, 1882, p. 253.)

concentration was such that it bordered on the abnormal. Michael Angelo was mainly inspired by the antique sculptures which were being discovered in his time and which he first studied in the Medici Gardens at Florence. Nor did he ever drop the role of student. "From boyhood to extreme old age [he] never ceased to practise with pen, chalk or pencil." (*Ibid.*, p. 368.) "Truly the most docile of men," says Gerald S. Davies (*Michelangelo*, London, 1924.) "One thinks indeed, of the old man in his last years as they found him one snowy winter's day near to the Colosseum. 'Why here, and whither going on such a day?' 'To school, to school, to see if I can learn anything.'" (p. 194.) We need only add that his passion for undraped figures, apart from the influence of the antique and that of Donatello, will be found largely derived from Signorelli who popularised both this style and the almost exaggerated insistence on motion, action, and muscular development, which he, in turn, adopted from Antonio Pollaiuolo who stressed the anatomical aspect in the human figure. Thus Michael Angelo's single easel picture at the Uffizi in Florence and his famous "Judgment" at the Vatican in Rome are palpably inspired by Signorelli, and his work generally by the classical sculptures.

The three super-giants of painting exhibit, then, the same fundamental characteristics.

We add a few extracts concerning some other eminent Italian painters to illustrate the paramount importance of the social heritage :—

Giotto.—"Giotto's greatness is less difficult to understand than it was a century ago. He owes something of his sense of form to Cavallini and to Niccola Pisano. To the same masters he is largely indebted for his fine free manner of designing drapery. To the inspiration of Giovanni Pisano he owes some of his dramatic power." (Langton Douglas's editorial footnote in Crowe and Cavalcaselle, *A History of Painting in Italy*, vol. 1, pp. 182-183.) Frank Rutter (*The Old Masters*, London, 1925, p. 44) writes : "What was exceptional in the art of Duccio became the rule in that of Giotto."

Masaccio.—"[Masaccio] strove to concentrate within himself the large experience of the past and the novel acquirements of the present." (Crowe and Cavalcaselle, *A History of Painting in Italy*, vol. 4, 1911, p. 34.)

Fra Angelico.—"There were, in the early days of the fifteenth century, three great centres of artistic life in the city. First, the *botteghe* of the pupils of the Gaddi ; secondly, the schools of the miniaturists, and chief amongst these the school of the Camaldolese convent of Sta. Maria degli Angeli ; and, thirdly, the group of young sculptors, Jacopo della Quercia and Ghiberti, Brunelleschi and Donatello, who were destined to fashion the most perfect art-works of the Quattrocento. By all these, as we shall see, Fra Angelico was influenced." (Langton Douglas, *Fra Angelico*, London, 1902, pp. 17-18.) "Living in that wonderful age of the early Renaissance, he was one of its most characteristic products." (*Ibid.*, p. 151.)

Fra Filippo.—"Fra Filippo knew how to take hints and suggestions from the art of all his great contemporaries." (P. G. Konody, *Filippo Lippi*, London, 1911, p. 76.)

Verrocchio.—"His was no precocious talent. In his extant works we note a progressive advance in power, as of one succeeding by conscious intellectual effort rather than by what seems instinctive mastery." (C. J. Holmes, *Leonardo da Vinci*, London, 1919, p. 5.)

Pollaiuolo.—"Since Donatello left Florence for Padua when he was a child of twelve, any personal influence must have been slight. It is more likely that it was transmitted through Andrea dal Castagno, to whom of all the Florentine masters Antonio owes most. It is even possible that to Andrea were due his ideals of physical force." (Maud Cruttwell, *Antonio Pollaiuolo*, London, 1907, pp. 31-32.)

Ghirlandajo.—"Domenico Ghirlandajo represents the apex of fifteenth century Florentine painting. . . . His position is not accounted for by the period in which

he lived. . . . Nor is it his inborn artistic talent bestowed on him by Divine grace, which raises him above his predecessors. . . . It was rather, combined with marked talents, breathless industry, an indomitable will, and clear insight, whereby, studying and assimilating everything achieved by his predecessors . . ." (K. Woermann on "Ghirlandajo," in *Kunst und Künstler des Mittelalters und der Neuzeit,* 2te Abt., 1ter Band, Leipzig, 1878, p. 65.)

Melozzo da Forli.—" In all probability Melozzo learnt his Di-sotto-in-su system from Mantegna." (Onni Okkonen, *Melozzo da Forli und seine Schule,* Helsingfors, 1910, p. 84.) Melozzo adopted the technique of Piero dei Franceschi. (*Ibid.,* p. 85.) Melozzo also owed much to Mantegna. (*Ibid.,* p. 113.) " Melozzo was alive to all currents in art and naturally assimilated the best artistic methods of his Florentine contemporaries." (*Ibid.,* p. 115.)

Signorelli.—" Signorelli caught and revived the very essence of Donatello's spirit—the love of bodily life in its most hopeful and vigorous manifestations." (Maud Cruttwell, *Luca Signorelli,* London, 1899, p. 19.)

Botticelli.—" There is no record of the date when the boy entered the studio of the master [Filippo Lippi], but his work shows that he remained there long enough to saturate himself with the chief features of his master's style." (Adolf Paul Appé, *Sandro Botticelli,* London, 1911, p. 4.) ". . . the sculpturesque attempt after relief, dignity, and solidity which was the contribution of the brothers [Pollaiuoli] towards the formation of Botticelli's style. . . ." (*Ibid.,* p. 6.) " Filippo gave him the love of human variety and the Pollaiuoli the sense of human dignity." (*Ibid.,* p. 7.) See to the same effect Herbert P. Horne, *Sandro Botticelli,* London, 1908.

Fra Bartolommeo.—Of Fra Bartolommeo, to whom Raphael owed so much, Crowe and Cavalcaselle (*A History of Painting in Italy,* vol. 6, 1914, pp. 52-53) say that he, " thanks to industry and heart, attained to a grandeur nearly approaching that of Buonarroti."

Pintoricchio.—" As regards splendour of colour, arrangement, landscape, architecture, crowds of figures, he brought together all the qualities Umbrian painting had developed in the course of a century, fused them into a whole, and carried them to a height of magnificence worthy of the most brilliant Courts." (Corrado Ricci, *Pintoricchio,* London, 1902, p. 6.)

Andrea del Sarto.—Fritz Knapp (*Andrea del Sarto,* Leipzig, 1928) shows how profoundly Andrea del Sarto was influenced by Piero di Cosimo, Hugo van der Goes, Dürer, da Vinci, Fra Bartolommeo, Michael Angelo, and others.

Dürer, too, was no mere virtuoso. " Dürer," says the discriminating *Descriptive and Historical Catalogue* of the National Gallery in London (edition 1913, p. 231), "*in common with the few supreme masters,* is great by reason of the profundity of his thought and revelation of life." (Italics ours.)

Of Rembrandt, to come to a later age, we read : "A steady determination to correct his faults and an intelligent and unsparing criticism of his experiments are the real characteristics of his temper, and it is upon them, and not upon some spontaneous unconscious instinct, that the profound and masterly work of his later years is built up." (C. J. Holmes, *Notes on the Art of Rembrandt,* London, 1911, pp. 70-71.) And the background of warm brown which he favoured for his pictures, Rembrandt adopted from Jacob Pynas. Of Rembrandt's compeer, Rubens, it is stated : " He came to his kingdom by dint of sheer hard work." (S. L. Bensusan, *Rubens,* London, 1924, p. 72.) And of Constable, the landscape painter, Holmes, in the work above cited, says : "No one who knows Constable's early work can wonder at his parents' opposing his wish to adopt painting as a profession. For years he was clumsiness personified. Yet by sheer patience and determination, and by an unconquerable enthusiasm for nature, he overcame all these deficiencies and became one of the significant figures in the history of art." (p. 63.)

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In view of the mass of evidence adduced, it may be fair to assume that what we have stated of Raphael holds true of great painters as a class.

Take now the most famous English architect, Sir Christopher Wren. Of him we read : He " must be considered as the direct successor of Inigo Jones, not only in the school of design founded by him, but also in the methods in which that school worked." (Arthur Stratton, *The Life, Work, and Influence of Sir Christopher Wren,* Liverpool, 1897, p. 28.) Furthermore, " his genius owed much to his irrepressible faculty of painstaking ; he never spared thought, but lavished it as freely upon the smallest undertaking as upon the most pretentious." (*Ibid.*, p. 29.) The following passage is also significant : " It may be that many of his most striking compositions, which charm and fascinate us by their wondrous simplicity, were only produced after extreme mental effort." (*Ibid.*, p. 43.) Accordingly, we may surmise, at least provisionally, that what is true of great painters is probably true of great architects.

Here is a broad statement with regard to architecture : " A glance along the perspective of past ages reveals architecture as a lithic history of social conditions, progress, and religion, and of events which are landmarks in the history of mankind." (Banister F. Fletcher, *A History of Architecture,* London, 1924, p. 4.)

Let us now turn from painters and architects to musicians. Music has been regarded as peculiarly the daughter of a tuneful ear and yet, as the subjoined extracts from *The Oxford History of Music* seem to suggest, music is probably in the same position as painting.

"Over six centuries of work went to provide Palestrina with his medium ; Purcell succeeded in the fullness of time to a long line of English ancestry ; Bach, though he owed much to Pachelbel and Buxtehude, much to Vivaldi and Couperin, was under still greater obligation to that steady growth and progress which the spirit of German church music had maintained since the days of Luther. Even those changes which appear the most violent in character—the Florentine Revolution, the rise of the Viennese School, the new paths of the Romantic movement—may all be rightly considered as parts of one comprehensive scheme : sometimes readjusting a balance that had fallen askew, sometimes recalling a form of expression that had been temporarily forgotten or neglected, never wholly breaking the design or striving at the impossible task of pure innovation." (W. H. Hadow, in editorial Preface to the whole work, vol. 1, 1929, pp. v-vi.)

" At the beginning of the seventeenth century Germany was quite unconscious of her great musical destiny. She had as yet given the world no striking proofs of great musical aptitudes, and though she had produced a few notable composers and musicians, she appeared on the whole to be less naturally productive or artistic than the rest of the civilised nations of Europe. It seems likely enough indeed that the appearance was in conformity with the facts, and that Germany attained her ultimate pre-eminence by force of character rather than by facility." (Vol. 3, by Hubert H. Parry, 1902, p. 409.)

"That part of musical history of which Bach and Handel are the chief ornaments is, even apart from them, a momentous period." (p. 1.) " Each, so far as his own work went, remained contented with the forms in which his predecessors had expressed themselves, and to each the discoveries or inventions of contemporary theorists or musical instrument makers were mainly interesting as affording new opportunities for the expression of their ideals. Both, however, may justly be regarded as the epitomes of the period in which they lived." (pp. 2-3.) " The student of history watches the sceptre of musical supremacy passing, as it were, from England to the Netherlands, and so to Italy, from Italy back to England, and by another medium, to France." (p. 4.) " The mere continuance of the tradition strengthens it with each decade that passes, so that with the Germans of the seventeenth to the nineteenth centuries music has become a second nature." (pp. 4-5.) (Vol. 4, by J. A. Fuller Maitland, 1902.)

And here is a suggestive summary, a summary which travels beyond the realm of music :—

"The greatest composers or orators or artists are by no means necessarily those who have the readiest utterance or the greatest natural aptitudes, but those who have ideals, force of character, individuality, devotion, and grandeur and depth of feeling and conception. Mozart and Mendelssohn were apparently the most naturally gifted of all composers, but neither of them attained to such a convincing standard of greatness as Beethoven or Bach, who only developed artistic powers commensurate with their aims by persistent and indefatigable labour." (Vol. 3, by Hubert H. Parry, 1902, p. 409.)

Only one more example from the realm of art—that of William Shakespeare, the greatest of modern dramatists. His attitude towards his art startlingly resembles that of Raphael in painting. Unfortunately, the absence of almost all biographical detail does not permit us to state categorically that he was a tremendous worker ; but seeing that he started with a poor schooling and had to write for a learned stage ; that he was an actor and theatrical manager besides being a dramatist ; that he died comparatively young ; and that he is broadly responsible for some thirty-seven plays, we may legitimately assume that he was that, as indeed John Webster suggests.[1] On the other points, however, a tedious likeness is evident.

Shakespeare rigidly adhered to convention and loyally changed with it, manifesting, like Raphael, from first to last a continuous adaptation to varying circumstances. He wrote historical, dramatic, entertaining, or romantic plays, according to which were in demand. For the same reason his verse form and his style were those common in his day and were subject to incessant improvement and development. The plots for his plays he mainly derived from prose tales or from plays, and he laid his sources heavily under contribution. Like Raphael, he was an imitator. His daring in this respect knew no limit and roused from the first the protests of his fellow dramatists. He appropriated without scruple whatever appealed to his artistic taste. Take for instance, *The Tempest,* which may have been his last play. It is itself based on an earlier play, from which it was somewhat hastily adapted. The situation, the characters, the language, the verse form, the general motive, are those of the plays of the day. The three finest passages therein are close imitations of passages in other authors and are in part literally copied. The first, Gonzalo's description of an ideal commonwealth, is from Florio's Montaigne ; the second, one of the most superb passages in Shakespeare, Prospero's "Like the baseless fabric of this vision . . . . ," follows Sterling ; and "Ye elves of hills, brooks, standing lakes, and groves," is from a translation of Ovid.

However, if we compare the play and the three passages with their sources, we observe the same fact as in Raphael, that is, Shakespeare appropriates the best only and undoubtedly improves thereon. Similarly with his plays in general. They were composed at a time when the ideal was virtually attained in the evolution of the drama and they represented an effort and a result similar to Raphael's, whilst, like Raphael, he never ceased in his

[1] ". . . the right happy and copious industry of Master Shakespeare . . . " (Preface to *White Devil.*)

endeavour to surpass himself. Had his career closed fifty years earlier he could only have been a third-rate dramatist, furnishing interesting work, but not work having any finality or greatness in it. If the fashion of to-day, in flagrant contradiction to his own age,[1] places him sky-high above his Elizabethan and Jacobean fellow dramatists, we owe this to critics who cannot do justice to one dramatist without derogating from the attainments of all the others, who, indeed, whilst emphatically asserting Shakespeare's uniqueness and infinite superiority, incessantly dispute among themselves concerning what is and what is not Shakespeare's.[2]

Nor does art stand alone. A Kepler, a Galileo, a Newton, a Kant, a Comte, and a Darwin,[3] all illustrate the same thesis. They were colossal workers; they fully assimilated the best of the special social heritage they were interested in and sought to improve on this and on their own work. They were each faced by a leading idea which the ages had well-nigh perfected, and all of them were worshippers of the ideal. They were in the most intimate sense of the expression children of their time.[4] If lasting fame was

[1]For a discussion of the subject, see G. Spiller, *A New System of Scientific Procedure*, London, 1921.

It is interesting to study Carlyle's gallery of heroes. Mahomet became a prophet late in life. Dante is represented as "an unimportant, wandering, sorrow-stricken man." Shakespeare's story is, as we know, shrouded in clouds of doubt. Luther and Knox lived uneventful lives until circumstances changed this. Johnson, Rousseau, and Burns, played their part because of their earnestness. Cromwell found himself in a like position to Luther and Knox; and Napoleon's fate was moulded by his time.

[2]Even of Homer we read: "Homer was no primitive poet. He was a consummate master, the heir to generations of discipline in both life and art. This appears in his perfect prosody, in his limpid style, in his sense for proportion, his abstentions, and the frank pathos of his portraits and principles, in which there is nothing gross, subjective, or arbitrary." (George Santayana, *The Life of Reason* (*Reason in Art*), London, 1923, pp. 93-94.)

[3]On Darwin, see the author's "Charles Darwin and the Theory of Evolution: A Sociological Study," in the *Sociological Review*, April 1926. The object of this practically exhaustive historical paper is to demonstrate, by a suggestive example, the specio-cultural origin of greatness. On Comte and John Stuart Mill, among others, see the author's above-mentioned work. Of the most famous of scholars, Aristotle, we read: "Aristotle stood at the very end of the classical Greek development and was himself a diligent student of his predecessors, owing much of his completeness and finality to the fact that he was able to incorporate in his work all that seemed to him valuable in the earlier schools of thought." (George S. Brett, *Psychology, Ancient and Modern*, London, 1928, pp. 6-7.) Nor is Plato, the prince of philosophers, an exception: "Plato is counted the greatest of philosophical writers, yet it may very well be true that every one of his most characteristic doctrines had been anticipated by some one else, and even that his method of literary exposition was rendered possible by the work of earlier dramatists and historians." (Prof. J. S. Mackenzie, in a paper which, because of the outbreak of the War in 1914, was, with other papers forming a symposium on an article by the present author, not published.)

[4]"The history of science presents us with no example of an individual mind throwing itself far in advance of its contemporaries." (David Brewster, *The Life of Sir Isaac Newton*, London, 1831, p. 112.)

"George Stephenson is often regarded as the parent of the locomotive engine, but long before his time steam carriages had been at work and indeed locomotives were known while he did but dream of them. In the case of steam traction, just as with the steam-engine generally, many men were groping their way to attain the same end. . . ." (Ernest Protheroe, *Railways and Steamships*, 1911, pp. 32-33.)

their lot, it was not attained without gigantic effort and infinite selflessness on their part. And as to moral greatness, Marcus Aurelius, the king of kings and saint of saints, shows us in his *Meditations* that he regarded himself as immeasurably indebted to his moral environment. By contrast, self-complacency, if sufficiently thorough, relegates men to the plane of imbecility.[1]

It may, of course, be asked how we reconcile the co-existence of hosts of indifferent painters with a Raphael or a Michael Angelo and it may be suggested that differences in innate capacity afford the explanation. However, when we find that, because of their general environment, most painters are creatures of routine, are not favourably circumstanced and only moderately devoted, do not seek to attain to or rival the best, and have no sense of the need of being constant learners, we can understand the situation. But concrete studies on this subject are clearly desirable.[2]

It is of crucial significance that the dynamic theory of genius propounded here harmonises with the facts of general history as known. For hundreds of centuries men existed without apparently manifesting the faintest glimpse of what is called genius. There was during that long period progress, general progress, steady progress, but infinitely slow progress—progress from unshaped flint tools to a modest selection of skilfully chipped tools of the same material. No sudden forward leap anywhere. According to this testimony, the unassisted individual is unable to do more than to invent or improve the equivalent of a primitive tool in a life-time. The art of the later Old Stone Age, too, evolved by minute transitions from Aurignacian to Magdalenian times and when it reached relative perfection it was socially diffused and not the product of a handful of great men. Those interminable ages certainly knew no magicians such as our men of genius are supposed to

[1] Goethe well expressed our dependence on others :—

> Ein Quidam sagt : " Ich bin von keiner Schule ;
> Kein Meister lebt, mit dem ich buhle ;
> Auch bin ich weit davon entfernt,
> Dass ich von Todten was gelernt."
> Das heisst, wenn ich ihn recht verstand :
> " Ich bin ein Narr auf eigne Hand."

[2] "What an interval between Isaac Newton and Bacon, and almost all their contemporaries ! Yet they never considered that they were possessed of any particular faculty, which others had not, by which they could comprehend science. They observed nature more accurately, and reasoned better on their observations than others. That was not a natural power, but acquired only by use and custom. What, however, contributed to form that fortunate habit, no one but themselves could easily say, nor is it necessary to do so ; and the matter is so subtle a one, that it might easily escape themselves ; since we see every day that many small things create a habit, without those being conscious who are affected by it. In fact, many who have happily promoted the sciences by their labour, confess that they were led by mere accident to give their minds up to it." (John Hunter, in *The Anthropological Treatises of Blumenbach and Hunter.* Translated by Thomas Bendyshe, London, 1865, pp. 390-391.)

" Men of genius " have rarely claimed to be superior by birth. Statements such as the following could be freely culled in numbers : " What I could do, could assuredly be done by any boy or girl of average capacity and healthy physical constitution." (John Stuart Mill, *Autobiography,* edition 1909, p. 18.) So Descartes : " Pour moi je n'ai jamais présumé que mon esprit fut en rien plus parfait que ceux du commun." (*Discours de la Méthode,* 1637, second paragraph.)

be, and we are therefore justified in assuming, both from a concrete consideration of great men and from the general course of prehistory, that the innate mental capacities of individuals differ probably to a wholly insignificant degree and, by themselves, are responsible for microscopic contributions only. It is world-wide historic cooperation, the cooperation of thousands of millions during long ages, which has created civilisation. Without such wholesale cooperation we should not possess, it seems, even the most rudimentary language or tool.

With the passing of Neanderthal man and the advent of Cromagnon man, the modern human species, *homo sapiens,* is said to have arrived. If so, we may note that the rate of progress for many thousand years from Aurignacian down to Neolithic times suggests that, unaided, individuals of the modern human species, like the men of the Mousterian and Chellean culture phases, are not capable of inventing or improving by themselves any but the most primitive tool. The moment also that we become keen and conscientious students of the human heritage, we find the above abundantly illustrated. When, for instance, we follow step by step the evolution of the ship, of the railway track and locomotive, of the motor car and of the airplane, of the arts, or of the individual sciences and sub-sciences, we are amazed how true it is that human knowledge is a flowing and growing stream consisting of the drops contributed by individuals. Naturally, the more inter-social evolution develops efficient methods and affords special opportunities, the greater the individual's contribution may be, but only as the mandatory of humanity. Hence we may conclude that greatness, like littleness, is apparently determined by a combination of individual, social, and historical circumstances and that it is the business of sociology to trace these.

Almost innumerable instances could be cited of noted "original" thinkers being primarily only favourably situated popularisers. "Adam Smith's achievement was to give the fittest form to ideas which were becoming current among the most progressive minds of his time." (Article "Political Economy," in *Chambers's Encyclopædia,* 1926.) Jenner is hailed by the uninitiated as the inventor of vaccination, yet he only generalised and popularised what he found certain country-folk practising. Von Baer, with whom the Recapitulation theory is said to have originated, was manifestly anticipated by Meckel in 1811. Lyell revolutionised geology by applying circumstantially Hutton's Uniformitarian theory which had been to some extent already elaborated by Playfair and which, later, largely inspired Charles Darwin. "A close scrutiny of the practice among naturalists in the time of Linnæus shows that he did not actually invent the binomial nomenclature, but by adopting the suggestions of others he elaborated the system of classification and brought the new language into common use." (W. A. Locy, *Biology and its Makers,* New York, 1915, p. 119.) Linnæus was also forestalled in his conception of a species by John Ray. "When Cuvier, near the close of the eighteenth century, committed himself definitely to the progress of natural science, he found vast accumulations of separate monographs to build upon, but he undertook to dissect representatives of all the groups of animals, and to found his comparative anatomy on personal observations. The work of Vicq d'Azyr . . . afforded a good model of what comparisons should be." (*Ibid.,* p. 148.) "The essential part of Weismann's doctrine was the adoption of the theory of germinal continuity originated by Professor Nussbaum." (C. S. Minot, *The Problem of Age, Growth and Death,* London, 1908, p. 235.) The theory of the germinal origin of infectious diseases was elaborated, not discovered, by Pasteur. Comte was indebted for his leading ideas to others. Stephenson's engine only accidentally carried off the prize. "C. Huygens and R. Hooke, contemporaries of Newton, saw that Kepler's third law implied a force tending toward the sun which, acting on the several planets, varied inversely as the square of the distance." (John H. Poynting,

article " Gravitation," in *Encyclopædia Britannica,* fourteenth edition, p. 663.) " The invention of the calculus culminated with Leibnitz and Newton in the latter half of the seventeenth century. There need be no surprise at the joint discovery, for after the work of Archimedes, Cavalieri, Roberval, Fermat, Barrow, Wallis, and others, matters were ripe for the generalisation attained by Leibnitz and Newton." (*Chambers's Encyclopædia,* article " Calculus, differential and integral," 1923.) Prince Kropotkin's *Mutual Aid* was confessedly unoriginal as regards its main thesis. Madame Montessori borrowed her apparatus from her " master." Freud's fundamental idea was not original. And so on.

As already intimated, the world, it seems, mostly dispenses with the man of genius. Modern democracy, modern humanitarianism, modern industry, modern science, modern Christianity, register a critically great advance over their predecessors of a century ago, without any conspicuous individuals being primarily responsible for the general attitude in these departments. In effect, if a sweeping survey of the field of human progress were made, perhaps ninety-five per cent. of the advance would be found unconnected with great men. The silent cooperation of social forces and individual needs and opportunities appears to have revolutionised innumerable departments of life without the intervention of any one outstanding individual in particular. Even in art, the marvellous progress made during the last century in depicting nature in her varying moods and aspects—of seasons, skies, mountains, and seas—has been of a general nature, no towering personality heading, or seeming to head, the movement. A statement to the same effect could be made concerning the Middle Ages where the guild system prevailed and where there were no highly favoured individuals as a rule. Consider, for instance, the fact that the unsurpassed Gothic cathedrals are not connected with architects' names.

The so-called man of genius, scientifically regarded, appears therefore an incidental, and not an indispensable, product and cause of human progress. As James M. Baldwin (*The Story of the Mind,* London, 1899, p. 253) says: "The world comes, by its slower progress, to traverse the path in which he [the man of genius] wished to lead it." His absence is consistent with advance and amelioration of the most far-reaching character. Where he appears, he usually throws out of perspective for the student the uninterrupted and steady continuity observable in objective progress. To a certain extent, in fact, an outstanding individual tends to fix a state which should be a transient one, discourages healthy criticism, and rouses unnecessary opposition because of the introduction of the personal element. The man of genius should be perhaps conceived as the favourably situated and enthusiastic emphasiser, summariser, and populariser of the final stage of an important historic trend.

The adequacy of the dynamic formula of greatness which has been proposed in this Appendix, may be easily exaggerated. In the first place, greatness differs immensely in degree and we can therefore only attempt to define a " type " to which actual examples but approximate. Secondly, certain classes of great men are differently situated from other classes of great men. A Shelley, for instance, does not require the preparation and study which a Newton does and may be much more self-expressive in minor matters. Lastly, the formula is only tentative and is perhaps only distantly applicable to certain categories—*e.g.,* to statesmen. It does, however, represent an endeavour to get behind abstract theorisings to the concrete facts.[1]

[1]The substance of this Appendix appeared in *The Sociological Review,* July 1929.

APPENDIX B.

FRANCIS GALTON ON HOW TO ELEVATE THE RACE.

SUBJOINED are the concluding paragraphs from an unpublished paper by the present author, analysing Galton's principal works :—

(a) Galton, basing himself on what he conceived to be the evolution theory, reasons that high ability is the result, consequent on selective mating, of the slow growth of ability in families and that, accordingly, we may by judicious marriage selection and by each generation aiming higher in this respect, raise the ability of families and of the human race to a well-nigh fabulous degree. If Galton reasons correctly, we should naturally expect his quoting numerous instances of this slow family growth from sheer mediocrity to towering greatness, but, significantly enough, not a single illustration is forthcoming to support his contention. Indeed, numberless cases might be cited where a man of the very highest ability sprang out of a mediocre family, decisively disproving thus Galton's basic assumption.

(b) As a compromise, however, Galton might be expected to demonstrate that the parents or the children of illustrious men, or other fairly close relatives of theirs, are always or generally not far removed from the great man in noteworthiness. In a distant way Galton attempts to show that this is so. But the evidence he produces is most unsatisfactory. Only by dint of frequently classing unnoteworthy individuals and unnoteworthy relations of noteworthy individuals as noteworthy, by including remote relatives and by unconsciously making light of a monstrous number of exceptions, is the faintest semblance of a case made out. Think in this connection of the extravagant instance (applicable to almost anybody !) of Newton's mother's sister's grandchild's two grandsons who are said to have been his only noteworthy relatives ! Or of Haydn's two noteworthy (?) relatives : his father who was " a village organist and wheelwright " and his brother who was " an excellent organist " ! Or of the majority of Galton's small number of musical noteworthies who were neither noteworthy themselves nor had noteworthy relatives !

(c) Galton believed that he had discovered tests for innate noteworthiness. He declared that " social hindrances cannot impede men of high [native] ability" and that " high reputation is a pretty accurate test of high [native] ability." Hence those who are not eminent and who have no high reputation, may be regarded as incapable of ever exhibiting high ability. Whence it follows, for instance, in agreement with his lists, that, for all intents, women are able to transmit but not to inherit high ability and that therefore Galton's future ideal society would consist of men of very high ability, on the one side, and of deplorably mediocre women, on the other.

And yet, as our quotations have shown, contrary to Galton's seductive assumption, over two-thirds of his eminent men of science traced their eminence to non-congenital circumstances and he himself provides several telling illustrations of the radical influence of the environment on members of particular families and on nations as a whole. Consequently, it remains an open question whether notable degrees of ability or eminence are not invariably due to post-natal causes and whether Galton's tests of innate ability are not altogether devoid of any substance.

(d) Galton plausibly argues that as numerous qualities can be evolved in domestic animals by selective mating, high ability can be evolved by the same process in human beings. If Galton's ingenuous reasoning holds, then conversely by selective mating our dogs and cattle might be evolved to the stage when they could sit with our children on the school benches and go up to the university. That is, if men differ in innate ability as immensely as they differ in actual ability—from the most primitive primitive to a Darwin, a Phidias, and a Marcus Aurelius,—why, on Galton's theory, should not dogs and cattle be equally susceptible of limitless intellectual, artistic, and moral improvement innately ? We have only to frame the question in this manner, to recognise that it is infinitely more probable that the existing enormous differences in human ability are not due to innate causes and that we have no biological grounds whatever for thinking that high ability can be bred. To judge by the decided mental homogeneity of every animal species without exception the most primitive human primitives alone represent man's native capacity and all ability above that level should be therefore assumed to be the outcome of inter-learning.

(e) In agreement with the farmyard practice of breeding for points and in harmony with the deeply ingrained popular belief that aptitudes are inborn and inherited, Galton might be expected to counsel the upward development of particular aptitudes rather than the evolution of such an indefinable something as "high ability." Poets would be in this way descended from poets and marry the daughters of poets in order eventually to develop poetic geniuses. For an excellent reason Galton ignores this very popular belief, namely because most of his lists would dwindle to a mere rump if he introduced the factor of inherited aptitudes. This suggests two things : aptitudes are not inherited generally, if at all, and, as (c) has shown, Galton has no definite criterion to propose as to who possesses high *natural* ability or who is, *by nature,* "healthy, moral, intelligent, and fair-natured." Hence whilst the future happiness and perfection of mankind is said to depend on selective mating, we are left in ignorance as to whom to select for a mate. Galton thus succeeds in brushing aside the popular theory that aptitudes are inherited but not in proving that marked differences in ability are inborn and may be recognised as being inborn.

(f) Galton lays down as an axiom that human beings, just like animals, can only be improved mentally by producing changes in their inborn nature. His supposition is groundless. Broadly speaking, animals can

learn nothing from their kind and the flight of ages makes virtually no difference to a given species—*e.g.*, our ants and apes are not better or differently equipped mentally to-day than their ancestors were a hundred thousand years ago. On the other hand, the colossal growth of human inventions and discoveries in the material and mental spheres from the earliest times till to-day, due to men being able to learn freely from the whole of their kind present and past and pooling their discoveries, involves a method as completely novel as it is admirably suited for raising mankind to ever higher mental levels. Galton's fundamental mistake was, accordingly, to overlook the fact that the members of animal species may be said to be mentally improvable, within extremely narrow bounds, by natural or artificial selection and men, boundlessly, by cultural selection.[1]

[1]The paper, of which this is the conclusion, was eventually published in *The Sociological Review* of January and April-July 1932, under the title "Francis Galton on Hereditary Genius."

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ERRATA

p. 42, line 17 from below, for " exceptions," read " exceptions) "
93, 8, for " dolicocephalic " read " dolichocephalic "
140, 18 from below, for " passing by " read " passingly "
220, 3 from below, for " hestitate " read "hesitate "
225, 20, for " a " read "*A* "
285, 1, new paragraph.
287, 12, omit comma.
298, 11 from below, for " becauses " read " because "
324, 21 from below, for " millenium " read " millennium "