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MIND EXPLORERS

The story of the mind explorers has never been told before. Now a lively biographer and an expert man of medicine join to write of the lives and achievements of those intrepid men who laid the groundwork for the brave new science of psychology.

The authors bring alive the discoveries, private lives and public achievements of that brave company of explorers who pushed back one by one the dark frontiers of the mind.

One was an English gentleman, playing at psychology as he would at cricket; another a Quaker merchant; a third a mystic toying with the notion of harnessing the power of the stars. From the asylum and the bedside, from religion, ethics, the laboratory and life, they brought their inspiration.

Now the enthralling story is unfolded in lively fashion. Such chapter headings as *Phienology-a Scientific Miscarriage* and *Magic and Mesmerism* indicate at once that this is anything but a solemn book. Rather it is a stirring chronicle of human curiosity and courage that makes such gallant names as Jean Marie Charcot, Francis Gall, William James and Freud himself come to life.

To read *Mind Explorers* is to take an entertaining journey in the company of extraordinary men through the endlessly fascinating land of the mind.

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Contents

I:	Adventurers of the Mind	i
II:	Phrenology—A Scientific Miscarriage	8
III:	Magic and Mesmerism	37
IV:	The Gentle Revolutionist	57
V:	Voices in the Wilderness	77
VI:	Charcot—Le Maitre	94
VII:	The Sportsman-Scientist	114
VIII:	A Psychologic Prima Donna	146
IX;	A Sire of American Psychology	184
X:	The Theater of Psychology	212
XI:	The Patriarch of Fort Defiance	223
XII:	The Measurement of Intelligence	238
XIII:	White Coats and White Mice	251
XIV:	Watson, The Iconoclast	285
XV:	Freud, Late of Vienna	311
XVI:	Crusaders of Mental Hygiene	333
XVII:	Mental Science and the Future	360
Index		371

I: Adventurers of the Mind

THIS is the story of mind explorers, of the men whose discoveries made possible the knowledge of psychology we possess today. They were born in many climes and lived in many generations, converging on their subject from scattered directions. Aristotle was a mind explorer; so were WilL·am James, Franz Gall, John Watson, Jean Martin Charcot, Philippe Pinel, and a hundred others. One was an English gentleman playing at psychology as he would at cricket, another was a Quaker merchant stirred by the spirit of helpfulness to his fellow man, a third was a mystic toying with the notion of harnessing the power of the stars, and a fourth was a neurologist besieged by the clamorings of his nervous patients. They brought their inspiration and their techniques from the bedside, from the lunatic asylum, from philosophy, religion, ethics, the medical laboratory, and from a wide experience with life. Some peered for hours on end at bits of nervous tissue through microscopes, others plied bewildered subjects with endless questions, and still

others watched with saintlike patience the quixotic behavior and speech of the insane. While wars waged and boundaries changed, while trade rose and fell, and monarchs came and went, our mind explorers worked on. Courage and an ideal were their chief sustenance; an explanation of the mysteries of the mind was the reward they sought

Although it is only a hundred and fifty years since the study of the mind and its vagaries could hold its head up among sciences, there were many in the ancient world who pondered its problems. From the Hebrew prophets to Jesus, from the Greek philosophers to the medieval scholars, men have always cogitated over human behavior. But until the beginning of the modern era of history, about the 16th century, psychology tagged along merely as the avocation of a theologian or a philosopher. With the unfolding of the 18th century, interest in *how* the mind operates became more widespread. The new-old study was fast attaining the dignity of a place on the scientific family tree. Modern psychology was born when its father, philosophy, was already venerable with age and long before its frail sister, psychiatry.

Why did psychology develop into a science in western Europe so much later than chemistry or mathematics? As we have seen, even in the days of antiquity there was no lack of interest in the activities of the human mind. The practice of psychology,' under whatever name, is an old human failing; and there were first-rate minds then as now. But the genius, though he pushes his work in a direction beyond the thought of his time, is still a man. And as a man he must necessarily be influenced by the social currents of the time which gave him birth. The intellectual atmosphere in which people lived had first to be cleared of supernaturalism before

psychology could flourish. The impetus to psychology in the last two centuries came from the spread of the scientific method and from man's newly acquired courage in looking squarely at himself.

In the 17th and 18th centuries feudalism crumbled and the Church relaxed its grip on intellectual life in Europe. France, especially Paris, was the scene of great mental activity during the 18th century. Historians and thinkers, many of them atheists, spread their influence among students that flocked to Paris. Clear thinking was the contribution of France to the times. "If you have a spark of genius," wrote Rousseau, "go and spend a year in Paris. Soon you will be all that you can ever be, or else you will never be anything at all." The European scholar invariably went to Paris to polish his erudition with the cynicism and wit of the generation of Voltaire and Rousseau.

Toning down the influence of the supernatural in man's affairs thawed the ground that was soon to be plowed, and to be seeded with the investigations of a century and a half of psychologic and social scientists. The 18th century witnessed a spread of interest in human nature and with it the awakening of man's awareness of himself as a social being. We shall see how this new idea of humanitarianism, nurtured by French intellectualism, was soon to have almost miraculous results as far as mental sciences were concerned. Philippe Pinel's attack on the practice that first shackled lunatics in steel, and then exorcised them with purges instead of prayers, was one result of this revolution in thought. With the loosening of the grip of supernaturalism on thinking, the old idea that demons possessed the insane faded. Gradually doctors and physical scientists became used

to measuring and classifying occurrences once considered beyond human ken. It was high time that the world hearkened to Voltaire's insistence that "Your study's man, that labyrinth you explore. . . ."

But progress was slow in spite of this aroused intellectual spirit. In the main the men to whom we now do homage worked alone. Even though the French Academy of Sciences had been established as far back as 1671, scientific work was unorganized. Ideas were disseminated at a slow pace and literacy was far from universal. The insistence of the Church on the belief in witches and demons was an obstacle to be overcome in the popular mind. Even the leading physicians of the 18th century who promoted medical advances championed demon possession. Dr. Anton de Haen, successor to the renowned van Swieten as head of the solid "Old Vienna" school of medicine, defended the persecution of witches while he espoused the then "modern" method of examining patients by taking their temperature regularly! This in the full glory of the Austrian Empire, in the days of Maria Theresa. Belief in witchcraft, strong among the laity, had not disappeared among educated men. It was only a hundred years before that Dr. Johann Weyer had exposed cases of reputed demon possession as patients suffering from hysteria. He proved that a girl in whom an entombed devil spewed out needles,* thread, and bits of cloth was only a hysterical child trying to get her father's attention by swallowing these objects without his knowing it. The few courageous doctors who examined bewitched maidens and hags were forced to conclude that crones passing for witches were mentally unbalanced persons and their possessed victims, suggestible hysterics. The Church hooted down Dr. Weyer

and bis kind as heretics. For every Weyer, there were hundreds of exorcising priests who handled these unfortunate creatures in their time-hallowed way. The majority of the medical profession considered they were well rid of hysterical women professing to harbor demons in their bosoms. Let the clergy care for them. Cases of demonomania were too close to the supernatural for the medicos' comfort.

Physicians skirted the idea of including mental cases among their responsibilities, partly because of the prevalent ignorance of medicine itself. They had just been weaned from the ancient medical teachings of Galen, and it was not long since they had been encouraged to study patients instead of Latin books. The effect of hoary tradition on the practice of "physic" was especially to be noted in therapy. Pills and potions from ancient tomes were accepted by generations of 18th-century physicians without question. Bloodletting was in its heyday. No patient escaped the treatment that killed more men than died on the battlefields of Europe. Every disease, every fever, was an excuse to bleed the patient white. When Descartes, the great French philosopher, cried on his deathbed to his berobed medical attendants, "Gentlemen, spare the French blood!" and Moliere poked fun at the pretenses of the wigged physician, they were echoing the sentiments of a despairing public. Melchior Adam Weickard, a young practitioner in Germany, risked his professional standing by writing in 1784:

"What confuson when we regard the therapy of different nations! The French bleed, use enemas,' astringents, purges, water, always want to dilute. The English give salts and herbs, minerals, and if you read one author you know all the rest. The Viennese praise their new remedies, the good

effects of which other sons of Aesculapius **never** can **confirm The** other Germans mill about, try first this and then that **and** in therapy do as they do in other things, imitate and **admire** the foreigner, collect and compile what has been done here and there the world over. Almost every province, every university, has its own routine. Where shall an impartial physician seek his information? . . . As a matter of fact, I have mistrusted much in the deluge of the German periodicals. I did not believe everything in the English, Swedish, or Dutch journals. The Viennese I trusted even less. Of the French, I believed not a word."

Weickard was forced into exile from his native Germany, but the capacious bosom of Catherine of Russia protected him at the Russian court.

Restriction of free expression of opinion as well as medical ignorance had to be combated. Intrigue of state ruled science, and a man was often exiled for speaking his mind. "My trade is to say what I think," declared Voltaire, but he had to flee France to do it. When the darling of the Parisian salons was banished to England, he wrote a book admiring the democratic spirit of the English. On his return the Parliament of Paris burned his works publicly. Later when Voltaire displeased Frederick the Great by his saucy frankness, he fled Germany. Returned to France, he found himself decreed an exile by Louis X V I because he had written a monumental history in which he elected to tell the truth of the growth of social institutions. Buffon, one of France's greatest naturalists, was forced to make a public retraction when he discussed the scientific meaning of the extreme age of the earth's crust. Gall, the phrenologist, was outlawed by the Austrian Court because he examined

people's skulls. Mesmer had to leave Vienna at the urgent request of the Faculty of Medicine for attempting a new type of treatment.

But in spite of the obstructions of politics, the Church, and popular ignorance, medicine had in itself the seeds that were to develop into luxurious scientific growth. Ideas need ventilation and cultivation before they can develop into bodies of fact and flourishing theories. The 18th century provided a background against which these ideas grew. It produced the first of our mind explorers, Dr. Franz Joseph Gall of Vienna, the founder of *craniology.*

Dr. Gall spent his life showing how the mental faculties of people were related to the bumps on their skulls and to the shape of their brains. The neuro-surgeon of today who with uncanny skill removes tumors lying on delicate brain tissue and restores mentally disabled patients to health—he owes much to Gall's researches. Gall was the great-grandfather of that branch of medicine known as *neurology.* He labeled his science craniology, but followers, fascinated by the possibilities of his science, carried his work into the fantastic realm of phrenology. Gall was a solid physician and for his time an advanced thinker, but, like so many pioneers, he suffered because his successors gilded the lily. Nowadays the average man thinks of phrenology in connection with turbaned gentlemen from the Orient sitting in their boardwalk tents. But the facts establish Gall as a scientist and a mind explorer of first rank.

I I : Phrenology—A Scientific Miscarriage

DR. FRANZ GALL had no idea at the beginning of his inquiries that his research into the shape of people's skulls would advance the frontiers of the mental sciences so dramatically. He could not guess that his brain child, *physiognomy^* would startle the medical fraternity out of their complacent neglect of the brain and the nervous system. Nor could he foresee that a quarter-century after his discoveries were set down in six well-packed volumes, his work would be toasted in medically aristocratic Edinburgh by George Combe, the English critic turned friend, at a dinner to Spurzheim, Gall's disciple. "I speak literally," intoned toastmaster Combe, "when I say that were I offered the wealth of India on condition that Phrenology be blotted from my mind forever, I would scorn the gift I" Gall's science of craniology went through strange vicissitudes. The Institute of France rejected his theories as unworthy of serious-minded physicians, but the American Phrenological Society meeting in Boston in 1884 dedicated itself to the perpetuation of his

"heaven-born science." Prince Metternich, in trying to woo Gall back to Austria after his banishment, hailed him as the greatest man of his day, and contemporary anatomists praised him as a true scientist. Still it was only a half-century later that Gall's elaborate charts showing the location of the brain organs of amativeness, avarice, and benevolence were buried aifrong the museum pieces of psychological libraries.

Dr. Gall puttered around his skulls and facial casts in his Viennese laboratory in the 1790^ thinking less about his place in history than about the answers to questions that had beset him since childhood. As he looked in his odd intensive way at the brothers and sisters who cluttered up the Gall household in Tiefenbrunn, he wondered why people had such different faces and such widely different natures. Why was one deceitful, another frank, a third virtuous? Why did they remain so from childhood through the years? Why above all did some have good memories and others, like himself, could not remember a couplet of verse for more than a few minytes? His curious mind, full of half-formed notions, was continually busy with such preoccupations. It was almost an obsession that the stocky, large-headed Franz carried with him as he walked about the streets of Tiefenbrunn, in the ancient duchy of Swabia, where his father was a leading merchant and mayor. At school as at home, Franz was recognized as a serious child, always studying, always turning over in his mind the mysteries of nature.

Burgomeister Gall, watching his intense son, came to a decision. Yes, it was easy to see that Franz was marked for an academic career. "My son," he said, "for a boy who is studious, two courses are open—the Church or medicine." Franz did *not* ponder long: his choice was medicine. He

enrolled in 1781 at Strasbourg and later transferred to the University of Vienna, where he attended his courses dutifully and in due time was awarded his medical degree. Practice of medicine had no charm for Franz: he had a problem to solve. His boyish obsession of reading the secret of human nature in a person's physiognomy had become even more pressing. That mystery of mysteries, the memory, must be understood before he could settle back to his profession.

Even as a neophyte medico Franz had a theory; it was this—that the secret of a good memory is the possession of a pair of prominent eyes. Back in Tiefenbrunn he had observed the presence of bulging eyes in two former schoolmates who had excellent memories. Now in Vienna he could test his theory. "At the university," wrote Gall, "my attention fixed on new students with large prominent eyes. They boasted excellent verbal memories and had the advantage of me when the object was to learn by heart." Gall's compulsion about people with the gift of memory actually made him misanthropic. It was his "misfortune," he confided in his notebook, often to meet persons endowed with surprising facility for learning things by heart. On the streets of Vienna, in the coffeehouses, in the university halls, he would scrutinize everyone, looking for bright men with facile memories and bulging eyes. When he spied them he was both delighted and unhappy. Franz looked at his own five feet two inches, his tremendous chest and large head, and pondered over his own miserable forgetfulness. But he kept his worries and his discoveries to himself.

Gall occasionally asked his fellow students casually whether they had noted what he observed about the new

students. They had. Pleased with this corroboration, Gall kept his counsel, but he grew more and more convinced that there was something to his idea of the connection between recollection and the position of the eyes. The reason for this phenomenon was still beyond him. He sensed that the answer lay in knowing more about the brain. But at that time no lectures on the brain or the nervous system were given in any medical college. It was an unknown territory to the redoubtable professors of the Viennese medical faculty. In the amphitheater all interest was centered on the heart, the lungs, and the viscera. No one bothered with the brains and skulls which could have been so easily obtained from the post-mortem room of the old Vienna Krankenhaus; that is, no one but Gall. He forsook the meetings and social affairs his colleagues thronged and betook himself to the laboratory. Night after night he sat looking at brains and skulls, measuring, comparing and wondering, heedless of the gaiety that beckoned in the cafes.

If the eyes bulged and the forehead was prominent, he reasoned, it meant that the frontal parts of the brain behind the forehead were enlarged. There was another question: Why did people who were combative all have protruding areas behind the ears? Gall again thought back to his schoolmates and the shapes of their skulls. Yes, the pugnacious boys all had wide skulls in the temporal region. If combativeness and memory were represented by the contour of the skull, what of the other faculties of the mind? Perhaps each made its particular imprint on the skull. After all, the notion fitted into the larger scheme of nature. In his notebook he wrote: "If we examine nature, we perceive every kind of earth, every salt and metal, has determinate

qualities by which we are enabled to distinguish one species from another." People's facial expressions differed as their mental faculties differed because of the variations in the size and shape of the brain!

Speculation had its place in Gall's world, but he also sought proof. First he would study cases with pronounced mental peculiarities and then he could go on to more common attributes of intellect and personality. He started his researches in public, haunting every sort of event, measuring with his eye the skull of whatever celebrated individuals were abroad. At Court, where he was introduced, hours were spent scrutinizing the great and the near-great around him, his fingers itching to measure the bumps and inequalities of their skulls. He visited schools, conversed with beggars on the streets, and camped around jails. The city prison in Vienna became his laboratory. Surely prisoners arrested again and again for thievery or roistering ought to show an exaggeration of the baser human traits underlying these offenses. Gall was delighted to find his surmises to be correct. He examined the heads of pickpockets and found them all to have one part of the skull enlarged. It was under these bumps that the thieving instincts were located; Gall called these the knobs of acquisitiveness.

One day he encountered a haughty beggar on the street who, it developed, had dissipated a fortune and was too proud to work. On examination of his head, the Doctor found a prominent oval area just behind the crown on each side. This clearly was the bump of pride. To make sure of his diagnosis, Gall hastened to the insane asylum where he had been appointed visiting physician, to check his discovery on the inmates there. He was shown a patient who talked

about proclaiming that she was the Queen of France. Here was a case with pride exaggerated to an abnormal point. Gall examined her avidly; unfortunately her prominent skull areas were round, and on the side of the head. "That circumstance," wrote Gall, "embarrassed me at first until I reflected that among the insane, pride was really vanity/' and he solved the problem by establishing the bump for vanity beside and below that for pride.

The months slipped by as Gall, oblivious to other medical interests, examined the * death masks of famous writers, statesmen, artists, and soldiers. At one time he had a collection of three hundred skulls of persons whose mental characteristics in life had been studied and chartered painstakingly in appropriate areas on their skulls.

By this time, Dr. Gall was a learned man as far as brains and skulls were concerned. But he did not know much about the *mind.* Literature on the subject was easy to obtain, and he set about in his methodical way to read it. In the 18th century the problem of how the mind worked, what lay behind it and in it, was being raked over by philosophers. They called this subject the *theory of cognition.* If Gall could join his developing science of "physiognomy" to this theory of knowledge, he might bring something new and vital to philosophy. He forsook his skulls for a time and buried himself in books. In the works of the French philosophers lay the answer. Etienne Bonnot de Condillac, Abbe de Mureau, and others had long been pondering the problem of how people *know* things, and the Abbe, a friend of the Encyclopedist Diderot, had made the greatest strides in solving this riddle. His explanation started with the notion that the English philosopher Locke had developed; namely,

that thought in human beings was built up of *sensations* to which was added mental *reflection.* This seemed reasonable enough, since the only contact we have with the world is through our five senses; sight, hearing, touch, smell, and taste.

Our eyes, ears, skin, nose, and mouth acquaint us with the world about us. Add to this the human attribute of reflection and you have knowledge. But the good Abbe was not satisfied. How did these sensations form thought? "Assume," said Condillac, "that you have a statue of a man, equipped with a human nervous system, which though ready to act as a human being has not *lived."* This statue, argued Condillac, would be a hypothetical creature, a passive thing, prepared to experience what human beings experience, but thus far without any ideas. "Now suppose," continued Condillac, "we let a sensation of smell fill the nervous system of our statue. The smell will be all that the statue as a living being will experience." Now add one sensation after another, and soon the passive statue, potentially a hyman being, will have developed a *mind* by the action of all these sensations *on* his nervous system. In a similar way the mind of man develops and becomes filled with ideas and knowledge.

To Gall this sounded very sensible and clear, as indeed it was. But Gall was first and foremost a physician. He liked to deal with solid things that he could examine with his hands and eyes. He had already examined a number of brains, and his active mind began to see some connection between the Abbe's theories and the brains that he had pored over. Every doctor, and certainly Gall, knew that sensations that come from the eyes, the ears, must pass

through nerve tissues into the body, for the eye has optic nerves, the fingers have touch fibers, the ear has auditory nerves, and so on. The nerve fibers which carry impulses from the sense organs end in the brain and the spinal cord. That is how sensations reach the brain from the outside world. But what of the sentiments, and the higher perceptions of man? These higher faculties of the mind, Gall decided, probably resided in the brain. But just where? No one had ever examined the brain seriously enough to help him answer this question. To the few investigators who troubled themselves about this obscure region, the brain was one pulpy mass, the business of which was to secrete fluid. Sommerling, the great German authority, was certain that the more fluid secreted, the higher the intelligence. He pointed to the well-known intelligence of the hydrocephalic (an individual with water on the brain) as proof of his theory! That was in 1796, the year Gall started in Vienna his demonstrations on the anatomy of the nervous system.

Gall had something to demonstrate. By laboriously following the fiber cords in the spinal cord up into the cerebral hemispheres he showed how they connected with the gray matter of the brain. He hit upon the new idea of unfolding the convolutions of the brain instead of slicing them in cross section. The result was a real discovery! Hours of dissection in the quiet of his laboratory bore fruit. The white matter was a continuation of the fiber tracts coming from the spinal cord; the gray matter lay over it like a folded cap, the folds being called convolutions. There was after all a design to this pulpy mass enclosed in a hard skull. Anatomists came in groups to his lectures. Reports of his discoveries soon reached the ears of the Austrian Emperor,

who invited Gall to the palace to serve him personally. Fearing that this would take him away from his beloved skulls, Gall begged off, recommending a friend in his stead. His friend was jealous and soon convinced the Emperor that Gall was jeopardizing the Court at Vienna by uttering blasphemies against God and the Church through his brain researches. The Emperor sent word that he was to discontinue lecturing. Gall lifted his head from his worktable long enough to see what was happening at Court; alarmed, he addressed a petition of remonstrance to the Emperor: "My collection of plaster casts of the skulls of men and animals in wax cost me 7,000 gulden. . . . I have made preparations forspending 15,000 gulden for a work on the functions of the brain. . . . My reputation will be destroyed!'* There was no reprieve—the imperial mind was made up.

For four years Gall plodded on hopefully, until in 1805 A royal edict forbidding him to remain in Vienna and continue his blasphemous researches forced him *to* go to Berlin. In Germany he met an unexpected welcome. Lodging at the home of an intimate friend, one Herr Kolzthrie, he carried on his lectures before the anatomists of Berlin. Serious students of medicine opened their eyes at his new method of dissecting the brain. Christian Reil, the renowned German physician, declared he found more in the dissections of the brain performed by Dr. Gall than he "conceived it possible for a man to discover in a whole lifetime.'* Gall's new technique had opened the gates to knowledge of the brain. "I am ashamed,[1]" wrote Dr. Loder, "and angry with myself for having like the rest sliced down hundreds of brains as we cut out a cheese and for having missed seeing the forest on account of the number of trees which it contained."

The literati in Berlin took to craniology enthusiastically and made it something of a fad. It was the favorite topic for conversation in every university in northern Germany, and Gall was invited to give a series of lectures before the royal family. The Queen was enchanted to see science unfold before her, but Dr. Walter, Berlin's leading anatomist, launched a raucous attack on Gall's work. Dr. Hufeland, first physician to the King, came to his rescue. Gall paid little attention to the controversy that ranged around his discovery of the tracts of the brain and the convolutions of gray matter. He was in the full stride of self-confidence.

At about this time a young man, Johann Christoph Spurzheim, fascinated by the promise of Gall's anatomical studies, attached himself to the scientist. A candidate for the clergy at first, Spurzheim's interest had already turned to medicine when Gall appeared. He was a pompous fellow with a facile tongue and a charming manner. He went no further in his medical work—craniology answered his intellectual needs completely. Forthwith he attached himself to the Austrian; Spurzheim became Gall's Boswell. Starting out from Berlin, they gave more than a dozen series of lectures on craniology a year between 1805 and 1807, traveling from city to city. Gall and Spurzheim were criticized for these "one-month stands," but as missionaries for science they were impelled to carry their message afar. Of his travels Gall wrote: "I experienced everywhere the most flattering reception. Sovereigns, ministers, philosophers, legislators, artists, seconded my design on all occasions." Everyone was charmed by his seriousness and kindliness and by the fascination of his subject. His discoveries of the spinal-cord tracts, the convolutions and gray matter in the

brain, where the thinking and feeling occurred, were of great value to medicine. A few die-hards found fault with his conclusions. "Imagine," wrote the English physician Barclay, "saying that a lot of gray material (convolutions) with texture resembling that of the intestines . . . contains . . . separate organs of the mind." In spite of these doubters, there could be no question that Dr. Gall was a success among his confreres, and with the public as well. But alas I social success proved a boomerang. In time it smothered his reputation as an anatomist and cast the lurid light of phrenology over his name.

Eventually Gall and Spurzheim reached Paris, and established themselves in permanent quarters there. Their lectures at the Athenee Royale attracted crowds of students and laymen. Spurzheim would stand at a table with several skulls in front of him. Thirty-five parts were numbered on each, and as Gall lectured and named the propensities, sentiments, and faculties located in the different parts, Spurzheim would carefully outline the area referred to on the skull, while in the audience furtive hands often touched on their own heads the bumps described. The names of the propensities and faculties were so charming, and their diagnosis so easy, once you located the knobs. Nothing was neglected by the craniologists. They described:

Propensities:	Amativeness
	Philoprogenitiveness
	Concentrativeness
	Adhesiveness
	Combativeness
	Destructiveness
	Secretiveness
	Acquisitiveness
	Constructiveness

Lower	*Sentiments* \	Self-esteem Love of approbation Cautiousness
Superior	*Sentiments:*	Benevolence Veneration Conscientiousness Firmness Hope Wonder Ideality- Wit Imitation
Perception	*Faculties*:	Individuality Form (capacity to recognize faces) Size Weight Color Locality Number Order Eventuality Time Tune Language
Reflective	*Faculties'.*	Comparison Causality

The lectures at the Athenee Royale were attended by a class of over a hundred. Sixty or seventy lectures were given in the course. At the end of the hour, when Gall was in the midst of a demonstration of the brain, an eyewitness reported, "he would ask whether he should proceed, the audience applauded violently, and he often continued two and upwards of three hours." Dr. Gall's practice developed rapidly. Gentlemen were having their physiognomies engraved on snuffboxes and ladies had theirs painted on their

fans. He became physician to ten ambassadors and any number of Parisians, "is considered a savant, bears himself and lives handsomely, like a gentleman." His wife, Catherine Leissler, daughter of a surgeon major in the French Army who had nursed him through an attack of typhus in Strasbourg, had remained in Vienna, leaving Gall a happy man, free of her jealousy. Lauded by men and women of society, he was free to pursue his work. The Parisian cafes echoed with conversation about the new miracle of the human intellect. A contemporary journalist wrote:

> Great indeed was the ardor excited among the Parisians by the presence of the men who, as they supposed, could tell their fortunes by their heads. Everyone wanted to get a peep at them; everyone was anxious to give them a dinner or a supper; and the writer of this article actually saw a list on which an eager candidate was delighted to inscribe himself for a breakfast distant only three and a half •months.

These breakfasts were charming experiences. A correspondent from the *Birmingham Journal* dropped in on Gall in Paris. "I presented my letters of introduction to him at seven o'clock in the morning. He showed me into a room, the walls of which were covered with bird-cages, and the floors with dogs and cats." At the door the Doctor caught the correspondent's look of amazement. "All you Englishmen are surprised that I am not differently made to any of you. Do you think that these little pets"—turning to two dogs at his feet—"possess pride and vanity like man?" At breakfast Gall told his visitor of his birds, describing their peculiarities and dispositions almost as if they were human. The conversation turned to craniology, and the Doctor talked on unhurriedly, showing his guest his collection of

skulls, his elaborate charts, and his life masks. The correspondent came away profoundly affected. "This man," he wrote home to England, "is the greatest moral philosopher that Europe has produced."

Popular knowledge of craniology was spread in Paris, partly through the lampooning of the master and his followers. Charles Villers wrote: "At one time everybody in Vienna was trembling for its head and fearing to put it in Dr. Gall's cabinet. It is told that M. Denis, the Emperor's librarian, inserted a special clause in his will intended to save his cranium for M. GalPs scalpel." Friends increased in spite of derision, and numerous societies for the study of craniology were formed in France and Germany. Their catalogues included, besides the list of members and the size of their book collections, the number of skulls acquired for study. Dramatic accounts in favor of craniology went the rounds and convinced the credulous. The Marquis de Moscate, friend of one Colonel Bucher of the Fifth Dragoons, reported that in 1810 a Polish lieutenant of very violent temper, a bloody duelist, was killed in battle at Linz. The skull was forwarded to Gall, who sent back word that it was the cranium of a man of violent temper, much addicted to sensuality.

Gall's serious demeanor was not changed by his flattering rise to fame. It was Spurzheim who paid attention to Parisian ladies while Gall wooed the French Academicians. He had been welcomed to France in 1807 by Cuvier, Flourens, and Geoffroy Saint-Hilaire, all serious scientists of the Institute of France, and it was their homage he sought in his first ten arduous years in Paris while he labored over his monumental work *The Anatomy and Physiology of the*

Nervous System. In spite of much criticism of his unseemly popularity, a hearing before the Institute could not be denied. The committee of five appointed to examine his anatomical studies included Pierre Flourens, who later served science brilliantly by his experimental work on the brains of animals, Flourens had been delighted with the doughty Austrian. "I shall never forget," he wrote, "the impression I received the first time I saw Gall dissect a brain. It seemed to me as if I had never seen this organ." The committee was favorably impressed, but Napoleon was not. Chauvinism was at a peak and the Little Corporal pointed up the lesson with a reprimand to the Institute for learning chemistry from an Englishman, Davy, and anatomy from a German. The little dictator judged science as he judged the military strategy of his enemies—from the heights of his own infallibility. "Nature," he thundered, "does not reveal herself by external forms, she hides and does not expose her secrets." Napoleon was irked at Gall's friendship with Corvisart, his favorite physician, who was espousing cranial science at every opportunity. Bonaparte's magnanimity had made Corvisart. He had given this genial doctor, the first to call himself a specialist in diseases of the heart, a chance to popularize percussion, the method of diagnosis by tapping the chest with the finger. Napoleon, suffering from a chest cold, had heard of a physician who diagnosed lung troubles by examining the chest. The master of Europe, who admired directness above everything, sent for Dr. Corvisart, who came and tapped the imperial thorax with his fingertips. Napoleon was pleased; he installed him in the Institute of France.

But Corvisart's devotion to science went to greater

lengths than the Emperor could approve. "It has been long my way to know my fellow creatures by seeing them in action," shouted Napoleon. "Away with this pettifogging German with his skull bumps and passions and sentiments!" Gall and Corvisart would have to give up this new fad.

Critics, seeing the imperial disfavor into which Gall was thrown, turned on him anew. No heed was given the great contributions Gall had made to anatomy of the brain; his conclusions regarding the mental faculties were ridiculed. Gall admitted he had even learned craniology among the inmates of jails and asylums. How could decent people compare their skulls with those of these base creatures? It was a plain case of fraud. But neither Gall nor Spurzheim was dismayed by these cavilings. For these reproaches as for others, Spurzheim had the answer. He brought the more respectable traits of mankind into relation with the contour of the skull; he made sure that constructiveness as well as acquisitiveness was charted, benevolence as well as combativjsness, marvelousness as well as destructivcness. The pair pressed on with their researches, aided by a willing clientele. Heads were falling to the phrenologists at every turn, and history was being reinterpreted. Voltaire's death mask showed a large organ of "causticity." The mask of Paganini showed extreme development of the region of sound and the organ of touch. Mary, Queen of Scots, showed by her skull a violent, vindictive nature and religious bigotry. Her head was wide on the sides and flat at the frontal area. History agreed with Gall that these were indices of destructiveness in her death mask and that it demonstrated an absence of benevolence.

One day in a salon amid a group of brilliant Parisians,

Gall was shown a skull with no identifying information. He examined it carefully, said it was that of a woman, gave the approximate age, and noted that it was the skull of one who during her life had suffered an absence of maternal love. His select audience was astonished when he identified it as that of Madame de Sevigne, the world-famed French writer. They recalled this brilliant woman with more intellect than love in her make-up whose impersonal letters to her daughter have become a literary prize. Again history agreed with phrenology.

While Gall was a scientist Spurzheim was a publicist. Spurzheim busied himself with refuting controversialists and spreading the gospel. Critics thought the description of faculties was too precise. Others asked for proof, branding the craniologists "uninquiring dupes." The *Edinburgh Review* set down the whole doctrine taught by "these two modern peripatetics as a piece of thorough quackery." To the charge that phrenology was irreligious, Spurzheim retorted that the organ of veneration, located close to the crown of the head, was not only necessary to mankind but also "the most evident proof of the existence of God." There was nothing he could not prove.

The yapping critics did not touch Gall. What caused him vexation was the turncoat tactics of his friends at the Institute. Philippe Pinel, a member of the committee, and France's greatest alienist, started a quarrel with him regarding the seat of insanity. Gall thought exaggeration of the various faculties in the brain would cause insanity. Too much combativeness means mania, too little hope pointed to depression, and so on. According to PineFs findings, the hypochondriac's disorder was in the nerves of the stomach

and the melancholic patient was depressed in every cranny of his body. How then could one explain insanity on the basis of Gall's bumps of propensities or knobs of sentiment in the skull as being disorders entirely of the brain? The weight of authority which was Pinel's was too much for the anatomist, and he bowed under political pressure.

If rejection by the scientists of the French Academy had caused him pain, Gall never showed it. He had one characteristic that never deserted him—belief in himself. "The love of truth and conviction about the purity of my ideas," he said, "served always to inspire me at every step with the necessary confidence and boldness." He still had a host of friends in Paris who clustered about him, each of them striving to catch a phrenologic crumb with which they could make themselves rich or famous. His friends were his scientific undoing, but he carried on to the end, discussing with them his valuable observations. One of his pupils set down the scene in the *American Journal of Phrenology* some years later.[a] "It was delightful to see the good old man sitting up in bed (for he was ill at the time) surrounded by his friends, all listening to him, while he spoke knowledge in the most amiable manner, attending to every question and allowing some more voluble, though not less admiring than the rest, to interrupt him, patiently resuming his arguments when they had finished. He is incessantly meditating and observing, telling them that much remains yet to be done, and mentions points upon which he wishes them to make observations for the purpose of solving various difficulties."

In 1813, Spurzheim moved on to England, and Gall remained in Paris to work on the *Anatomy and Physiology of the Nervous System,* The six volumes appeared some time

carried medical thought into the arena of direct observation. In the history of science he lay between the old tradition of speculation and the new approach of observation. Right or wrong, Gall turned the medical mind away from supernatural explanations of the human soul to an organic explanation of human mental and moral characteristics. What though Gall had distorted his experimental work to fit a lot of stilted moral precepts? The kernel of his studies still stands as the cornerstone of neurology. Many great discoveries have been made through a search for some nonexistent entity; Columbus found a new world in search of a mythical passage to India. With the shift from craniology to phrenology, from Gall to Spurzheim, there was a shift in emphasis from anatomy to a mixed doctrine of moral principles and anatomical pretensions.

Johann Christoph Spurzheim had been a student of divinity originally, and though he picked up a medical degree just before he met Gall, his interests were never entirely medical. He was always the missionary, carrying the word to the benighted. When he reached England, he saw the need of a book written in English. Starting in 1815, seven volumes appeared by him, claiming some of Gall's discoveries as his own. His *Phrenology, in Connection with the Study of Physiognomy* was the last. The name *phrenology,* suggested by Dr. Forster in 1815, immediately displaced *physiognomy* and *craniology.* Lecturing in England and Scotland, Spurzheim soon became the toast of the intellectuals, answering his critics by making converts of them. The novelist George Eliot enlisted in his ranks and became an ardent phrenologist. With the excitement of a child over a new toy, she applied her new knowledge to

everything she read or wrote. She felt hqr creative skill grow under the influence of phrenology. Writers of the time crowded Spurzheim's lectures, straining to be touched by the magic wand. Shakespeare's immortal characters were subjected to phrenological analysis. "I feel sure," George Eliot wrote, "that Hamlet had a square anterior lobe . . . (which) would involve amply developed organs of ideality and wonder, necessary organic concomitant of a temperament sufficiently developed to see ghosts." She as well as her teacher, George Combe, England's foremost phrenologist, was sure that her success as a novelist was due to the phrenologic philosophy she absorbed. She had her "propensities, sentiments, and intellect," gauged "at regular intervals, and she never found the readings wanting." After the second reading she wrote: "I am pronounced to possess a large organ of Adhesiveness, a still larger one of Firmness and as large of Conscientiousness."

Others picked up the amusing game. George Combe, a publicist of the first water, joined Spurzheim, founding phrenological societies in England and in Scotland. His book *The Constitution of Man,* published in 1828—the year he declared undying allegiance to phrenology at the dinner to Spurzheim in Edinburgh—became enormously successful. For a time Combe's volume on phrenology was a household companion; bookshelves that held nothing more than the Bible and *The Pilgrim's Progress* added his book. Even clearheaded Edinburgh took him to its bosom, although the *Edinburgh Review* complained with true Scottish thrift when the organ of philoprogenitiveness was announced that this was a word it "couldn't spare another day to write." The influence of phrenology on the popular mind

was so threatening that high authorities of Church and State were forced to take action. Not content with moral qualities, phrenologists were diagnosing the bumps of a tyrant, a hypocrite, a Jacobin (18th-century radical), a calumniator, a conspirator and so on. In 18.17, Pope Pius V I I excommunicated those preaching phrenology. Five years later the Parisian fathers forbade Spurzheim to lecture there again. Nevertheless the movement spread. America, the land of the free, opened its arms to phrenology, and in 1832 Spurzheim sailed to the United States.

Here was fertile ground for his new science. He visited mental institutions, schools, and churches, making his observations, lecturing, demonstrating. America had no official body of scientists to investigate him. Indeed, only a few states had embryonic medical societies. The America of the i83o's, which accepted anything new, welcomed Spurzheim warmly. Phrenology swept the country like wildfire. Huge audiences turned out in New York, Philadelphia, and Boston. Spurzheim was received everywhere as a minor prophet. Here at last was a key to human character—every man his own explorer. All eyes were focused upon the heads of their neighbors. Ladies dressed their hair in new ways to display their bumps of mirthfulness, high on the side of each temple, while coils modestly concealed the nape of the neck, where amativeness was said to be determined.

Spurzheim was a heroic figure. As Dr. Capen wrote : "He was a feasting presence . . . full of light . . . six feet in height . . . a picture of vigor." But his lecture program was too much for even his unusual vitality. He so completely overtaxed himself that his death came as a great shock only a few weeks after his arrival in the United States,

Gall had died unsung in Paris, while Spurzheim's death in Boston in 1832 was almost a national catastrophe. Boston mourned its loss. Dr. Capen, president of the American Phrenological Society, wrote: "The decease of Spurzheim cast a gloom over the city not to be described by language." His brain was preserved in alcohol, remaining on the shelves of the laboratory in the Harvard Medical School until 1843, when it quietly and mysteriously disappeared. In the 1880's Charlotte Wells, partner of the firm of Fowler and Wells and an active member of the American Phrenological Society, revived the search for Spurzheim's preserved brain amid Harvard's laboratory specimens. It was not to be found. *Sic gloria mundi!*

Prophets come and go; New England did not lack its share, and America in the "stammering century" sunk its frontier teeth into every evangelistic preachment that came its way. Religion, socialism, transcendentalism, naturalism, and spiritualism were hungrily embraced by the American populace. Hypnotists, evangelists, freethinkers, abolitionists, temperance men, spiritualists; Millerites, Shakers, Holy Rollers, mesmerists, Mormons, theosophists, perfectionists, and revivalists thundered in the pulpits of churches and the lyceums of the cities and backwoods of these United States during the middle 1800's. The spirit of America bubbled over in every kind of sect or cult known to man. As Ralph Waldo Emerson wrote in 1840: "We are all a little wild here, with numberless projects of social reform. Not a reading man but has a draft of a new community in his waistcoat pocket."

But nowhere was there reverence shown a leader to compare with that given Spurzheim. Boston, hub of the intel-

lectual life of the country, took him and his stolen theories into its heart. The Millerites, who looked for the world to end one spring day in 1836, were no more solemn than the Brahmins of Boston, who drank in the words of Dr. Spurzheim, the "feasting presence." The height of restrained effusion is found in the peroration of a speech made by Dr. Bartlett to the Prince of Phrenology at the opening meeting of the Boston Phrenological Society in 1838:

> Worthily did he fulfil the great mission upon which he came,—to reveal to humanity its true nature,—to vindicate its true nobleness,—to clear away its blindness,—to rebuke its waywardness and folly,—to teach it its best good,—to call it to its highest happiness,—to reclaim it from its wanderings,—to lead it into paths of pleasantness and grace,—to enlighten it, to elevate and adorn. Single-hearted seeker after truth,—Lover of all human excellence and good,—Compassionate mourner over all human perversity and ill—Friend and benefactor of men,—Peace be to thy ashes! They have spread a new and perpetual sanctity over that beautiful place of the dead, where they rest.

Small wonder that respectable doctors turned Gall and his theories out of their books and that phrenology bears the unsavory reputation it does.

Yet phrenology flourished in America, finding its way into education's sacred precincts. Phrenology was said to be the greatest advance in psychology that had come from Europe in years. In 1843 the grateful trustees of the Albany Female Academy resolved:

> That we are forced to believe that phrenology, as taught by Mr. Grimes, may be learned by persons of ordinary intelligence and observation, so as to be useful to them in their everyday intercourse with society; that it is destined to improve our race, remodel the present mode of education, become useful in legislation, and in the government of children in families and in schools.

Phrenology—A Scientific Miscarriage

A host of opportunists made capital of **Gall's** discoveries. **The** Fowler brothers among others tilled the ground assiduously. Orson S. Fowler, in the days of the wasp-waist corset, published under the slogan of "Natural Waists or No Wives" a book, *Matrimony or Phrenology and Physiology Applied to the Selection of Companions for Life,* which sold five thousand copies in three months. Happy married life was a matter of phrenology. "If Hope be large in the husband, but small in the wife, he magnifies prospects , . . whilst she, especially if Cautiousness be large, looks at them in a directly opposite light, she fearing . . . he hoping and rejoicing." The new firm of Fowler & Wells Co. brought phrenology into big business. They ran a Phrenological Museum, the American Institute of Phrenology and the *Phrenological Journal* from their offices at 27 East Twenty-first Street, New York. The Fowler & Wells catalogue for 1881 featured:

THE NEW PHYSIOGNOMY

Reduced to $3.00

BEAUTIFUL	FACES	HOMELY
BENEVOLENT	FACES	MISERLY
HONEST	FACES	KNAVISH
THOUGHTFUL	FACES	BLANK
GOOD	FACES	BAD

How to Study

ALL KINDS OF FACES

FOREHEADS—High—Low—Broad—Narrow. NOSES—Large—Small—Roman—Pug. EYES—Blue—Black—Grey—Hazel——Large—Small—Sleepy—Expressive. MOUTHS—Large—Small—Communicative—Secretive. LIPS—Red—Pale—Thick—Thin.

CHEEKS—Plump—Lank—Rosy—Sallow. CHINS—Square—Round—Protruding. EARS—Generous—Stingy—Musical——Mulish. HAIR AND BEARD—Color—Quality and Quantity. ALL indicate Character

Fowler & Wells made phrenology pay. In their hands the *American Phrenological Journal* was a financial success. From the time they took over its management in the 1840'S until late in the century the firm practically had a monopoly on phrenology. In the 1847 volume stands this

VALEDICTORY: Subscribers and Readers:

With this number, our existing relations terminate. Have we returned an equivalent for your money? Could you have spent it to better advantage? that is, could you have derived from other disbursement of it, a greater amount of HAPPINESS?

With Gall a memory and Spurzheim dead, phrenology was practiced by those perilously close to charlatanry. As late as 1873, Professor Graham, under the title *The Mirror, or, Human Nature Mathematically Dissected,* dispensed Gall's science. "The Perceptive powers are at the lower part . . . the Reasoning powers are above. If the head is perpendicular, standing out 3" before the Zygomatic Arch, the mind will be extra strong."

When a medical theory becomes the property of the uncritical masses, academic scientists lose interest. They reject it completely at the time, until later generations stumble across its basic truth and re-examine its principles. This is what happened to the craniology of Gall, for underneath phrenology there was sound neurology. Gall's discoveries of the tracts and lobes of the brain could not remain unrecognized. Pierre Flourens, the skillful French experi-

menter who had earlier adjudged Gall's anatomical discoveries, set out to prove the "faculty" theory. He operated on animals in 1842,' removing portions of different lobes of the brain to discover the functions of parts of the brain, such as the cerebral hemispheres, the cerebellum, the medulla oblongata, and so on. Flourens took each lobe in turn. He removed the cerebral lobes; as a result the animals could not move. When the cerebellum was removed Flourens's subjects developed a clumsy, incoordinated gait. This proved that muscular power belonged to the frontal lobes, while muscle balance was governed by the cerebellum. Here were incontrovertible proofs of the function of large areas of the brain. Animal experiments based on Gall's brain dissections were pointing the way to a science of neurology. Doctors in clinics and hospitals with this new knowledge could now analyze living patients In whom it was suspected the human brain was diseased or injured. They learned, for example, that the back of the brain, the occipital lobe, is concerned with vision; a portion of the temporal lobe has to do with hearing; the frontal lobe has to do with thinking and muscular action and so on. Neurologists nowadays who can locate disease in the brain through knowledge of where its manifestations in the body occur are utilizing the assumptions of Gall's *cranial science.*

As for phrenology itself, its remote influence is still seen faintly from time to time. William James, the dean of American psychology, was loath to cast phrenology completely out of psychology. In his famous textbook *The Principles of Psychology* he wrote that although phrenology did not satisfy scientific standards about different functions of the brain, it still had an empirical value. "A hook nose

and a firm jaw are signs of practical energy. . . . Prominent eye is a sign of power over language and a bullneck is a sign of sensuality." One recalls that the first naive observations that Gall made in his schooldays in ancient Swabia was that "boys with prominent eyes had good memories." Not even professors of psychology feel secure in the face of the unknown.

4

I I I : Magic and Mesmerism

WHEN the layman thinks of mesmerism, he probably remembers an exhibition given in a Chautauqua meeting or on the vaudeville stage by a cadaveric-looking foreigner. Or the picture he carries in his mind is that of a Svengali whose glowing eyes, turned upon Trilby, the darling of the Bohemians of Mont Parnasse, made her do his sinister bidding. For the vast majority of people such a picture is justified. For a century after Dr. Mesmer's discovery, hypnotism was a parlor game or a theatrical trick. The scene our reader conjures up when he hears of hypnotism is probably somewhat as follows.

He is in a music hall: the orchestra has finished the intermezzo and the audience quiets as the show cards "Prof. Carlos Delsanto" are displayed before the proscenium. The footlights dim and the great Delsanto strides from the wings. His black coat sets off a pale, intense face and matches his glossy bank of hair. He advances to the row of eerie lights and introduces himself in a deep-accented voice.

"Ladies and gentlemen, I have the honor to present to you an exhibition of the magic art of mesmerism, which I learned under my master, Professor Legrand. Permit me to ask that young lady to come upon the stage as my first subject."

He points a lean finger at the first rows. There is a profound silence. Presently a young woman timidly arises and walks down the aisle. She is assisted up a few steps and stands somewhat abashed near the curtain as Professor Delsanto makes his preparations. Soon he seats his subject, and with a tone of authority bids her look directly at his eyes. The audience is tense. Here and there is heard a suppressed sigh, but all eyes are riveted on the pair on the stage. Delsanto waves his long fingers before the girl's eyes; his voice takes on a singsong quality. "Look at me, do not be afraid, listen to what I say," he intones. "You will breathe slowly and deeply . . . you will think only of what I am saying . . . you will think only of breathing deeply . . . you are breathing slowly and deeply." The patient's eyelids flutter as he places two fingers across her forehead. An almost imperceptible sound escapes her. The doctor purrs on: "Now your eyelids feel heavy, you are growing drowsy • . . drowsy and sleepy . . , you feel more relaxed . . . sleepy . . . relaxed . . . drowsy." The facial muscles of the patient ease and a delicate change comes over her countenance, an expression of resignation and contentment. The hypnotist continues his quiet commands: "You are growing sleepy, your lids feel heavy . . . soon your eyes will close of their own weight . . . your eyes are closing . . . you will sleep for three minutes, and when you awake, you will walk to the blackboard and add these num-

bars: 128,674 and 89,634." He gives her several complicated tasks to carry out when she is released from sleep. A change has come over the patient; her breathing is slow and regular now, her eyes are closed—she is asleep. Professor Delsanto turns to the audience, inviting one of them to awaken her. A uniformed attendant shuffles out of the wings and shakes her—there is no response. The mesmerist turns back to his subject, makes a few more passes before her eyes and murmurs a few words. In precisely three minutes after the start of the hypnosis, the subject awakes rubbing her eyes and looking about with a startled expression. She rises, walks to the blackboard, and writes the required numbers. Astonished, she turns to perform the remaining tasks to the letter of the instructions. The mesmerist questions her as what she heard when she was asleep. "I heard nothing/' she re* plies. Delsanto turns to the audience and bows amid the thunder of applause.

That is the view of hypnotism of the man in the street. A dangerous, dark art, born of wizardry and closely related to phrenology. It is small wonder that librarians keep their books on hypnotism locked in special bookcases as a measure for the preservation of public morals. Mesmerism unlooses a power of one human over another that can work havoc. Even the physician trained in the modern science of medicine is a little uneasy about hypnotism. He, like the physicians of Dr. Mesmer's day, has little inclination to traffic in the diabolic art.

A hundred and fifty years ago Mesmer stumbled upon the secret of hypnotism. It was Mesmer's fantastic idea to borrow magnetic energy from the stars and planets to use in treating patients. The substance Mesmer thought he

siphoned from the heavens he called *animal magnetism;* actually he had stumbled upon mental suggestion. It was concealed in the magnetism he thought he applied to his patients, as it had been concealed in shrines and relics where miracles of healing had been perfqrmed for countless generations. Unwittingly Mesmer retrieved this universal force, so long thought to be invested in inanimate objects, for use by those who dealt with nervous and mental ills. In time, magnetism, mesmerism, or hypnotism came to be recognized as a legitimate method of relieving human suffering,' and eventually in the hands of Braid and Charcot led to remarkable discoveries in the field of psychology.

At the outset, Mesmer knew nothing of the nature of the force he employed. He may not even have known that Paracelsus, *I'enfant terrible* of medieval medicine, had suggested using the magnet as a cure for all manner of complaints. Philipp Aureal Theophrast Bombast von Hohenheim, called Paracelsus, was a revolutionary in medicine of the 16th century. He upset tradition, displacing the roots, herbs, and tinctures of plants of the accepted Galenic school by the use of minerals such as iron, mercury, and sulphur. Paracelsus, as bombastic as his name, was convinced that the power of minerals to cure was derived from the heavenly bodies. It was not illogical for him to think so, for in his day astrology was a respectable science, employed by physicians in picking a favorable time for treatment, by kings to guide them in their decisions of state. Paracelsus, whose only recognized authority was himself, mixed astrology, alchemy, and mineralogy, emerging with the magnet as the cure-all. The magnet, passed over each organ, cured patients through the magnetic power which flowed from the planets and stars

into the patient's body. The arcanum of the heavens was his diagnostic chart; the proper planet and the proper magnet, and he had the cure. The brain was ruled by Luna, the moon, the spleen responded to Saturn, the kidneys were controlled by Venus, as the liver was related to Jupiter and the bile to Mars! It was infallible.

When Mesmer was a medical student in the 1760^, Paracelsus and his magnets were probably no more than a bit of medical history which professors added to their lectures for the sake of novelty. To Mesmer, the idea was alluring, it fitted into his mystical nature. The scientific possibilities of magnetism fascinated him less than its mystic meaning. To recapture the power of the stars over human beings; to bring back the faith of the medievalists in the heavens 1 Knowledge of magnetism and electricity was widespread in Mesmer's time, but the interest came from a different direction. Scientists were experimenting with electric sparks by rubbing polished metallic surfaces. They were even storing electricity in the primitive storage battery of Galvani, and the wonder of the age was the Leyden jar. The fact that the earth itself was a magnet, with a magnetic pole in the North, was known to every schoolboy. Benjamin Franklin's experiment, obtaining electricity from lightning through a key attached to a kite flown in a storm, had been seized upon as a fascinating addition to knowledge.

But such facts as electricity, magnetism, were far from being used as tools for medical treatment. Solid doctors bled their patients and sweated, purged, cupped, and dosed them in the good old-fashioned way. Physicians knew what bleeding would do in dropsy; they knew a thousand and one herbs for a thousand and one complaints, but to use electricity on

human ills was like changing horses in mid-stream. A man who, like Mesmer, would try to cure with a magnet carrying magnetism from the stars was certainly a fool. The doctors of the last quarter of the 18th century were busy with anatomy and methods of clinical observation of their patients. The stethoscope had not yet been developed, the fever chart was just about established, and pathology, the science of tissue changes in disease, was still an infant among medical sciences. What physicists did with electricity was their business. What doctors needed to know was anatomy, botany, and more anatomy.

But Mesmer, fool or genius, paid little attention to all this. He had the doggedness and the resistance to discouragement of Gall the craniologist. In that respect they had a temperament in common.

Mesmer was only a few years ahead of Franz Gall, but centuries separated them in their manner of thought. Gall's work started with science and ended in mysticism. Mesmer's experiments began in mysticism and tended toward science, for his magnetism proved to be the open-sesame for the developments of modern psychopathology. What a contrast between two minds born in the same century, educated in the same decade at the same university! Gall an observer, painstakingly examining the brain and skull to read the secrets of the human soul, and Mesmer a mystic dreamer hoping to bring down magnetic energy from the stars.

Friedrich Anton Mesmer also was born in Swabia, in 1734, the son of a forester in the employ of the Bishop of Mersburg. Early in life the boy showed signs of a mystical turn of mind. He would sometimes fail to arrive at school, walking open-eyed over the woodlands and countryside. Like

Gall he loved nature, loved the manifestations of an impalpable power which he sensed was at work. The mixture of natural piety and studiousness were the accepted ingredients of a churchman, and Friedrich accordingly qualified in Latin and French, hoping to enter the priesthood. But a poetic urge made him turn to music and philosophy. A doctorate degree in philosophy left him dissatisfied, and for a year he haphazardly studied law. Still restless, Mesmer enrolled in the medical faculty as a prospective physician, subordinating his musical interests to anatomy and botany.

Mesmer was thirty-two years old when he presented his doctor's thesis on a somewhat unusual subject, *The Influence of the Planets on the Human Body.* His discourse before the medical faculty must have fallen on interested ears, for a degree of Doctor of Medicine was granted him in 1776 by the "Old Vienna" school, established under the despotic Maria Theresa. For three years he was a desultory medical practitioner, supporting himself by a meager practice. Study and music held up his morale. Everything interested him—geology, physics, chemistry, mathematics. Marriage to a wealthy widow of a Viennese official suddenly brought leisure and the chance he craved to read and to play his harpsichord. The sumptuous Mesmer home on the Lindenstrasse became the meeting place of the musical elite of the day: Gluck, Mozart, and Haydn were frequent visitors. Mesmer is said to have introduced the glass harmonica for which Mozart composed. The Mozart family were close to the Mesmers, and the good doctor took the immortal Wolfgang Mozart under his wing. He consoled the twelve-year-old genius when, as the result of intrigues at the Austrian Court, he was not permitted to present an opera commis-

sioned by Joseph II. Soon Mozart was invited to write another work, and *Bastien and Bastienne* was given in 1768 "at the private theatre of Dr. Mesmer."

Moving in a wide circle of acquaintances, Mesmer by chance met Father Maximilian Hell, a Jesuit astronomer, at the court of the Empress Maria Theresa. The priest was attracting the curious because of his successful treatment of nervous patients by means of the application of the magnet to the body. The Jesuit priest propounded no theories about the nature of his remedy, in that way conveniently avoiding any controversy with the Viennese medical fraternity. He knew only that his method worked when other methods failed. Dr. Mesmer, as he watched, became intrigued by the results of Father Hell's magnetic treatment. A foreign visitor who had asked the priest for a magnet for his wife gave Mesmer permission to observe the results of its use. Under Mesmer's close observation the patient actually felt the magnet "draw the pain out of her body." Here was a new toy for Dr. Mesmer, the dilettante. He himself was convinced of the efficacy of the magnet. As he pondered over it, the theory of his doctorate thesis, the interaction of the planets on the human body through magnetism, sprang to his mind.

That year Mesmer decided to treat one Fraulein Franzl Oesterlin, who was a friend and companion to Frau von Mesmer. Franzl Oesterlin was a buxom woman of twenty-eight who suffered from nervous attacks, lasting a few days, which defied all treatment. The attacks started most often with an earache, then fever, terrifying convulsions, hallucinations, paralysis, and pains in the legs, which came in rapid successon. It was as difficult a case as Mesmer could

wish for to test the magnetic treatment. On the appointed day the Fraulein had been v£ry ill; she lay in bed unable to move for fear that her spasms of pain would return. Mesmer walked to the bedside, and turning down the coverlet, placed a magnet over each foot and a heart-shaped magnet around her neck, falling on her breast. The doctor waited, his hand on the patient's pulse. Nothing happened. Mesmer then touched each magnet to make sure that it was in contact with the skin. Instantly the patient jumped as if stung. She cried out that an intense pain had shot through her chest from the point where the heart-shaped magnet touched her. There was a pause, then the patient squirmed again as the pain shot along her legs and out of the body at the point where the magnets lay. For six hours she was free from pain. Dr. Mesmer was delighted. Following several more applications of the magnet, the patient reported no further attacks, and she was discharged as completely cured. Frau Mesmer was as pleased as the doctor. The story went the rounds, and friends who had known of Franzl Oesterlin's terrible suffering and her miraculous cure were impressed. Mozart, writing of her after a few years' absence, exclaimed, "On my honor, I would not have recognized her; she is fat and healthy, and she has three children."

Mesmer, hastening to write up the case, gave numerous details of the symptoms and the treatment, but he failed to mention the essential fact, that Fraulein Oesterlin had absolute confidence in her doctor and professed a belief that he was the only one who could cure her. Mesmer with his head in the clouds had a faculty for missing the obvious—in this case, the faith of the patient in the physician. The force **that** cured Franzl Oesterlin was mistakenly presented to

the scientific world by Mesmer as none other than the *"gravitas universalis"* (universal magnetism) of the mystical thesis of his student days. "My observations/' he wrote in his article, "opened up a new horizon, confirming my former ideas . . it taught me that another principle acted on the magnet, itself incapable of this action on the nerves." His medical confreres read the article, but failed to comment.

General opinion in the coffeehouses where doctors met was that there was nothing much in magnetism. Such talk was unscientific; a case or two cured by the magnets would have got well anyhow. In spite of the learned doctors, Mesmer's experiments had great popular appeal. It was not long before the Vienna newspapers were busy trying to keep pace with the marvelous successes of the magnetizing doctor. Miracle followed upon miracle, and the number of patients increased daily. Mesmer abandoned all activity at the Lindenstrasse house except that of magnetic treatment. Old friends, embarrassed by widespread publicity were only too glad to find an excuse for declining invitations to visit his lovely gardens. Madame Mesmer was disturbed by all this popularity. The honors falling to her husband were no balm to the distress she suffered as she witnessed the wear and tear on her furniture. There were no more lovely evenings to be spent with gentle friends. After the clattering patients went home Fricdrich was in no mood for Mozart and music. This new madness of Friedrich was more than she could stand, and she told him so: "It's either I or your magnetism I" The Doctor shrugged his shoulders in resignation. Between his experimentation and his wife he chose the former. Neglect by his friends both stimulated and dis-

appointed Mesmer. He became more determined than ever to convince a skeptical city. A few providential occurrences caused his hope to soar. The director of the Academy of Sciences at Munich heard of the new treatment and sent for Mesmer, who returned a few weeks later to Vienna with testimony as to the efficacy of magnetism in the case of Herr Direktor Osterwald's paralysis and Professor Bauer's inflamed eyes.

Professionally things were going well with Dr. Mesmer. He was curing people, making new friends daily, and learning more each day of his "magnetic virtue." But the coolness of his medical colleagues irritated him. Perhaps he would try to show them what was so evident to him. If he could only find a man who knew something of physics and electricity as well as medicine! Then one. day in January, 1775, he chanced to hear of M. Ingenhousz, a member of the Royal Academy of London and inoculator in Vienna, who was amusing the nobility with experiments of reinforced electricity. Ingenhousz, whose name stands high in the history of botany, had a clean reputation as a scientist. He was just the man. Within a week, Dr. Mesmer invited him to witness a demonstration on Fraulein Oesterlin. With a young assistant, Dr. Ingenhousz followed Mesmer into the sickroom where the Fraulein lay in the midst of another attack of nerves. Mesmer instructed Ingenhousz to touch her; there was no movement. Very good. Then Mesmer called him away from the bed and "communicated to him the *animal magnetism* by taking him by the hand. Immediately he reapproached the patient and touched her a second time: there resulted some convulsive movements." The experiment was repeated; each time Ingenhousz, "to

his great astonishment/' caused a convulsive attack in **the** part he touched with the magnetized finger. They tried other tests; the demonstration worked beautifully, and Mesmer asked the scientist if he were convinced of the "marvelous properties which I had announced *to* him." Ingenhousz was apparently won over, but advised Mesmer not to be hasty about communicating his results to the public. "It might make for unpleasant notoriety, you know." For two days Dr. Mesmer was happy. Then the bombshell! Dr. Ingenhousz publicly stated that the experiments on magnetism were valueless and that Mesmer's demonstrations furnished no proof of anything. Mesmer was furious at his betrayal.

The Medical Faculty of Vienna stepped into the controversy. Dr. Van Swieten, leader of the "Old Vienna" school of medicine, was anxious to learn of this new work. He personally appointed a commission to investigate Mesmer's claims. The commissioners proceeded to the Lindenstrasse, watched Mesmer at work, examined his patients, and left to render their report. They informed Van Swieten that the cures claimed by Mesmer as due to magnetism were based entirely on imagination and therefore opposed to the whole body of medical knowledge. They saw nothing of positive value, and suggested that the medical faculty discountenance any further experiments in this field. The report was another bombshell to Friedrich Mesmer. But he could not turn back. His results were too spectacular, besides his patients clamored for him.

A young blind girl who was studying music under the patronage of Maria Theresa, from whom she received an annual stipend, begged him to treat her. Mesmer insisted that when he applied his magnetic treatment to the child,

medical men be present. The magnetic treatment was successful, but the attending doctors cried, "Humbug I" A scandal developed that splashed all over Vienna. Mesmer claimed that the patient recovered her sight sufficiently to be able to see some of her surroundings. The Faculty of Medicine insisted he was grossly mistaken and spoke of collusion. Mesmer stoutly insisted that the treatment had been interrupted at the behest of representatives of his enemies, who threatened the father with loss of his yearly income if his daughter recovered her sight to any degree.

Disgusted with the obstinate opposition of his medical colleagues, who threatened to expel him from the medical fraternity, Mesmer departed from Vienna on a tour of Europe. In Paris, which he reached in February, 1778, his reception was heartening. His reputation had preceded him; he was already launched on the perilous course of being a popular hero. Still with scientific aspirations, upon arriving in Paris Mesmer addressed a statement to the Academy of Sciences, and was informed he might set to work among the sick providing there was supervision by physicians, who proposed to examine all comers before treatment. Mesmer resented this offer. "Everyone," he declared, "wants to prove my doctrine false." He preferred to build up his following among the mass of Parisians who were ever ready to give audience to an innovator, particularly one who assumed the role of a persecuted benefactor of mankind.

Mesmer set himself up in a house in the Place Vendome. Clients increased and he was forced to move to the Place de la Bourse, where he lived in a style designed to attract the best of pre-Revolutionary Parisian society. His salon was beautifully decorated with thick carpets and gorgeous wall

hangings. A concealed band suffused the dimly lit atmosphere with subtle strains of music, catching the fancy of the large audience that never failed to appear. Plumed and brocaded ladies, young blades and the best-dressed men about town, pressed their way through the throngs that besieged Dr. Mesmer's clinic. They took their places around the *baquet,* a kind of great copper bath in the middle of the room. From the cover of the *baquet* projected a variety of magnetized objects—metal rods, twists of wire, and other articles that could be grasped by the enchanted audience that fancied it was connected with a great reservoir of magnetized fluid under the copper cover. This magnetic fluid was the substance that connected the stars and planets with human beings. It was an *etherium,* a health-giving celestial force, captured by Mesmer alone.

The seance proceeded; the group sat around the *baquet,* each one holding a metal rod. Mesmer's assistants touched them with magnetized rods from time to time. A ripple of excitement was felt, then yawning, closing of the eyes, a feeling of suffocation. The reactions, first mild, became violent hysterical spasms. "The women, being the most easily affected, were almost at once seized with fits of yawning and stretching; their eyes closed, their legs gave way, and they seemed to suffocate. In vain did musical glasses and harmonicas resound, the piano and voices re-echo, these supposed aids only seemed to increase the patients' convulsive movements. Sardonic laughter, piteous moans, and torrents of tears burst forth on all sides. The bodies were thrown back in spasmodic jerks, the respirations sounded like death rattles, the most terrifying symptoms were exhibited. Then suddenly the actors of this strange scene would frantically

or rapturously rush towards each other, either rejoicing and embracing or thrusting away their neighbors with every appearance of horror."

These *crises,* as they were called, were regarded as the sign of the effectiveness of the magnetizing treatment. Mesmer, attired in a purple silk robe, presided over the sessions, baiting the emotions of his clients by touching them majestically from time to time with an iron wand. Cases that did not respond to the *baquet* received special treatment from him. He would sit in front of the (usually female) patient, knees touching, and stroke her limbs and body until the "crisis" occurred. Sometimes there was too much crisis, and the possessed one had to be carted off to the anteroom,' where Mesmer's or his handsome assistants' personal attention subdued the patient. People began to talk; the wits of the town hinted that the treatment which Mesmer afforded in private was far from being unknown to man.

Thomas Carlyle, sitting in his thatched cottage in Chelsea writing his monumental history of the French Revolution, scoffed at "Herr Doctor Mesmer in his spacious Magnetic Hall." The picture he painted could only have been written by a Carlyle. "Long stoled he walks . . . around his baquet. . • . Round their Magnetic Mystery—which to the eye is a mere tub with water—sit breathless, rod in hand, the circles of Beauty and Fashion, each a living circular *Passion-Flower:* expecting the magnetic afflatus, and new manufactured Heaven-on-Earth. O Women, O men, great is your infidel faith 1"

Mesmer never denied that he was theatrical. Of imposing height and distinctive features, he admitted that his procedure was not on the surface a reasonable one, but he

cured patients and delighted the dilettanti of Paris. Success bred success, but Mesmer, sober and serious, could not forget his failure to impress his medical colleagues. After a time he petitioned the Court for assistance in his war against the pedants of the medical fraternity. He wrote directly to Marie Antoinette, saying he hoped the Government would support his humanitarian cause, begging that a commission be appointed to examine into his discovery. He did not neglect to add that a certain chateau was to his liking and that a pension from the Crown would help the cause of magnetism immeasurably. Otherwise, he wrote, Paris would lose him. Louis X V I proffered 30,000 francs and a clinic that was to be under the supervision of three responsible persons to be named by the Government. Mesmer saw in this offer only incredulity of his greatness. In petulance he departed for a spa, taking with him several of his well-to-do adherents. In his absence, Professor Charles Deslon, the single member of the medical faculty to befriend Mesmer and honor him by conversion to the magnetic cult, asserted himself as his local successor.

Mesmer and his followers were quick to perceive the error in their move, and immediately planned to return to the scene of their public triumph. A subscription organized by the Harmonic Society (formed by supporters of magnetism) brought 317,040 Iivres. Rich Parisians gave the major part, but the society at Bordeaux and St. Etienne contributed 4,000 and 1,200 Iivres respectively. The Master returned to Paris, establishing himself in a larger, more imposing clinic in the rue Montmartre. His renewed popularity made a public investigation incumbent upon the Government. Finally a royal commission was appointed, com-

posed of four physicians and five scientists, including Benjamin Franklin and the chemist Lavoisier. Their verdict, issued in 1784, was devastating to Mesmer's hopes and achievement; Franklin epitomized the opinion of the commission regarding animal magnetism by saying that "what could not be smelt, felt nor seen was not there." In a private report to the King the commission pointed out that magnetism was a menace to public morals, what with the stroking of beautiful ladies in public and in private. In fact, Lenoir, lieutenant general of police in Paris, had himself been answered in the affirmative when he asked whether it would not be easy to rape a woman who had been magnetized. No matter that the physicians were pledged to "act with probity" in their experiments. "The danger exists," said the commissioners, "and no one can rely on being always master of his will."

Mesmer took this report badly. He wrote to Franklin, who was head of the royal commission, complaining that they had followed Deslon in their investigation of magnetism. When Mesmer was away, Deslon had assumed all the credit for magnetism. "It is mine and mine alone I" cried Mesmer. "I believe it to be a discovery of importance and scope." He begged Franklin to remember the good he had done his patients and to let posterity revenge him for this insult. In August of 1784 Mesmer wrote to the editors of the *Journal de Paris* demanding a chance to be heard by the public and the scientists. He implied that he repudiated the commission's verdict. He took up each item of the royal commissioners' report in his letter to the *Journal* and tried to answer them severally. He objected to the fact that Deslon had presented his "doctrine" for examination to the

society; he was outraged by Professor Thouret's claim that Mesmer's doctrine was identical with those of THE 16th-and 17th-century philosophers, "I asked to be example? in 1778." he wrote, "but there was no answer." His senetn with the public was no balm to the abuse which his self Isteem received at the hands of the French Academic ans. e

The secretary of the royal commission I due,time took cognizance of Mesmer's outburst. Vicq d'Azyr, secretary of the commission and a man of solid attainments, calmly answered the charge. He stated that in 1778, on Mesmer's first entry to Paris, he would not allow the commissioners to check on the diagnoses of his cured patients. Besides, d'Azyr stated, the commissioners had to deal with M. Le Roux, an "agent" of Mesmer. The society had given him a fair trial; the secretary could not but agree with his colleagues that Mesmer's doctrine was a chimera. Mesmer hastened to answer, offering to set forth the facts of the Le Roux affair and to present twenty-five of his cases, along with twenty-five treated by others, before a magistrate and to show "that my patients get better quicker and more surely than those under treatment of other doctors." But his polemics were unavailing. The scientific gentry had no further interest in his magnetism, and Mesmer's dream to bring his work into the realm of medicine was shattered.

Retirement was the only course open to Mesmer. "Let him walk by the shore of the Bodensee—meditating on much," wrote Carlyle. He returned to Mersburg, the site of his birth, there to remain inactive and moody until his death in 1815, the year of Napoleon's downfall.

Mesmer's withdrawal to the home of his childhood, and his indifference to what the scientific world might eventually

think of his work, did not set the matter at rest. Harmonic Societies sprang up in France and Germany to study animal magnetism. Experiments by the thousands, treatments by the hundreds, were carried out. Mesmer had made the medical world conscious of a principle to which no one had paid attention before. He himself had noted the personal factor (the physician himself) involved in his magnetizing, but did not appreciate its meaning. The Marquis de Puysegur, his successor in France, had made the discovery that the force used did not flow from the astral sphere, but was a force coming from the magnetizer himself. Mesmer in his retreat clung to his old theories in spite of new evidence that was accumulating. There was no use refining his theory when science had already condemned it.

In 1843, James Braid, an English physician, stumbled upon the effect achieved by Mesmer with his magnetic fluid by simply putting the patient to sleep through repetition of monotonous words. Dr. Braid called his revision of Mesmer's treatment *neurohypnosis.* Gradually more tolerance for hypnotism developed in England and in France. We shall see in a later chapter how hypnotism was brought to a scientific level in the last quarter of the 19th century.

The public, delighted at a new intellectual novelty, remained loyal to Mesmer. Well-meaning individuals, followers of both Gall and Mesmer, banded together in London in 1843 and commenced the publication of the *Zotst,* a magazine devoted to "cerebral physiology and mesmerism." Well written, it was at once sober and ridiculous, and served only to carry the mystical notions of Mesmer to an absurd degree. The journal was dedicated to "Truth though opposed by the philosophy of ages." Its protagonists defended mes-

merlsm in high-sounding words. Mesmerism is a "physiological truth of incalculable value and importance; and . . • there is not the less certainty that it represents the only avenue through which is discernible a ray of hope that the more intricate phenomena of the nervous system of Life will ever be revealed to man."

The direct descendants of Mesmer and his animal magnetism were the Harmonic Societies, itinerant popularizers of animal magnetism, the Zoists, and others who, in the mid-i9th century, practiced the unholy alliance of magnetism and phrenology. In another quarter-century Professor Jean Martin Charcot and his fellow workers in the Salpetriere hospital took mesmerism out of their hands and placed it on the throne of science. The idea of the influence of one human mind on another was proven to be due to mental suggestion and present day scientific hypnosis appreciates and utilizes this fact. But though Friedrich Mesmer and his lusty followers were far off the mark in their explanations, it was Mesmer who stumbled unwittingly upon the notion of using for purposes of cure the remarkable power of mental suggestion.

I V : The Gentle Revolutionist

T H E Bicetre is a large city hospital that sprawls in one of the Parisian suburbs. One section of it is devoted to the insane of Paris. Go there today and you will see cobblestoned patios where gray-clad patients sit under chestnut trees in the pleasant sunshine. On one wall of the encircling buildings you will see a plaque to Dr. Philippe Pinel, the patron saint of the institution. There are more formal institutions for the mentally ill elsewhere. In America one can find enormous state hospitals for the insane, equipped to the last detail, sparkling and new. In the metropolitan cities like New York, one can see skyscrapers full of busy scientists and the patients on whom they labor. The great system of state hospitals and private mental institutions throughout the civilized world owes its being to the work of Pinel at the Bicetre. The thousands of unfortunates stricken by man's darkest curse owe the help they receive to Philippe Pinel, son of the French Revolution, an aristocrat of the spirit.

The Bicetre before the Revolution was a hellhole. Since the 14th century it had been a prison for political prisoners, then a home for the indigent and aged, and later a lunatic asylum. The Bicetre belonged to pre-Revolutionary Paris, the city of fascination and filth, of powdered ladies and puny children. Paris was the center of continental wit and learning and at the same time a monument to man's degradation of man. The streets in some sections were stinking, the houses blackened and wretched. Crowds of beggars, carters, harlots, and sellers of nostrums crowded the streets while in another part of town dowagers could be seen riding in their sedan chairs carried by sweating hirelings bent double beneath their burdens, their heavy shoes studded with iron. While the marchioness and the countess arrived in coaches in time for the opera, hair curled and powdered, aglitter with jewels, hordes of laborers, carpenters, and masons clumped through the muddy streets on their way to the faubourgs where they dwelt. The dustmen who gathered up the garbage, the washerwomen and their vans, the one-horse chaises driven by young men of fashion, blocked the streets. The pedestrian had to flatten himself to escape the axle of passing carts and coaches. "In Paris/' remarked Montesquieu, "you will find a great number of honest folk on foot, whereas most of the coaches are full of scoundrels." In the early morning hours the workers, carrying the tools of their trade, trundled through the streets, buying *cafe au lait* at two sous a bowl by the light of flickering lanterns from women who carried enormous tin urns of the liquid. During the same morning hours cafes were alive with poetasters, wits, gallants, and lovely ladies. In the cafes near the Pont Neuf people drank coffee, played chess, learned

and discussed the news, lampooned and twitted each other. Charles Mercier, the Samuel Pepys of pre-Revolutionary Paris, wrote: "In one of them they prepare the coffee in such a way that people who drink it are greatly exhilarated by it. At any rate, everybody on leaving believes he is four times as brilliant as when he entered."

This was the city of a hundred thousand Parisians in the 1780's. This was the city for whose unfortunates the Bicetre was the catch basin. In it were crowded the insane, prostitutes, the aged, the criminal, and the city's derelicts. They were jumbled in its ancient halls in one unsavory mess. For the "dispossessed, demoralized, degraded, and bitter-spirited people" of Paris, the Bicetre was a living grave. For the insane of the city, it was a tomb. The treatment they received was chains that bound them to posts, lashes of a whip, and the coarsest food. Doctors rarely saw the inmates; negligence was their trusted medication.

The situation at that time in regard to the treatment of the insane was no better elsewhere. In England, the treatment at the "Old Bedlam" (St. Mary of Bethlehem Hospital, founded in 1247) was featured chiefly by neglect. Wardens politically appointed were in charge, and the patients rarely saw a physician. Once a year a physician would prescribe treatment for the "lunaticks" which was carried out on every patient religiously. The prescription called for free bleeding on all patients in April and in October, and during the month of May the lunatics were given purges and "vomits." A variation in treatment consisted in scarifying the scalp, after shaving the hair, by blistering the skin to cause a "determination of the blood" to the head. The smaller private institutions were visited by a physiciart

only once in ten years, and his regime followed to the letter until his next visit. The chronic patients were chained to posts, and if they were crazy enough, exhibited to the public on Sunday afternoons for a shilling a head. "Going to Bedlam" meant the final deterioration of a mental patient. "Once insane, always insane" was an axiom among wardens of insane asylums. No one dared hope for a cure. And so it was all over Europe until the spirit of humanitarianism preached by Voltaire, Rousseau, and Montesquieu broke through to the insane.

The Revolution in France was a boon to scientists. For one thing, official support was given to any serious scientist who wanted to work out his theories for the benefit of the people. For another, public opinion had carried great weight in Paris with government authorities. The voice of the Parisian public was heard on every problem. It was the force of public opinion in Paris, as well as the farsightedness of Professor Thouret and Dr. Cabanis, that gave Pinel his chance to put his ideas into practice.

In the second year of the French Revolution Dr. Philippe Pinel, a small mild-mannered man of studious bent, called upon his friends, asking for support for a new project. Why not, suggested Pinel, apply the practice of humaneness about which Marat and Danton were thundering in the National Assembly, to the insane? Why not give to those miserable creatures the benefits of Liberty and Equality? Thouret, Commissioner of Public Safety in 1793 and 1794, and Cabanis, physician to Mirabeau, were stanchly in favor of enlightenment. Thouret was a realist; earlier, acting for the Faculty of Medicine, he had upheld science in denouncing Friedrich Mesmer when he sought

official sanction for his "animal magnetism." Thouret had used strong language about Mesmer's universal treatment, "an illusion which cannot be excused in an enlightened age." Apparently Cabanis and Thouret were impressed by Pinel's plan, for in their role of Administrators of the Hospitals of Paris, they granted his request and appointed him to head the lunatic asylum of the Bicetre. Next day, Pinel repaired to the old gray-stone house on the outskirts of Paris. Here was his chance to apply the theories that had been moiling in his mind for several years. They were the logical outcome of the new humanitarianism that was triumphant in France. After all, were not madmen men? Did not their afflictions rise from the same passions, intellect, and will as our own? Pinel as he hurried to the asylum thought of the zealous Jacobins, those extremists who were then controlling France, and of the tumult and the unleashed passions that filled the streets of Paris. "Yes," he murmured to himself, "they are like us, only more so." He walked into the office of Couthon, the prison-commission member of the Paris Commune, and explained his proposal.

Couthon, a hardened warden, belonged to the old school. He listened impatiently to the Doctor. "Why not," he satirically suggested, "proceed to the *zoo* and liberate the lions and tigers?" Pinel persisted, and finally Couthon agreed and, partly out of curiosity, accompanied him to the scene of the great experiment. A ferocious little man, Couthon started to walk ahead as befitted his office, but at the sound of three hundred manfacs screaming and clanking their chains he drew back, his face white. "Citizen," he said to Pinel, "are not you yourself crazy that you would unchain these beasts?" But Pinel lost no time; this was his

opportunity. Quickly he entered the cell of an English captain who was believed to be particularly dangerous because he had once killed an attendant with a blow from his manacles. Pinel was alone. Outside Couthon, by this time completely shaken, murmured: "Do as you will, but you will be sacrificed to this false sentiment." Pinel addressed the English captain: "Ah well, Captain, I will cause your chains to be taken off; you shall have liberty to walk in the court if you will promise to behave like a gentleman and offer no assault to those you meet." "I would promise," answered the old soul, "but you deride me; you are amusing yourself at my expense." Pinel called the attendants, the fetters were struck off. The old man tried to walk; he could not. He had been in chains for forty years! After many attempts, he tottered from his dark cell to the corridor, where he could see the sky. "Ah," he cried, "how beautiful!" The second to be released was a drunkard who had been discharged from the French Guards, Chevigne by name. For ten years he had been in chains. His mind disordered, assaultive and surly, he was considered incurable. Pinel went to him, took off the iron anklets and handcuffs. Behold a revelation! The vicious sot stood up, and with a courtly flourish bowed to Pinel. He became a model of good conduct and in time was released.

Pinel passed on among his newly acquired charges, encouraging this one and talking to another. He unleashed some from stone posts in which anklets and chains were riveted, removed patients from dungeons some of whom had lain there on filthy straw mats for years. He gave them better food and forbade attendants to beat them. Pinel did what any humane administrator would have done in a mod-

ern institution, but he did more. He dosed his patients with a new kind of medicine, a medicine mentioned nowhere in die textbooks which doctors of the 1790s read. This new drug was kindness. And strangely, it worked. Dazed lunatics, rubbing their eyes at their good fortune, talked for the first time in years, and became almost human again. Skeptical Couthon could not believe his eyes; it looked like a royalist plot. "Citizen," he said sharply to Pinel, "I will visit thee in the Bicetre tomorrow and woe to thee if thou hast deceived us and concealed enemies of the people among thy madmen." The enemies of the people were not in the asylum; only a friend was there.

This Pinel was a strange man, gentle in the midst of the fury, yet firm in his resolves and clear in his purpose. His father was a simple country doctor in Saint-Paul, too poor to afford schooling for his family of seven. Because Philippe showed early a capacity for intense concentration, his father provided a tutor for him at home. Even in later days his powers of concentration were extraordinary. His brother, also a physician, related how when they lived together, Philippe would sit with fixed gaze pondering some problem for hours. Once the brother went to sleep, awakening hours later to find Philippe in the same position, thinking; apparently he had not even moved. At the age of thirteen he was sent to the College des Doctrinaires at Lavour. His reputation preceded him and he justified it with a brilliant record at the college.

Philippe seemed from the start to be stamped of another mold. Nowadays we would say he was introverted, shut in, too mature for his own good. Then a studious habit made one welcome as a candidate for the priesthood, and Phi-

Hppe was not averse to this choice. At college he elected to study philosophy, mathematics, and logic. At school philosophy, at home religion. Even his brothers and sisters did not dare to treat him familiarly; to them he was a benevolent little parent, serious of mien and magisterial in tone. During holidays he officiated in the role of household priest, assembling his siblings for lessons in the morning and for prayer in the evening. The parish priest and the bishop of his diocese watched his progress with glowing satisfaction.

Dr. Pinel, Senior, stimulating the boy to get into the open, took him on hunting expeditions, but Philippe was painfully sensitive at the sight of fallen game. With his gun he always took his books, and he rambled away from the chase over the fields of Agone in view of the distant Pyrenees. So his youth was spent in a pastoral, scholarly atmosphere.

Soon young Pinel started reading the books that straggled out of Paris—books suggesting atheism, the rule of reason, the overthrow of brutal serfdom, and so on. The liberal principles and anticlerical writings of Voltaire seeped into his mind and the fascination of the Church began to pale. At twenty-two he had already abandoned a career in the Church and left his college for Toulouse, where he enrolled in medicine. Again he passed brilliantly, and in 1773 graduated from the Faculty of Medicine. Brilliant as a student, rich in book knowledge, he still had a living to make. Tutoring the sons of an eminent family in ancient languages and natural history kept him from want. But this was dull fodder for a thirsting mind. At thirty, still unsettled, he moved to Montpellier, which at that time was a medical center of the first rank. Others had better take over

the burden of medical practice; his timidity suited him for study more than for dosing patients. Pinel could never be the city doctor powdered and scented, authoritative but ignorant.

The atmosphere at Montpellier fitted Pinel's personality exactly. Under the leadership of Boissier de Sauvages, doctors there were busy rewriting medicine, developing the idea of classification of diseases and following the lead of Sydenham, the modern Hippocrates and founder of "clinical" medicine. It was Sydenham who described measles and showed how to differentiate it from scarlet fever, who described chorea (St. Vitus's dance) and rheumatic fever in terms of what he saw at the bedside instead of in Latin phrases. Linnaeus, the Swedish naturalist, had recently organized botany by classifying plants according to genus, species, order, family—an arrangement which is still held valid. The Montpellier school combined the science of Linnaeus and the bedside acuity of Sydenham, and produced a table of diseases that was clear, precise, and understandable. There were 2,700 types of human diseases arranged in species, genera, families and orders. Pinel had always suspected that mathematics could be applied to natural science; he loved the true scientific spirit of his leaders. Pinel, the overeducated medical man, was fired with ambition to do something of value in the field of comparative anatomy and physiology. When Boissier de Sauvages passed on, Paul Joseph Barthez became his successor and Pinel's teacher.

Theologian, soldier, lawyer, philosopher, "counsellor of judgments," and doctor, Barthez introduced *vitalism* into medicine. It was the explanation of life phenomena as due to a "vital" force arising elsewhere than in the material

body. Vitalism was later developed to form the curious *seminal vitalism* enunciated, and promptly forgotten, by Theophile Bordeu in the 19th century. Bordeu's idea, which he called the *Tripod of Life,* was that the blood carried a specific principle from each organ of the body. "The semen imparts a firm masculine tone to all parts and stimulates all the bodily fibres. It is the cause of that fetid odor exhaled from vigorous males." Bordeu's crude notion was the forerunner of modern interest in glands and their secretions. For his theories, he had been expelled from the Faculty of Medicine in Paris, but in Montpellier no theory was unwelcome.

But for all the intellectual uplift which Pinel received at Montpellier, he was unable to find, a real foothold in practice. There was always Paris; so at the age of thirty-three Pinel and an English student-companion footed their way across France. The two were threadbare enough in appearance to arouse suspicion in the authorities, who demanded their passports. On Pinel's arrival in Paris, a cousin to whom he carried letters of introduction looked him over and advised him politely to continue in mathematics, since his geometrical studies were of the first caliber. Such a bookworm could never be a doctor, certainly not in Paris.

Pinel, who had mastered the English language, continued his teaching while he worked on a translation of Professor William Cullen's *First Lines of Physick,* the Bible for medical students of the 18th century. Publication of this book introduced Pinel to medical society, where he made friends. Everyone was impressed by his intensity and some tried to help him to get a post. Lemonnier, physician to Louis XVI, agreed to obtain the appointment as physician to the King's

aunts for him. Pinel was so unprepossessing in his appearance that, Lemonnier or no, the royal princesses refused to have him. Four times he stood for the examination for Regent Doctor, and four times his shyness caused him to fail. In Paris, a doctor was an elegant gentleman dressed in silks and ermine who rode to his patients in a luxurious coach. The fashionable doctor was an agreeable person who knew everything but medicine. As he lightly turned back his lace cuff and gracefully felt the pulse of the mistress of the house, he gossiped a little on the theater and waved a delicate white hand on which he was careful to display a large diamond. After a pleasant chat he left the house, as often as not forgetting to leave a prescription. A successful physician had to know how to treat the "vapors" which afflicted a lady, had to know literature and the news of the day, else he would find his fashionable clientele drifting off to Mesmer's gilded salons *to* receive treatment from his *baquet.* Pinel was doomed to failure.

For fourteen years Pinel remained in Paris without rising from obscurity or poverty. What else could one expect? Here was a doctor who seemed to care far more for geometry than for treating dyspepsia or the ague. When Pinel spoke, it was rather like a man whose head was in the clouds of mathematical physics than a jolly, reassuring family doctor. He was so precise and so learned! But what good was all that accuracy when the average doctor of his time prescribed herbs by the pound, scores of pills, and removed quarts of blood from his patients? Pinel drifted into medical writing. He translated books, edited the *Journal de Paris,* wrote papers on medicine, physics, and philosophy,

managed the *Gazette de sante,* and tutored private pupils. And above all, he kept on studying.

Pinel's idea was to classify the diseases of human beings with the same exactness with which Cuvier was classifying animals in the biological world; that was his dream—the union of mathematics and medicine. To range all the fevers together according to their characteristics, to set down all the stomach complaints, the lung distempers, the bile diseases, the heart disorders, so that a student could learn at a glance—that was his aim. The result of long study was a book, *Nosographie Philosophique,* published in 1798, later called *La medecine clinique.* Looking back from the vantage point of our century, we can see that his hope was premature. Without bacteriology, chemistry, X-rays, and a thousand laboratory aids, the true nature of the disease could never be appreciated. Although his efforts were regarded with respect by his colleagues, nothing came of them. The shade of Pinel would toss uncomfortably of nights if it knew that his monumental labors to bring mathematical order into medicine rest unmolested in a dusty volume in the Library of Congress. His ambition was to startle French medicine out of its lethargy. "The time has arrived," he used to say, "when medicine in France, now liberated from the fetters imposed . . . by its association with religious institutions . . by prejudices . . . by public discredit . • . will be able to assume its proper dignity and to maintain its level with the other departments of natural history." So Pinel struggled on known only to a few well-read physicians and a small circle of friends in Paris.

By this time Pinel was in bad repute with the Commune and the public. He was an intellectual supporter of the

French Revolution, a rational man, fervently following Voltaire in his belief in human liberty. In the first phase of the Revolution, he was appointed as a municipal medical officer of low grade, but he was not prepared for violence. The excesses of the Revolution and the vicious hate of the Paris mob were more than he could stomach. He could not so easily overcome a lifetime of piety and gentility. Pinel had tried to save some beleagured aristocrats from the guillotine, taking his life in his hands to rescue Condorcet from the Tribunal. The fickleness of the revolutionists openly irritated him, and as time went on he expressed more and more openly his disillusionment with political reprisals.

When the Revolution was at its height and the Reign of Terror had been loosed, Pinel again began to have misgivings. "Why should I," he thought, "kill myself in this cyclone? I will keep clear of all public functions unconnected with the medical profession." It was the time when the Girondists fought the Jacobins in the National Assembly, Robespierre guillotined Danton for saying there were too many beheadings, and a leader one day became a decapitated hero the next. Pinel counseled himself to keep out of the public eye "in a country where the man of audacity and miscreancy so easily contrived by political cunning to ape true patriotism and lift himself to any position." So he withdrew from the little contact he had with social life, spending all his time and energies at the Bicetre. For three years he labored, transforming the asylum from a den of teeming humanity, of vice, crime, infirmity, arid disease, into an institution where the mentally ill were treated humanely, separated from the human debris of Paris.

An unfortunate experience came to him when a friend,

distraught through a mental condition, ran off into the woods, only to be devoured by wolves. This directed his attention to the study of mental alienation. He turned to the older writers, looking for recommendations of treatment. There was precious little to be found and what there was treated insanity as a supernatural thing. Pinel was puzzled; this was not the way for science to deal with the suffering of human beings. "What is needed," he wrote, "is a moral management of insanity." In 1790 he wrote a memoir on a remarkable case of erotic melancholy cured by work in gardens and by baths. In 1791, when the Society of Medicine offered a prize for an essay "on the most efficacious means of treating invalids who become insane before old age," Pinel received honorable mention.

By this time Pinel, incurable student that he was, had informed himself of the best in treatment offered in the field of mental disease. The same year he published a treatise entitled *Traite medicale-philosophique sur Valienation mentale.* Then came the appointment to the superintendency of the Bicetre and the release of the chained insane. Thrusting the responsibility on Pinel, Commissioner Couthon gave his assent to the introduction of all his moral reforms. The moral treatment was simple as well as enlightened. Pinel reasoned from the premise that the variable temperaments of maniacs made them susceptible to the "liveliest emotions of pleasure and pain." In the language of today, he proposed to utilize the emotions of the patient to produce the curative result desired. This meant following every whim, every "transport of blind and ungovernable passion," every paroxysm of violence or caprice of the patient. To really "treat" patients in this way meant having qualities that only

a Pinel could have: "How many rare qualities, what zeal, what sagacity, the union of how much firmness with mildness of manners and unaffected goodness of heart, is it not requisite to possess in order to manage . . . such untractable beings as lunatics generally are." Management was the secret of Pinel's moral treatment—persistent, painstaking supervision of patients as human beings. First there must be exercise and good diet, then fixing of the attention on a laborious or an interesting occupation, the reading of Plato, Seneca, and other philosophers, the removal of every cause of sadness or passion, and lastly, the "general propriety of mildness both of tone and of behavior" in the physician. The "bland arts of conciliation" replaced imperiousness. It was a technique of treatment that was startling in its simplicity but meant unremitting work and thought on the part of the physician. For the first time the physician was to pay attention to the actual mental state of the patient. He was no longer to be a warder, or a mere dispenser of pills, but one who entered into the life of his patient. The loosing of shackles was but a tenth part of Pinel's work. The idea of thinking along with a patient took longer to appreciate. A century later this art of actively *handling* patients was exploited in all its possibilities by Adolf Meyer, who developed it in relation to the science of psychobiology. Pinel's idea, which could come only from a simple yet profound man, was an innovation because it placed the burden on the physician to be a man rather than a knowledge-stuffed automaton who spewed out fixed medicines for given diseases. Under the "storms of revolution, stirring up the passions of men, overwhelming not a few in a total ruin of their dis-

tinguished birthright as rational beings," Pinel dared to be a man as well as a physician.

Most of his cases reacted satisfactorily to the new regime. The old soldier Chevigne was exemplary. During the famine, Chevigne helped Pinel with his food supply for the hospital when food could not be purchased for gold. A monster had been made into a man. But others were not so amenable to reason, and soon Paris mobs got the idea that the doctor who would release mad men would poison the wells and cause the cholera epidemic which was then rampant. Pinel was seized and was to be dragged to his death in the cart that paraded the doomed royalists through the streets of Paris, when Chevigne appeared miraculously and rescued him.

Pinel's writings meanwhile were being recognized abroad and throughout France. The English particularly were pleased with what they had heard of the new treatment inaugurated at the Bicetre. When PinePs *Treatise on Insanity* was published in London in 1806, the translator, Dr. D. D. Davis, observed that in distinction to most treatises, which were Advertisements of lunatic establishments under the superintendence of their respective authors," PinePs book was the work of an "enlightened foreigner."

In France too, the timid doctor was acquiring fame. The following year he was elected a member of the Institute of France. Soon after he became Professor of Pathology at the School of Medicine. Honors multiplied. In 1803 when the Emperor Napoleon returned from Elba in a frenzy of popular admiration, he received his physician at a reception at the Institute with a question about the reputed increase of the number of the insane. Dr. Pinel answered in the neg-

ative, "but I thought *to* myself," he quipped afterwards, "that the superior geniuses and ambitious conquerors were not exempt from a trace of madness."

As a member of the Institute and France's foremost alienist, he was called upon by Napoleon to investigate the claims of Franz Gall, the craniologist. Pinel took Gall's technique to the Bicetre and honestly tried to determine what type of skull showed a predisposition to insanity. The skulls of the insane did not match Gall's charts, and for this and another reason Pinel joined his fellow Academicians in denouncing Gall. The other reason was that even a scientist, during the time of the First Empire, had to think of political affiliations. The little dictator had made something of a fetish of the development of French-made science. Pinel could not therefore be blind to the fact that Gall was an Austrian, a blood relative of the hated Prussian. But there were other blind spots in Pinel's scientific eye. His obsession for precision brought him into conflict with his most famous student, Itard, in the famous case of the Wild Boy of Aveyron.

In 1799 Citizen Bonaterre reported in the *Journal des debats,* the discovery of a "wild" boy in the woods of the Department of Aveyron. The boy, like other wild children, occasionally caught by hunters in the woods of France, was clad in a few shreds of cloth, his hair matted, and grunting like a beast of the forest. He was brought to town, placed in the hospital of Saint-Afrique, and exposed to the rural populace as a curiosity. Through Bonaterre's note, Paris heard of the Wild Boy of Aveyron, and a clamor went up for his transfer there. Naturalism, and the effect of civilization on man in his natural state, was a popular theme for

discussion among the coffeehouse intelligentsia. Rousseau sighed for the natural freedom of man "when wild in woods the noble savage ran." The prospect of seeing a true human savage untainted by society's vices kept Paris in excitement for days before he arrived.

When the Wild Boy finally arrived, the public and gentlemen of science crowded about him with expectations of seeing an angelic but untutored boy full of the unsullied sweetness of nature. Instead, they saw a dirty, scared, inarticulate beast who grunted and trotted like an animal,' ate everything from refuse to raw food, and was though practically naked insensible to heat and extreme cold alike. Pinel, the great mental authority, was called in for consultation. The diagnosis was—an incurable idiot and not a true *homo ferus,* or savage man. Pinel referred to him thereafter as the Pretended Wild Boy of Aveyron, for'physicians still regarded the wild children as a special species of man.

Jean Marc Gaspard Itard, a young student of Pinel's full of the philosophy of naturalism, begged the National Institute for the Deaf and Dumb, where the boy was housed, to let him try out his pedagogic theories on the boy. The directors agreed, and in spite of Pinel's pessimistic pronouncement, Itard undertook to transform the boy into a normal French child of twelve. This he hoped to do through awakening his nervous sensibilities and adding one sensation after another until the Wild Boy possessed a normal set of perceptions and ideas. For five years Itard labored with infinite patience. . . . He taught the boy to dress himself, to care for his bodily functions, even to read simple words and do easy calculations, but he could not teach him to speak. Itard's purpose was logical; he wanted

"to lead him to the use of speech by inducing the exercise of imitation through the imperious law of necessity." Five years of fascinating but tedious work left Itard somewhat shaken in his feeling that Pinel was wrong in the; diagnosis of idiocy. But, as so often happens, his failure proved to be his success. Pinel had said that the boy was an idiot and incurable; Itard had said he was a wild boy untouched by civilization's teachings. The truth was somewhere between the two, but Itard's methods, although they could not put speech in the boy's mouth, started the movement toward the training of the deaf and dumb and the mentally defective. In his lifetime Itard's reputation spread, and after his death Sequin, his pupil, continued his work with feeble-minded individuals. Itard's courage and patience had opened up an entire field of psychology, and handicapped children gained him for a patron saint. Laura Bridgman and Helen Keller, who learned how to talk, write, and read without voice, speech, or hearing, owe their reclamation to the spirit of Revolutionary France that seconded Itard in his wish to work on so hopeless a group of human creatures.

At the Salpetriere, Pinel inspired all who came to hear him lecture on his moral treatment. Ferrus, Fsquirol, and other men who became famous later were among his listeners. In a congenial atmosphere he labored for twenty years to bring medicine to the scientific level of other branches of natural history, but again he met with political difficulty. Suspected of having opposed the delivery to authorities of a great number of priests and emigres whom fear had compelled to take refuge at the Bicetre, Pinel was denied the return of his teaching post.

He accepted his decline philosophically. Under the cloud

of suspicion of being a royalist, Pinel lived out his life in comparative destitution.

The strong anti-Napoleonic feeling among the nations of western Europe must have colored the attitude of loyal physicians in the several countries. Except for a few liberal souls who read the translation of PinePs treatise in England, his ideas made surprisingly little progress until the dream of world domination tumbled about the ears of the Little Corporal at Waterloo. Pinel was essentially a product of France, of French philosophy, enlightenment, and liberalism. Great as the man was, his times were greater. The intellectual ferment that surrounded him throughout his life came to a crystallization in his epoch-making stewardship at the asylum of the Bicetre.

Convinced that a new age of science had come to medicine, Pinel was a greater figure in medicine than he himself realized. The blow he dealt medievalism and brutality in mental medicine was heard round the world. He had established forever the rule of reason in psychiatric treatment. In fact, he had established *psychiatry.*

V: Voices in the Wilderness

A CENTURY and a half ago, in the ancient walled town of York a tea merchant inadvertently joined the front ranks of the knights of humanity. What occurred in historic York was being paralleled during stormy revolutionary days in France. But the development in England, which changed forever the barbarous treatment of the insane, was carried on quietly and with Quaker dignity. The story is simple.

In the early part of 1791, the visitors of Hannah Mills, a Quaker inmate in the Lunatick Asylum of old York,- were denied admission by the overseer; no reason was given. A few days later it was announced bluntly that the patient had died. The relatives, who had reason to believe that the patient had been beaten, brought the story to William Tuke, a well-to-do merchant of York. Tuke was a religious man, the best product of the Quaker tradition, gentle but withal practical. He talked the case over with his son Henry, and with his wife, who saw nothing out of the way in the situation. But Tuke did, and, with Henry, officially interested

the Society of Friends, his personal acquaintances, and several town doctors in the need for a hospital for insane persons. In preparation he quietly investigated other asylums; what he saw amazed and horrified him, and yet no one seemed to have bothered themselves about the poor unfortunates housed there. A visit to St. Luke's Hospital showed him how mental patients were coerced, hounded, or neglected as a matter of course. He saw one young woman chained to a wall, lying half-nude on some loose, filthy straw, her body crusted with excreta, her hair matted, a blank expression on her face. It was enough for the Quaker. Burning with indignation, Tuke told his friends what he had seen and how he intended to remedy the situation. "We shall have a place," cried Tuke, "in which the unhappy might obtain a refuge; a quiet haven in which the shattered bark might find the means of reparation, or of safety."

Months of conferences and planning passed and Tuke's idea took form. Mary Maria, the wife of Henry Tuke, suggested that the place be called a "retreat." The name suited well the gentle spirit of the Society of Friends; it was such a name that could succor the unfortunates suffering under the "most afflictive dispensation—the loss of reason." Together with Henry Tuke and Lindley Murray, the founder laboriously raised funds by subscription among the Friends until the modest "place" was ready to open. Knowing nothing of medicine nor of the noisy arguments of the medical faculties of London and Edinburgh regarding the treatment of madmen, Tuke decided to place the Retreat in the country. The building was more like a farmhouse than a prison. There were no bars or gratings on the windows. With a garden surrounding the house, a few cows at pasture,

the whole scene was that of a quiet, rural farm. The Retreat was designed particularly for Quakers, but others who might have come from a similar social atmosphere were also to be admitted. In 1796 the Retreat opened its doors. Slowly it grew, until five years later thirty patients were enrolled. At the May meeting of the committee for 1797, Tuke reported that seven of the "poor" patients were paying 4 shillings a week; others in more comfortable circumstances paid from 8 shillings to 1 pound 15 weekly. The Retreat grew slowly, attracting attention all over Europe. The institution became the entire preoccupation of the Tuke family. Henry's son Samuel was drawn into the work before the nonegenarian William died, and the name of Tuke has ever since been associated with treatment of the insane.

British medicine in the field of lunacy was at a disgraceful level at the time that Tuke started his work. Doctors avoided the whole subject, but the public began to be stirred by the occasional litigations that arose when a relative or a patient in a lunatic asylum complained of ill-treatment. When an inmate died, it was within the overseer's power to decide whether he should call a coroner, and then the coroner's jury were selected by the warden to whitewash him as to responsibility. Too many horrifying tales were creeping into public attention. Besides, His Majesty George III had suffered from recurrent attacks of insanity, and the treatment that lunatics received became a matter for general speculation.

So many conflicting reports went out that in 1789 a committee from the House of Commons held an investigation of the various doctors attending George III, to ascertain whether the King could "go to Parliament or attend to

public business." Affairs of state were active then, and William Pitt, the Prime Minister, wished to know what the chances of George's recovery were. Sir Lucas Pepys and Dr. Richard Warren, prominent physicians of London, were called in to report on the hourly condition of His Majesty during two weeks of January,' 1789. Everyone agreed that he would recover, as indeed he did, but the investigation disclosed that the attending lunacy expert, Dr. Francis Willis, complained he was coerced into signing a report showing that His Majesty was not well. Dr. Willis was an eminent authority at that time, a man who had made a vast fortune from his private madhouse. A bitter controversy broke out between the doctors Warren and Willis as to the need for force used in subduing the King during his delirious period. Warren made the statement that he would rather have persons of common sense such as nurses attend the king than men who purported to be mental specialists.

The committee deemed that the report of the hearings "must be published immediately in the public interest." At 2 shillings the copy, it had a wide sale. The public read the Parliamentary report avidly, and conversation in the coffee-houses and pubs was as much about George's chances of recovery as about the Revolution in America or the rise of Napoleon in France. Further investigations into the conditions among the insane were held; especially revolting were the disclosures that attended the Commons investigation of 1813. Stories that had been bruited about for years were outdone by direct evidence taken from keepers, nurses, and so on. Rat bites were a common complaint in the madhouses ; amputations from frost bites occurred almost daily. Even Dr. Monro, the head of Bedlam in London, defended

the practice of fettering a lunatic continuously in an iron collar and an iron waistband for nine years, because he had been "the most mischievous and ferocious lunatic" he had ever known. King George's illness had awakened the official and unofficial public to the crying needs of the insane and struck a responsive chord in Tuke's breast.

Tuke and Pinel were brought closer together when Ferrus, physician to Napoleon and a student of Pinel, visited England and praised the humane methods initiated by the patriarch and his peaceful Society of Friends. Curiously, Tuke knew nothing of Pinel when he brought his idea to the Retreat. Unversed in physic, he discarded the "bleeding, blisters, setons, evacuants" recommended by the profession, and substituted ordinary kindness and decency. A person bereft of reason could still be talked to like a human being, given exercise and good food; his moral feeling could be stimulated, his body cleansed. Tuke insisted on human treatment. Religious sentiment, a moral feeling congenial to the patients, recreation, and employment were more valuable than a ton of drugs. Simplicity was the keynote of the plan. "A few acres for keeping cows and for garden ground for the family, which will afford scope for the patients to take exercise when that may be considered prudent and suitable." For the rest, talk, religion, and personal contact—that was the moral treatment in a nutshell.

The York Retreat was a homely place, and the "moral" treatment was simplicity itself, but it worked wonders. William Tuke was no more than a tea merchant, a man with a heart, a Quaker who believed in putting into practice what he heard preached in the Society of Friends' meetinghouse. The backbone of the Quaker philosophy was gentleness, and

the standard they lived by, consideration of others, fitted perfectly the needs of the insane, who had been crying unheard for ordinary human treatment. Tuke, with his ears attuned by a religion that stood for the moral rights of man, heard them. The upheaval in France produced Pinel, scholar and scientific man. The slow process of moral growth in England produced Tuke, the Quaker.

In 1790 George Washington delivered his first annual address to the first Congress of the thirteen United States. It was the year when Eli Todd, a young man not quite twenty-one, hung up his shingle as a practitioner of medicine in the little rural village of Farmington, Connecticut. A scion of an old New England family who settled there in 1638, Eli Todd had graduated from Yale in 1787, the youngest and most brilliant member of his class. After a voyage to Trinidad, where he almost succumbed to yellow fever, he apprenticed himself for two years to study "physic" with an older physician in New Haven. The liveliest topic in medical circles in New Haven in Todd's time was the possible formation of a state medical society. Eminent physicians had repeatedly petitioned the state legislature for a charter that would in some way distinguish the "Honest and Ingenuous Physician" from "the Quack," and when the legislature accused them of "attempting to establish a grasping monopoly," they formed a local association of their own. Dr. Todd, in his new office in Farmington, wondered if he could not form a medical association there, and before the year was out he gathered about him five neighboring young doctors. They called themselves the Medical Friends. Their purposes were expressed as follows:

"We found this society on affection. Among friends there should be no secrets, so among us as physicians there shall be none. . . . Young and possessed with an ardent desire to obtain science and reputation in our profession . . . we propose to ourselves the perfecting of ourselves in medicine. . . . We intend to observe the operations of nature that are carried on before our eyes. We intend to mark the variations between the accounts of others and what we ourselves discern. We intend to collect with the most scrupulous fidelity whatever is extraordinary in our own, especially, and in the practice of others. . . . We look forward to the time when our labors will be important enough to communicate to the world." Medical organization was being born in the New World.

The young Dr. Todd's social talents attracted Farmington folk. Handsome to look upon, quick of wit and humor, he was passionately fond of poetry and music, performing exceptionally well upon both violin and flute. He was welcomed in sickrooms, for in spite of his youth he was dignified and his bedside manner was full of assurance. Within a few years he was happily married and firmly established in Farmington.

The country doctor in the 1790's roamed far and battled problems quite different than those the physician of today meets. Connecticut's population of some 240,000 was so evenly distributed that her only large towns, Hartford and New Haven, numbered as much as 4,000 inhabitants each. The doctor rose at daybreak and was off on horseback or in his buggy, sharing pot luck in whatever patient's home mealtime found him. His visit for many was a social event. Though there were several weekly newspapers in the state,

mail facilities were uncertain, and for many rural families the doctor was their only contact with the outside world. Although each household concocted its own simples and remedies—the apothecaries' shops were almost nonexistent—the doctor was still the main source of supply of medicines. Doctors spent so much time in the saddle that it was a common quip that a doctor's horse could always be distinguished by his professional air. There were serious professional problems too. Yellow fever was a horrible scourge then, and Dr. Todd had known what struggling for a life was. In 1808 he had been cited by the governor of the state for distinguished service in a fever epidemic.

As Todd traveled about the countryside, he frequently came upon sights that stirred him deeply. Hidden in the attics of more than one highly respected family was a member no outsider ever saw except the doctor. Farmers, absorbed in their daily labor, simply boarded up their insane, imbeciles, or dotards in crates, or chained them in some barn or outhouse. Nor was it unusual to meet on the road a group of boys making sport of some local half-wit. Sensitive and idealistic as he was, these sights touched Todd particularly, for his own father had died insane and his sister, Eunice, was then in the throes of a deep melancholia. The plight of these unfortunates made him wonder if some provision could be made for them. There were no hospitals or charitable institutions of any nature in the State of Connecticut. America was not yet charity-minded, being still dominated by the hard doctrines of the Puritans—that poverty was due to sloth, and sickness that could not be paid for was attributable to sin. There was little that Todd could do, for in spite of his ever widening practice he was always

pressed financially. The countryside knew that Todd's pocketbook, as well as his services, was open to all.

In 1819 the Todds decided to move to Hartford, now a growing commercial town of some 6,000 inhabitants, where medical fees had recently been increased from 50 cents to 75 cents a visit. Todd was now fifty and at the height of his physical and intellectual powers. Attired generally in a blue-skirted coat tightly buttoned around him, his brown eyes bright and piercing, he soon became one of the community's leading physicians and a consultant of weight.

The Connecticut State Medical Society had finally won its long-sought charter. Joining with the Corporation of Yale, the society had inaugurated the Yale Medical Institution, America's third college of medicine. Todd now saw an opportunity to do something for the cause that had never been out of his mind. One blustery night in December, 1820, he forgathered with his medical confreres at a meeting of the local branch of the Connecticut Medical Society in Hartford. "We.were long at the dinner table, drank a moderate amount of wine, and listened to a multitude of stories," recounted one member years later. Of all the tales told, the one the members of the society remembered best was the story told by Eli Todd. For Todd told them of Philippe Pinel, who had liberated hundreds of maniacs shackled in the Bicetre, Paris, and of the great Frenchman's efforts to treat these victims medically and humanely. He spoke long and earnestly, finishing by pointing to the need in their own Connecticut of some sort of adequate and humanitarian care for the growing number of the countryside's insane. Every eye was on him as he exhorted them. "Not only do the people of New England inherit the constitution of their

ancestors," he said, "but other causes operate here with peculiar force. The easy transition from one rank of society to another serves to cherish even in humble life those hopes which in other countries are repressed or entirely subdued. Expectations raised high are the usual precursors of disappointment, and numerous cases of insanity are thus produced." Todd rallied to his point: "Gentlemen, it is our duty as civilized men to attack this disease. Let us make inquiry and find out how prevalent it is and then establish an institution for its treatment and cure."

Without a dissenting voice, Todd's motion was carried. A census revealed over one thousand deranged individuals in Connecticut in conditions so barbarous as to seem unbelieveable. The Connecticut Medical Society now swept swiftly into action. It voted every penny of its treasury, some $400 to the cause. Throughout the state, subscriptions were taken up in churches and from citizens privately. By 1822, donations ranging from 12½ cents to $300 had netted the munificent sum of $12,000. Later came a lottery grant and a small sum of money from the state,' and by 1824 the new institution, called the Retreat, was completed in Hartford and ready to open its doors. The board was $3 a week and the physician in charge was Eli Todd, at $600 a year.

Todd was not the first doctor in America to turn his attention to the cure of the insane. The indomitable Dr. Benjamin Rush of Philadelphia had acquired some notions on this subject even before Pinel's time. Rush had studied in Edinburgh, for many years the seat of medical culture, and was the most celebrated physician in America when he became head of the Pennsylvania Hospital in Philadelphia. Here, in one wing of the hospital, were numbers of de-

mented people locked up for safekeeping. They attracted Rush's curiosity, and he turned to that problem with the same gusto with which he attacked others—yellow fever, the abuse of tobacco, morality, and the use of cathartics in medical practice.

During Colonial and Revolutionary days there were two schools of medical thought, each contradicting the other, which influenced all medical treatment on both sides of the Atlantic. One school advocated stimulants, the other depressants. One group ordered brandy, the other fasting, purging, and venesection. Though both methods seemed to cure or kill with equal facility, they raised a dispute that often disrupted medical faculties and even families and whole communities. A family that believed in brandy would hold no traffic with another which held to jalap. Tn America these divisions even took on a political bias—stimulation, Democratic; depletion, Federal.

Whatever Rush's political views may have been, in medicine he was a Federalist. His theories were the basis for his ideas of treatment. One of them was that the cause of "madness" was seated primarily in the blood vessels of the brain. Accordingly, he bled, he cupped and blistered, his patients. He recommended that cold water be poured down the sleeves of excited patients, and that they be punished by deprivation of food. He resorted to the fear of death, and used such strategy as "the cure of patients who suppose themselves to be glass may easily be performed by pulling a chair upon which they are about to sit from under them, and afterwards showing them a large collection of pieces of glass as fragments of their bodies." Rush's Thunderbolt

was a pill that contained about ten times the present dose of calomel.

Though dead for over a decade in 1824, Rush still dominated medical thought and practice in the United States. Todd was the first to break a lance with the father of American medicine on the question of treatment of the insane. Todd's views upon insanity were novel to a generation of physicians taught by Rush. "Insanity," said Todd, "in most cases is a disease in which the moral and intellectual faculties are not destroyed, but some one or more of them are in a morbid condition." The plan of treatment at the Retreat in Hartford was simple. The design of "moral management" was to try to develop what mental functions had been spared. To do this, individual attention was needed; nurses were trained to take their charges seriously as distressed human beings. The fiendish practice of deceiving patients was not practiced by Todd. The greatest frankness, as well as kindness, was the rule. The patient's case was explained to him, and as far as possible he was made to understand the reasons for the treatment he received. Reason was triumphing at the Retreat. Todd wrote: "By this course of intellectual management, it has been found, as a matter of experience at our institution, that patients . . . who had always been raving when confined without being told the reason, and refractory when commanded instead of being entreated . . . soon became peaceable and docile." Moral treatment, above all, was not difficult to apply: "Fortunately there are certain plain and simple maxims in the moral treatment of insane persons which are easily understood and of universal application. These are to treat them, in all cases, as far as possible, as rational beings. To allow them all the

liberty and indulgence compatible with their own safety. . . . To cherish in them the sentiments of self-respect. . . . To draw out the latent sparks of . . . social affection. To occupy their attention, exercise their judgment and ingenuity, and to engage them in useful employments, alternated with amusements."

On the medical side, Todd was a stimulator rather than a depleter. He built up body resources rather than tore them down. Foaming tankards of ale and beer were placed on the table at mealtime. Indeed,' the yearly liquor bill far exceeded the cost of drugs. Nevertheless, he experimented with various "arm-jackets" that would prevent violent movement, yet at the same time allow some play of the muscles and joints. The most effective remedy at the Retreat, however, was Eli Todd himself. Night after night he would bring out his violin or flute and play to the patients as they gathered around him. He walked, talked, and dined with his charges. Many called him "Father" as he worked and played and suffered with them. More than one he took to live in his own family.

Todd achieved results that would have astonished Rush indeed, or even Pinel himself. Years later Pinel's successor, Dr. Esquirol, was to pay Todd high tribute. At the time, though, Todd was too engrossed with each day's problems to pay much attention to the outside world. Then in 1827 Todd's work was suddenly, almost accidentally, exposed to public view. In that year a British author-traveler, Captain Basil Hall, visited the Retreat in his tour of the United States. Hall was a popular figure at the time,[1] one of that group of writers of travel books on whom, in the days before the telegraph and radio, many depended for infor-

mation of foreign activities. Everything he said and did was publicized. His book, *Travels in America,* attained wide circulation. In it he extolled the treatment of the insane as practiced in America, and at Hartford especially. Hall wrote: "Dr. Todd, the eminent and kind physician in charge of the retreat, gladly communicated his plans, and showed us over every part of this noble establishment—a model, I venture to say, from which any country might take instruction. . . . In practical illustration of this system, Dr. Todd carried us to a neatly furnished parlor, where we found eight or ten females seated at work. Instead of showing them off like monsters, he introduced us to each of them and encouraged conversation as if all the company had been in perfect health." Hall reported that Todd had cured 91.3 per cent of all recent cases during the year 1826. Until then Todd and the Retreat had been practically unknown. Todd's figures of cures astounded the world; the Retreat's fame spread daily. Insanity was curable! All eyes turned toward Hartford, and every private institution in the United States set out to copy Todd's methods and beat his figures. The "cult of curability," in which ridiculous claims of cure were made, dated from the time of Hall's broadcast of the success at the Retreat.

Bloomingdale Asylum, a branch of the New York Hospital, which had been opened in 1821 and was utilizing Dr. Rush's methods, now sought Todd's services, offering him a salary five times as large as the one he received. Horace Mann, a brilliant young member of the Massachusetts Legislature, visited Hartford and decided that Massachusetts too must have a mental hospital along Todd lines. When the Worcester State Hospital was finally established, he

begged Todd to take charge. "Todd is the sort of individual/' Mann later remarked, "whom one instinctively would want to embrace if one met him on the street." "Come on here and show yourself among our lions," wrote Dean McClellan, offering Todd a lucrative professorship in the Jefferson Medical School in Philadelphia.

But Todd refused all offers. The truth of the matter was that his heart was in Hartford. Spurzheim, whose lectures on phrenology were sweeping New England with excitement, visited the Retreat. Running his practiced fingers over Todd's head, Gall's disciple exclaimed: "Ah,* what a bump of benevolence—a bushel of benevolence!"

Todd's health began visibly to fade in his sixty-third year. Friends begged him to rest and offered to finance a trip to Europe, but he continued to make his daily rounds. Finally in June he was persuaded to go to the seashore for a short time. The patients, learning of his departure, presented him with a memorial signed by every man and woman in the institution able to write his name: "You have done much, sir, to alleviate one of the most formidable calamities of life. The world ought to know how to be informed of those liberal, original, enlightened views which you, sir, have taken of this subject. . . . Know, sir, that in every change of life and in every vicissitude of fortune, you shall be accompanied by the warmest good wishes of your grateful patients."

Todd's influence spread fan-wise. One of his assistants inaugurated his methods at the McLean Hospital, the psychiatric branch of the Massachusetts General Hospital; another installed them in a namesake Retreat in Vermont, from whence went no less than nine superintendents of asy-

lums in various parts of the country. Doctors who studied under Todd or watched his methods closely later headed large state institutions in New Jersey,' Massachusetts, and elsewhere. These were all pioneer establishments and each served as a model for those that were to follow.

Undoubtedly, Todd's most eminent pupil was Samuel Woodward, whom he had recommended to Horace Mann for the new state hospital at Worcester. The Worcester hospital was then, as it is today, one of the model state mental hospitals in the country. When the first superintendents got together and formed an association staggering under the title of "Associations of Medical Superintendents of American Institutions for the Insane," forerunner of the American Psychiatric Association, Woodward was chosen as first president. To Woodward for advice came the pale New England schoolteacher Dorothea Lynde Dix, who started a crusade in behalf of the insane that was not terminated until her exposes had shocked every state in the Union into making provision for its mental sufferers.

The worldly estate Todd left was exactly $1,200, but he was rich in friends and medical admirers. These followers were often credited with the originality that had been Todd's, and Todd himself was overlooked and forgotten. There is no bust, tablet, or statue of Todd as a public benefactor in his native town. His picture hangs over the mantel in the office of the present psychiatrist in chief of the Retreat, two corridors of the main building erected in 1824 bear his name, and his silver snuffbox has passed through the hands of six successive superintendents.

What Tuke did in Old England, Eli Todd introduced in New England. Separated by three thousand miles of ocean,

one in staid old York, the other in the turbulent New World, the two possessed a kinship of spirit. Todd, the young physician, was a Federalist of Colonial rebel ancestry; Tuke was a mature, serious Tory—a "King's man"; yet both were humble and both brought trust and humaneness where it had never been before—among the insane.

The institutional system of caring for the mentally ill of the New World had its beginning with Frankfort's "Friends' Asylum," built in 1817 for the "distraught of mind," and the Hartford Retreat. For more than fifty years while the state assumed responsibilities for its insane, the struggle went on to keep the ideas of Tuke, Todd, and Pinel in the foreground. There were difficulties a-plenty—indifferent legislators, grasping politicians, a public with its eyes on the growing West, and the backwoods neglect which still allowed idiots to be chained in outhouses or kept for years in an attic. Through the influence of three generations of idealistic physicians building upon the sterling qualities of these early humanitarians, the state institutions in our land are today among the most scientific in the world.

V I : Charcot—Le Maitre

PARIS in the 1880's was beginning to rear her head from the quick defeat by the Germans at Sedan. France was recovering from the difficulties of the birth and infancy of the Third Republic. With increasing crescendo, Paris was regaining her place as a ferment in the arts and sciences. Students of painting on the Montmartre following the lead of the Impressionists revolted against the Academicians. Gauguin and Cezanne were painting furiously, putting life, movement and color on canvas. Toulouse-Lautrec was immortalizing the Parisian street life. Zola with his realism was setting the tone for a new literature. Franck and Saint-Saens lent a new meaning to French music. The visitor to Paris in the eighties found Paris an intellectual feast. He would go to the Louvre, the Opera Comique, the Left Bank, and—to the Salpetriere Hospital. The Salpetriere was the show place of French medical science. It was the clinic of Dr. Jean Martin Charcot, dean of French neurologists.

Originally a prison, then a pesthouse in medieval days, the Salpetriere had of late been used as a great public hospital for pauper insane women. Prostitutes, epileptics, idiots, and paralytics were crowded into its chambers, without respect for their afflictions: at one time there were as many as five thousand patients there. The hospital had been an arsenal in the 1500's; it derived its name from salt peter, the common name for the chemical nitrate used in making gunpowder. In 1862 a young interne named Charcot had come to the Salpetriere, and in the space of twenty years had gleaned from this motley group of unfortunates a wealth of knowledge which gave neurology the standing it has as a medical specialty. In 1875, Richet, an able French investigator, brought hypnosis to Charcot. With his intense industry and Salpetriere's wealth of hysterical material, hypnotism was added to neurology as a triumph for "Le Maitre." Charcot's lectures on hypnosis and hysteria were a milestone in the history of medical science as well as a landmark in the life of Paris.

Let us join our visitor who has gone to the Salpetriere. It is Tuesday morning, shortly before eleven o'clock. The lecture hall, which holds an audience of nearly six hundred, is filling with bewhiskered doctors in frock coats, young foreigners carrying notebooks, and elegantly gowned women. Cafe society and science often meet in Charcot's hall. The atmosphere is charged with a faint air of mystery and impressiveness, the muted feeling of a theater shortly before the curtain rises. Soon the side windows are closed and the room is darkened completely. Footlights are turned on before the low stage at one end of the long room. Precisely at eleven Dr. Charcot walks in, seating himself with

his profile to the audience. Everything is precision at the Salpetriere. Charcot, dominated by devotion to punctuality, demands it of his audience. Presently he stands up and starts to talk, without gesture or inflection, gazing into the rows filled with students and doctors of repute who have come from England, America, and the other lands of the Continent to listen and to learn. *

The lectures are marvels of systematic presentation. After the *text* for the lecture is stated briefly, Charcot discusses it in relation to what has been known before. He points out that the audience and he are fellow students, struggling with the contradictions of nature. "It is my duty to lecture to you, because we have on our wards at this moment a truly remarkable collection of patients which we can study together." This day's demonstration consists in showing hysterical patients of the three stages of hypnosis, lethargy, catalepsy, somnambulism. Charcot explains that these hypnotic effects are real and can be proved.

He relates the history of the patient, a woman of twenty-eight, describing her symptoms, her nervous spasms, twists of the arm, flutter of the eyes, and sudden falling spells. He announces that he will show that hypnosis will bring out these symptoms, proving that they are truly hysterical. There is no loss of motion. Every sentence counts. Every idea follows along the exact path of logic. And as Charcot stands there with the heavy mat of black hair cut to end in a thick nap at the base of his neck, his brow high, his nose of a heavy Gallic cast, he looks like the poet Dante surveying a world whose secrets are revealed only to him.

The Master looks about him and nods to the waiting assistants. Every eye is fixed on the door. Suddenly a calcium

spotlight is played upon the stage and two attendants move forward in a circle of light, with a patient between them. The young woman stands uncertainly, body bent backward, her eyes fixed on the ceiling, her breast heaving. With a quick look Charcot signals her guards to loosen their hold. She sinks into a chair. The silence is intense. One can hear the half-suppressed gasps of the audience. Charcot looks at the patient quietly. There is no question in his mind that he is complete master of the situation, master in the land of hysteria. The patient sits in a chair, her eyes half closed, in a state of repose or lethargy. With a few words he puts the patient into hypnosis. Charcot looks questioningly at Dr. Pitres, his first assistant, who has many times hypnotized the patient on the wards; the latter nods in affirmation. The patient is stuck with a pin. There is no visible recoil. The skin is pinched, again the patient does not move. Anesthesia of the skin has been produced under hypnosis. Charcot goes over to the patient, and with a few more words puts her into a deeper state, somnambulism. He raises her arm in an awkward position and removes his supporting hand. The arm does not come down. He says a few words quietly into her ear and suddenly her body becomes rigid.

This is the stage of catalepsy. The assistants bring in chairs. They are placed back to back, about five feet apart. The attendants place the woman with her heels on one chair, and the nape of her neck on the back of another. She lies in that position immobile without slipping or falling. It is like the trick of a magician. Charcot looks at Dr. Richet and then at the audience. There is no question that she is completely cataleptic. He brings out other instruments, electrical devices, metal disks, testing her responses. He

puts cold and warm substances repeatedly on her arms; she remains immobile and inactive. After a time the chairs are removed and Dr. Charcot releases her from the hypnotic trance. She rests for a while, then, calmly and obediently, walks toward the door. The demonstration is over. Doctors turn reflectively in their chairs. One asks a question; it is answered precisely and courteously. In a few moments there is a separation of the group: the neurologists and serious-minded students gather around Charcot who leads them to the wards; the nonmedical audience goes away.

The doctors follow him in clumps, discussing quietly what they have seen. The first stop is a small clinic room where there are two male patients. Here Charcot explains briefly that he can bring out the same symptoms in men as in women and that the old theory that hysteria is a prerogative of women is not entirely according to fact. He tells them he has been able to put his male patients through the same steps of lethargy, somnambulism, and catalepsy. "We must no longer think that hysteria is limited to the female sex. It is merely an evidence of the special hysterical personality," says Charcot.

The group passes on to another ward. They pause for a moment at the door. Charcot sweeps his penetrating glance over the half-dozen or more patients sitting there. As they slowly walk from bed to bed, patients start to become dreamy-eyed, then drowsy, then of a sudden they are hypnotized. Like a breeze rippling over wheat fields, the entrance of Charcot causes his patients to assume cataleptic positions. The influence of Charcot is truly amazing. Of course, the visitors do not know that these patients have been hypnotized again and again by Charcot and then by

his associates, until they are conditioned to react to his slightest glance.

After rounds the group walks to the laboratory. Here is seen another side of the Master. In earlier days the makeshift laboratory was an old kitchen next to the cancer ward, but soon his superiors recognized the value of better facilities. Slides of diseased areas of the brain and the spinal cord are brought out, and students pore through the microscopes at his direction. This is where the laborious part of neurology resides. In Charcot's kitchen science and drama meet.

The fame of the Tuesday-morning clinics spread beyond the confines of medicine; writers and artists used it as a new feeding ground for material. Dumas in his novel *Bahama* made his hero, who is no other than Cagliostro, a charlatan of the Mesmer era—a physician-hypnotist. Paintings by Brouillet and by others depicting spectacular episodes of Charcot and his students' hypnotic experiments began to appear in the Parisian salons. Charcot was accused of being theatrical, but he was saved from theatricality by two things: a well-developed feeling for art and a prodigious capacity for work. He was not afraid to be artistic even in medicine. A witty remark, delivered sotto voice, to those in the front benches, a twist of the neck to show how the hysteric looked, or an expertly imitated paralytic gait were to Charcot not affectation but art. The dazzling effect of his lectures was obtained by his carefully gained knowledge of how the bodies of his patients looked. The papers he delivered and published were meticulously prepared. Charcot was known to write and rewrite his lectures three and four times before he was satisfied with them. He was a connois-

seur of fine things,' the heritage of art which his father passed on to him.

Like a true son of Paris, he had a sense of value for beauty which he could not choke down. How an artist became a doctor happened this way. One day Charcot's father, like the laborer in the fairy tale, called his children into his presence:

"You are all, my children, at an age to choose an occupation, and my resources do not permit you to continue a classical education. I can make the necessary sacrifice for one of you only, therefore I have resolved:

"That you, Martin, are to be a carriage-builder, like myself.

"Emile, you are to be a soldier, and your brother Eugene is to be a fisherman, because he loves adventure.

"But Jean, you, because of your great talents as a draftsman, are to be a painter. You are also a hard worker, therefore, if you prefer, you may end your art studies and become a doctor."

The choice of medicine in place of art was a fortunate one for Charcot as well as for the medical world. At the age of twenty-three he had entered upon his undergraduate interne studies in the Salpetriere hospital. Four years later he emerged a handsome young physician, eager to get to work on patients. For several years he held a minor post in the Central Hospital Bureau, until in 1862 he returned to the Salpetriere under Professor Vulpian. But first he had to win his teaching rights, the position of *professeur agrege.* This meant an open competitive debate among the various candidates. Charcot, a quiet speaker, impatient with his rivals who could spout medical literature with eloquence, failed

several times. The *concours,* as these debates were called, was a test of more than medical ability. When finally he was able to maneuver his opponents into clinical discussion of cases rather than books, Charcot won his professorship easily. Immediately he plunged into work at the Salpetriere. His first interest was in diseases of the heart, the lungs, and the joints. "Rheumatism" was a problem then, as now, and physicians encountered many cases of swollen joints that did not act like the ordinary "rheumatic fever," nor yield to standard treatment. Charcot was not satisfied with the explanation that these were "unusual" cases. Day after day he scrutinized his patients, waiting for light to come. "I would look," he said, "at a case until everything became clear to me." At length he discovered that these swollen flail-like joints belonged, along with abdominal pains, peculiar flapping gait, and so forth, to the disease locomotor ataxia (now known to be caused by syphilis) and not to "rheumatic fever." This was considered so revolutionary a finding that the St. Thomas Hospital in London invited him to lecture there in 1864, on what has since been called "Charcot's joint."

Diseases of the lungs and the heart were forgotten as he studied the mass of paralyzed, epileptic patients that filled the hospital. On the ward and in the laboratory he watched patients with weazened arms and legs, cases due to infantile paralysis and muscular atrophies. In his timeless way he observed palsied and tremulous patients by the hour as they shuffled along the salons and corridors of Salpetriere. Up to then, the lame and the halt had been neglected in the main by medicine. Tremors of the head and the hands were deemed insignificant symptoms, just as the modern doctor

dismisses nervousness with the phrase "Go home and forget it"

Charcot conceived the idea that tremors and palsy were symptoms of some disturbance in the nerve tissue. He set out to find just what it all meant. Watching was not enough; he experimented. Charcot attached plumes to the patient's head so that he could get a graphic idea of the extent and the type of tremor. Soon he could tell a case of shaking palsy (paralysis agitans) from multiple sclerosis by the character of the tremor itself. Again a revolutionary finding, for until then tremor of the hands, the head, or the body was considered to be a disease in itself. As he published his observations, doctors elsewhere were encouraged to look for neurological conditions in their practice. Eight years after he arrived at the Salpetriere he discovered the artery in the brain which is the cause of the common paralytic stroke. He worked out the clinical course of his cases on the wards, examined their brains after death, and proved how this artery, now known as the artery of Charcot, could rupture and interrupt in one stroke all the fibers going from the brain to the other side of the body.

That was the way Charcot worked—--exhaustively, meticulously, and to the very end. His interest in specimens of the brain and the spinal cord after death made people think he was hardhearted. When he would stop on his way into the hospital to barter a few sous or a stick of tobacco against a future delivery of a spinal cord, people shuddered at his callousness. It was Charcot's way, and the only way to learn neurology.

Opening up the no man's land of neurology was a gigantic task in those days. Even today it is medicine's most

intricate domain. It is hard for us who are living in a generation when psychiatry is a recognized science to realize how great a furor was elicited when discovery was made that a leg which would not jerk when the knee was tapped was a sign of the dread general paralysis of the insane. Now every adolescent knows that if your knee jerks do not snap forward at a touch, there is something wrong. But in the 1870's and 1880's, the most astute neurologists spent hours trying to decide with the help of this reflex whether a limp arm or a flaccid leg was a hysterical or an organic paralysis.

Another triumph in clinical neurology was the description of the baffling disease multiple sclerosis. Early in his career at the Salpetriere Charcot encountered many cases characterized by palsy of the arms and legs which appeared and reappeared. The doctors were sorely puzzled as to the correct diagnosis. Some called these cases hereditary tremor, others chorea or the dance of St. Vitus. There was a case on record of a cook in the hospital, one Darges, who had these palsies some twenty years ago and whose spinal cord after death had been examined by Dr. Cruveilhier. Patches of tough, glistening tissue in different stages of softening, called sclerosis, had been found throughout the nervous system of this case. As Charcot watched over his cases on the wards, it flashed through his mind that transitory paralyses and tremors were due to the softening and hardening of these glistening patches of tissue. Charcot's genius was the type that immediately detected associations that no one else had suspected before. By checking over the histories of the dozens of patients who dragged themselves along the wards, he was able to sift out those whose symptoms were intermittent,

and establish a disease which he called multiple sclerosis. Discoveries in this field were like finding the crucial pieces in a picture puzzle long disarrayed. In 1873 all his neurological work was put together in a volume called *Lectures on the Diseases of the Nervous System.* That year he was voted a member of the Academy of Science in Paris. Two years later he became a corresponding member of the New York Society of Neurology and Electricity, and in 1887 he was elected to the Royal Medico-Chirurgical Society of London. At the end of twenty-seven years he had contributed twelve volumes on neurology; he had written all that there was to be known on the subject up to that time.

Jean Martin Charcot had started his career with art; it colored his life and his personality. His early sketches were witty caricatures or line drawings of Parisian types done with a fine enthusiasm for bodily motion. Others were of classic mold. Purty characterized them as being derived directly from the Florentines. Later when he had made his mark, the Charcot home became a gallery of examples of great art, his own work forming a part of it. Artistic living was part of his creed. On Wednesday nights the Master, with his wife and brilliant children, was at home for his students, visitors, and friends. Alphonse Daudet brought his son Leon to the clever, genial host, and Leon brought the Paris intelligentsia. The mask of professional austerity was dropped. It was at one of these soirees that Charcot said in a friendly discussion, "There is much of sexuality beneath the surface of this hysteria." Freud recounts in his *Autobiography* how the Master had touched upon the nugget of truth that was to blossom in Freud's fertile brain

into psychoanalysis. Perhaps Charcot was thinking of the famous *arc du circle;* women patients in their hysterical seizures would twist into a position like a curved bow, lying on heels and head. There was something in the attitude of these patients toward Charcot that had elements of adoration in it, but his inherent gentility kept him from allowing this to develop.

But the god was human, and subject to human passions. He was seen frequently in the front rows of the Folies-Bergeres. When Pasteur was attacked in the Academy of Medicine for his animal experiments, Charcot defended him. He attacked the Church in the fight between the Clericalists and the Republicans in the i88o's for the control of the Government. His dislike of the Church followed from his vast knowledge of art, as he showed the pictures of medieval saints to be really those of hysterical individuals. He loved to demolish the miracles set up by priests, to annihilate the wonders of religious history by leveling them with the charge of hysteria. Charcot's work *Demonomania in Art* was a fascinating volume of the crossroads of medicine and art. The faith cures at Our Lady of Lourdes, Charcot explained, were due solely to the latent hypnotic influence of the shrine acting on basically hysterical patients. And then, with the inconsistency that is the sign of a big mind, he would send patients to Lourdes for treatment. "What does it matter," he would say when someone checked him on his irregularity, "if the patient gets well?"

What he prized most of all was the truth that comes from persistent observation. He was interested only in students who demonstrated ability to do scientific work. He ruled his hierarchy, distributing honors to them as did

Napoleon to his soldiers. There was tremendous pride in Charcot, and with it domination. For forty years he ruled the French school of medicine as a dictator. It was his character, when he spoke as a teacher, to lay down scientific law. No nomination for a fellowship or professorship, no appointment to any hospital, no medical honor, could be given in that period without first being submitted to Charcot. To have attracted his attention by scientific work was the open-sesame to professional success; to incur disfavor was likened to a sentence to the guillotine. He was, in a way, a curious contradiction—democratic, yet autocratic in his own sphere. To an outsider he appeared cold and haughty, but only because of his devotion to his patients and to the problems of neurology. His office hours were claimed by the helpless poor as well as by the wealthy hysterics who traveled from afar to consult the internationally known consultant, the Maitre of Salpetriere. One day an impatient Princess X sent word into his consulting room that she could wait no longer. Charcot did not answer. In a few minutes a second frenzied request came in. After a time the Doctor turned from his patient and said to the attendant: "She must be a foreigner. She doesn't know that we have taken the Bastille."

For all his early triumphs, Charcot's life was not empty of scientific trouble. This came about, curiously enough, through the work for which his name was revered for a quarter of a century—hypnosis. When Charcot started a problem," he saw it through; that may be why his theories of hysteria and hypnosis were his greatest mistakes. Qharles Richet, an assistant at the Salpetriere, had first interested

his chief in hypnotism about 1879. Up to then, doctors were convinced that hypnosis achieved results through pure trickery. Dr. Braid, the Manchester surgeon, had dealt a blow to the magnetic theory by showing that the same results could be obtained by having the subject gaze fixedly at his shiny lancet case. Braid's interest in hypnosis was medical, and practical. Every few years after Braid's work a doctor would report an operation carried out under hypnosis as the anesthetic. But more often when a physician attended a hypnotic seance, he tried to expose the mystery of hypnotic effects. That was the situation when Dr. Richet took a hypnotized patient into the laboratory and proved beyond a doubt that there were no wires or currents or other magician's tricks in the fact of hypnosis. He brought his discovery to Charcot, who proved to his own satisfaction that hysterical symptoms were *real, and* could be artificially produced in the patient through hypnosis. Conversely, hypnosis could only occur in a hysterical individual; hypnosis and hysteria were opposite facets of the same psychological condition. Charcot in establishing the great dictum of the Salpetriere school set the scene for his scientific Waterloo.

This dictum, at first held to light as a real nugget of scientific gold, began to tarnish. He was assailed by academic psychologists whom he antagonized by complaining that their science was dead to live human problems. The theories of hypnosis and hysteria of Charcot and his associates were savagely attacked. Most annoying were rumors that Charcot's patients were hypnotized beforehand by his assistants to make his Tuesday-morning clinics more dramatic. It leaked out that the spectacular results the Master achieved were practiced for hours on the wards. When

people were skeptical, or regarded his hypnotic results as due to wirepulling, he stood firm. When his more aggressive opponents ridiculed his views that hypnosis could occur in men as well as women, because it was after all a disordered state of body and mind, he only answered, "That doesn't prevent it from being true." By now hypnosis was familiar to the medical and the lay public as a miraculous method of treatment. The occasional surgical operations under hypnosis increased. Almost every surgeon in France, and elsewhere in Europe, tried it at least once. Amputations, operations on ingrown toenails, and even the extraction of teeth were sufficiently interesting to be reported at the Academy of Medicine from the Charite and other Parisian hospitals. The first International Magnetic Congress met in 1888 under the Presidency of the Abbe de Meissas, chief almoner of the College Rollin, who in his opening address stressed the need for science and religion to join hands over hypnotism. The same year saw the meeting of the Hypnotical Congress, a more scientific body headed by Charcot, Dumontpallier, and Liegeois of Nancy. In both congresses the burning questions were the routine use of hypnosis in medical treatment and its use in public exhibitions. Everyone had something to say. At least all were agreed on one point, that stage hypnotists should be prohibited. Did not La Fontaine, one of the best of public hypnotizers, report a case of death due to fear and resulting congestion of blood *to* the brain? Other cases were brought forth, such as that of the waiter at Nantes who was magnetized and remained for two days in a state of lethargy approximating death. The congress concluded that public hypnotizers had to go, and only the most redoubtable and most honest physicians

should be allowed to use this method and then on selected cases. The controversy spread to the armed forces of France, when in 1890 the Minister of War, De Freycinet,. and Barbey, the Minister of the Navy, forbade the use of hypnosis among the patients in army and naval hospitals. Apparently one of the situations that bothered the Ministers was the readiness with which soldiers reported sick hoping to be hypnotized.

Difficulties to the acceptance of Charcot's theories persisted. One Dr. Liebeault, a quiet practitioner of Nancy, had developed an idea some years before that people were hypnotizable because it was suggested to them by the doctor. This idea lay dormant until Dr. Bernheim, a fellow townsman, revived it. Bernheim had been a student of Charcot's and had carried back to Nancy a faint skepticism; Charcot's theatrics struck everyone who visited the Salpetriere. When Liebeault, back in Nancy, proved to Bernheim that he cured a case of sciatica by pure suggestion, without the passes of the operator's hands, Bernheim was won over. "Perhaps," he thought, "the final reason for hypnotism is mental suggestion." He found he could hypnotize anyone by simply suggesting sleep to them; he did not require only hysterical patients. When Bernheim published his thesis the Salpetriere school was put on the defensive. Charcot's lieutenants took up the challenge. Binet, who later became world-famous with the Binet-Simon intelligence test, waxed bitter over Bernheim's allegations. He and Fere checked over Bernheim's results: "It is strange," they wrote, "that at Nancy they had never been able to produce contractions by stimulating nerves. . . . What can be thought of subjects so devoid of material signs?" But Bernheim persisted in his

work, and he soon proved that 90 per cent of all individuals could be hypnotized. In the end Bernheim's theory won out. For we know now that hypnotism, the state of mind, is nothing more than a mental suggestion carried over from hypnotist to the patient through the latter's subconscious.

As time went on, Charcot began finding his grip on the contemporary world of medical science weakening. He saw with sorrow the decline of his art. Though he had made himself great, though he had genius, there was no humility in the man. At sixty he was still handsome, his hair plentiful, bright, but his mouth was tense and hard, the lips a thin arc curving to the right. As one observer said: "You would think he had drunk a bitter magic draft. The bitterness was for life, and inappropriate to the great, ambitious soul within."

Charcot brought the ghost of hysteria out into the open. All the bizarre symptoms, falling fits, crying spells, sudden anesthesias of arms or legs, glassy-eyed trances, and uttering of strange words that had puzzled doctors for years were studied in his clinic in minute detail. Two centuries before Charcot they would have passed for the evidences of the work of the Evil One, and patients would have been exorcised and doused with holy water. One century before Charcot, the poor hysteric would have been bled, dosed with purges, or treated with a magnet in a last vain attempt to cure the malady. Even in Charcot's time, hysterical patients were dismissed to a spa or sent *on* a long sea voyage, the longer the better, to the relief of the attending physician more than that of the patient. Hysterical patients made up the hordes of "charming invalids" of the Victorian era.

Nowadays the phrase is more a literary allusion than an actuality, but in the 1870's the patient with "female weakness" and the woman who was "delicate" were a source of despair to the medical practitioner.

Elsewhere than in France the best medical minds were at work on the problem. Dr. S. Weir Mitchell of Philadelphia, Americans first neurologist, devised a treatment for hysteria, the famous "rest cure," which is still favored by sanatorium doctors. Dr. Mitchell observed only too often the exhaustion produced in these patients by those in attendance. Nervous fatigue, he decided, was the prominent symptom, and anemia the most significant medical finding, that the doctor encountered in such cases. His treatment was based on medical principles chiefly, but underneath was sound psychology. Dr. Mitchell combined these two ideas. "Let us bring in Dr. Diet and Dr. Quiet," he said. Put relatives out of the sickroom; feed the patient, rest her, teach, encourage, and restrain. In time the hysterical paralyses, the weakness, would be conquered and the patient could be taught again to walk, talk, and act like a human being. Encouragement, persistent encouragement, and patience on the part of the physician, were the new tools Dr. Mitchell brought to the perplexing problems of the hysterical patient. He wrote a book *Fat and Blood,* pointing to the two essential needs of the hysteric—nutrition and blood. The medical fraternity applauded; now they were getting somewhere. Unfortunately there were not many who had the patience of Mitchell nor the breadth of his understanding, for besides being the dean of American neurologists, he was a distinguished novelist. The Mitchell treatment was effective, but it side-stepped the baffling problem of what the hysteric

was and how she came to be. The solution to that problem was to wait for another generation when the labors of Janet, Freud, and other psychopathologists lighted the way.

Charcot's name will always be bright because even though his conclusions were wrong, he studied a nervous disorder with precision and vigor. Most important was the effect on his students. The men who sat at his feet became the world's greatest exponents of the new science of the nerves and the mind in our century. Charcot founded a French school of neurology, but he did more. He furnished neurologists all over the world with new ideas, which had to be overthrown, but in their decline lit up the way along which the science of neurology would travel. Pierre Janet, professor at the University of Paris, now dean of French psychologists, was one of the most illustrious followers of Charcot. Janet rejected Charcot's idea that hysteria was synonymous with hypnosis, and with this in view re-examined the histories of his patients. Searching into their past, he found in most of these a history of some emotional shock that preceded the onset of their nervous disease. The memories of these shocks had dropped away from the patient's consciousness, reappearing as symptoms. The personality was split, so to speak, as these painful ideas or emotions were pushed into the *subconscious.* Hysterical symptoms, then, were the result of a split-off process in the personality. Such people, reasoned Janet, had a weak personality, so that they could not successfully retain more than one idea, memory, or impression in their consciousness.

The notion of the dual personality grew from the develepments we have just traced. Occasionally individuals fell into the hands of scientists who were capable of living out two,

three, or more distinct personalities. Professor Morton Prince of Boston had such a one in Sally Beauchamp, a girl who lived in four different worlds. When she was Sally I, she spoke of things unknown to Sally II; when she was Sally III, she acted like a saucy child in contrast to the intelligent, tractable Sally I. Prince's investigations of the dissociated personality shed light on the legend of Dr.-Jekyll-and-Mr.-Hyde types; Stevenson's macabre story could be scientifically true! The meaning of the outlandish behavior of the hysteric was understandable now. The subconscious, or split-off, personality was a reality provable by experiment; this new concept changed the complexion of psychological medicine.

The progress of psychology was truly amazing. Charcot had brought hysteria through hypnosis along the path of science into a position where it could be studied seriously. The next step was the descent into the subconscious, a region that the mysterious passes of hypnosis tapped. Paracelsus, Mesmer, Charcot, were the links in the chain of events which ended with the uncovering of the hidden powers and dark recesses of the mind in modern psychopathology. Paracelsus, the strident-voiced seer of medieval days, Mesmer, the mystic doctor of Vienna, and Charcot, the clinician, complete the passage of an idea through time —Paracelsus in his alchemist's laboratory, Mesmer in his gay salon, and Charcot in the Salpetriere. Such is the course of science, such is the genealogy of mind explorers!

VII: The Sportsman-Scientist

SET in among the smooth lawns and pleasant walks of South Kensington Park in London, there stands today a large structure housing the Museum of Science and Industry. In its spacious halls are instructive exhibits of airplanes, steam engines, hydraulic presses, and turbines, all copiously labeled so that schoolboys on a holiday down from Eton can see and learn. The thousand and one marvels of engineering are displayed in all their intriguing splendor. It would take a generation of Sundays to explore every one of the exhibits that reveal the contributions to civilized life made by the mechanical genius of man. But nothing remains in these imposing halls to remind the visitor of him who on that site a half-century earlier made the first attempt to measure the human faculties. The simple paraphernalia which Sir Francis Galton used has long since been moved to the laboratories of London University.

On the ground floor of the wooden structure that housed the South Kensington Museum in 1884 was the room which

served as the first laboratory for intelligence-testing. It was the Anthropometric Laboratory established by Galton himself. Here the keenly interested gentlemen of sixty-two presided over the gathering of data from the long queue of Londoners who offered themselves as human guinea pigs for his pioneer work. At the head of a long table sat an attendant busy with sheets of foolscap on which were lists of names, with spaces for several entries beside each name, while the public slowly filed past after paying the fee of threepence each. Farther down the table, which was laden with an assortment of queer-looking apparatus, stood the gentleman of patrician bearing measuring the bodies and something of the minds of Londoners curious enough to pay threepence for the privilege. Their heights, weights, breathing power, ability to see, hear, and taste, were computed; their sense of color, their strength to pull or lift a weight or squeeze a spring, were carefully determined and set down on the attendant's tally sheet. It was an amusing performance to the casual bystander, somewhat like the penny arcades where one whiles away an hour at a seaside resort. Francis Galton too was genial as he collected his prized data, but his bland good humor was misleading, for underneath was a serious scientific resolve.

Galton wanted to measure the mental and physical capacity of the average Britisher. The Government took the census, knew the strength of its army, counted its money, but no one knew the value of Britain's population in terms of mind and body. He wanted to learn so much, this aristocrat, so much useless, almost silly, information about a lot of ordinary people. For Galton was made of the stuff of mind explorers; he had a perpetual curiosity, unusual powers

of observation, and limitless capacity for work. Beyond that he possessed two assets that were to help him in his quests —the opportunity for the culture of England's upper class and the gift of life in a great century, which witnessed the death struggle between two great traditions, science and religion.

Upper-class culture in England did not always eventuate in science and progress. When Francis Galton was young, the way of life for a son of the aristocracy was already traditional. The rigid social-caste system constrained him to follow a narrow path leading to one of a few educational institutions, to be followed by the opportunity to serve God and country. A young gentleman like Francis could inscribe his name on Britannia's role of honor in the Royal Dragoons or in His Majesty's Navy, could attain distinction in the inner Temple or the cloth, or carry the Union Jack to the far-flung colonies. He could if lie chose follow the fortunes of Tom Cribb and Jem Ward in the prize ring at the Fives Courts and the trots of Epsom Downs, or lite the hearty life of a country gentleman. In the main, the sons of titled gentry chose the last-named, collecting their rents, imbibing their drams and ingesting their roast beef, unaware of the larger cultural or the social implications of the Industrial Revolution.

Meanwhile urban growth was eclipsing rural life. Agriculture as an industry was yielding before the advance of technology and the concentration of population in towns. The rising class was the bourgeosie, moving up the social ladder, buying the estates of the nobility, and seeking power to match their wealth. The early flickers of workers' resentment against long hours and huddled living-conditions of

factory hands were seen in such spontaneous action as roving bands of Luddites who smashed machinery in factories in a blind rage at their social wrongs. On all fronts the Industrial Revolution was progressing and forcing new ways of thinking, new kinds of legislation, and new modes of life on Britain's population. But the aristocratic young gentleman paid little attention to all these seething changes that were by the end of the century to affect the lives and thoughts of their sons.

A few of the alert upper class and of the nobility were alive to the social changes that were threatening England. Albert, the Prince Consort of Queen Victoria, sensed it as he deplored the low level to which England's famous universities had sunk. Families like the Galtons were prescient enough to see that land would be an encumbrance rather than an asset. Galton Senior, a captain of industry of Birmingham who had been elected to important scientific societies for his experiments on color, put the family money in commerce and his faith in the future of science. In both directions he acted wisely. The Galtons moved with the times; they were progressives on a broad front. In the germ plasm of Francis Galton, the aristocrat-scientist, the faith in progress and a practical sense of success lay fallow. Perhaps it was this subtle influence that led him away from the life of sport and culture into the arena of practical science. His interest in heredity sprang from a wish to understand the human differences that distinguished the upper from the lower classes in England; and the science of eugenics which he fashioned arose from a wish to do something about it. Along with this interest in differences between men went

his unquenchable curiosity. That was why Galton, at the age of sixty-two, stood in his Anthropometric Laboratory in the South Kensington Museum measuring the brains and bodies of the commoners of London. He was making a new science, the measurement of individual human divergencies.

From the beginning, Francis was unusual. At the age of one and a half, he was able to recite the alphabet forward and backward, at two and a half he could tell a nursery story, and at three sign his name. He was pampered, yet a shy, intense child who was a little odd, a little brilliant—but thoroughly likable. As the youngest child, the darling of his four sisters, everyone in the household vied for the chance to amuse him. When he was ill, the sisters were placed on a time schedule, allowing each only a few minutes to visit with Francis, Adele, the third sister, twelve years his senior, was most devoted. His arrival in the world was hailed as a fairy gift by Adele and she begged to be allowed to consider him as her sole ward. The love Adele, a victim of the dread spinal curvature, showered on the monarch of the household was expressed in her intense interest in his education. Until Francis attended school at the age of eight, Adele taught him the Bible, the rudiments of Latin, and a great deal of English verse. The infant prodigy gulped down this intellectual fodder and asked for more. At the tender age of four he wrote his sister:

MY DEAR ADELE:

I am four years old and I can read any English book. I can say all the Latin Substantives and Adjectives and active verbs besides 52 lines of Latin poetry. I can cast up any sum in addition and can multiply by 2, 3, 4, 5, 6, 7, 8, (9), 10, (n).

I can also say the pence table. I read French a little and I know the clock.

^ ^
F. G.
2/15/1827

The next year she taught him the Iliad and the Odyssey of Homer and started him collecting shells and minerals. He was greatly attached to her, for when the time came to enter school, he left a will behind him:

I, Francis Gal ton of the Larches near Birmingham, make this my last will and testament. I give to my dearest sister Adele for her great kindness in teaching me all my English books, my watch and my compound money and collection of beetles. . . .

To others he bequeathed "minerals, shells, hygrometer and desk, medals, parchment and a share in two ponies, bow and arrows, steel pens, skates, Latin and Greek books." Of all, he said, "I make my dearest sister Adele my executrix."

Mother Galton, a Darwin, was an intellectual woman. Sociable, even garrulous, and unconventional, she had none of the rigidity of the Quaker Galtons and much of the intellectual brilliance of her father, Erasmus Darwin. In spite of the active distaff side of the family, Francis's world was not entirely influenced by women. His little head full of the glories of Greek and Trojan warriors, as well as Latin verbs, Francis was busy in his play defending the realm against Britain's enemies. When Erasmus, his second brother, who entered the navy at the age of twelve, came home with a dirk in his belt, Francis exulted. England was safe; thenceforth she could avail herself of his "puissant arm and terrible weapon." Father and brother, like all men, were to the imaginative boy creatures of power and invulnerability. Papa Galton never forgot his Olympian

role, for the family lived in a Victorian world where children were properly brought up through good example and "exercises of the mind and passions." The father, whose every conversation was for the purpose of instruction, taught Francis entymology and the natural history of birds, stimulating in him a love of natural science. Long before the best private schools taught scientific subjects, he arranged that Francis be allowed to dabble around with retorts and crucibles and colored solutions in a chemist's shop. Francis grew up in a cultured atmosphere, a home where the mutual admiration which all aristocrats share replaced the mawkish sentiment of other homes. The father made it his business to see that every educational opportunity was afforded young Francis. There was no rush to get degrees, no avidity for success. There was only the steady pace of learning for its own sake, and for its future value.

So at the age of eight, Francis was bundled off to school in Boulogne, France. As a dutiful son and brother, he took his education very seriously. He wrote home about his new situation, how happy he was among newly made friends, how he was welcomed socially, how he was adjusting, and so on. But he must have been frightfully unhappy, because years later he admitted that he hated the school, its birchings, and its penalties.

Soon he was back in England, in a new school at Kenilworth. For three years he breathed the air of unrestraint, and then was moved on to King Edward's School in Birmingham. Now the infant prodigy was thirteen, full of new hopes, wild-eyed with novel ideas. At King Edward's he conceived the notion of an aerostatic project, a flying machine with wings, an engine, and places for fifteen passengers. At

school he was thirsting for "good English reading and solid science." All they fed him was the dry rudiments of Latin and Greek and grammar. The contradictions of the educational system struck him deeply, as it struck all thinking men of the day. It was an "Unhappy system . . . by which boys acquire very imperfect knowledge of the structure of two dead languages and none at all of the structure of the living world."

But Francis was always a polite English boy, always manfully trying to adjust to a new situation. Far underneath his politeness the spirit of revolt was seething, however, for he wrote in notes, but not until the age of eighty-six, that "this period of life (schooldays) had been one of stagnation." Perhaps this is where later on in life he got his zeal to better the educational aims and conditions of youth. "I hope," he wrote, "to save another boy a like period of depression and stagnation, for I sadly fear that its possibilities have not forever vanished." It was this conviction which other learned men shared that finally pulled modern education out of its medieval darkness.

At last, at fifteen, Francis was released from his secondary schooling. That was the year 1837, when Victoria, herself an adolescent, was crowned Queen of Great Britain. Young Francis was in London during the ceremony, jammed in the crowd watching the pomp and ceremony. The coronation was magnificent, but what Francis that day learned was not alone the lesson of the splendor of Empire. The lesson he learned was that when one can't see over a crowd, ingenuity has to be relied upon. The boy who planned an airplane at thirteen could solve this problem. Wrapped in a piece of brown paper was a block of wood, which he let

down in the crowd by means of a string. Standing on the block, he peered through a pair of parallel tunnels lying at 45 degrees to its axis. The assemblage saw Queen Victoria and her Court. Francis Galton saw the crowd through his "hyperscope."

Soon Papa Galton had him apprenticed to a doctor in Birmingham, who sent him to King's College Medical School in London. His experiences at medical school revolted him. His first case, that of a man crushed in an accident, left a terrible impression—and well it might in the days before antiseptic surgery. What was medicine to a youth interested in the whole world? Bored and frightened, Francis decided on a trip to Constantinople and the Near East.

His father let him go, sensing his uncertainty about a medical career. For a long time Francis debated whether to go back to medical school and take his degree or go on to the university. After much thought and investigation by father and son, it was decided that Francis should go to Cambridge. Matriculation day came, and he was escorted to the institution by his father, who had concurred with his son on the advisability of continuing in anatomy, chemistry and mathematics at Trinity College. The lectures in science fascinated young Galton, particularly those by William Hopkins, a geologist and a mathematician. Hopkins brought mathematics into geography, amalgamating two widely separated disciplines. Galton recognized his own infatuation. "Hopkins," wrote Francis to his father, "is a regular brick . • . tells funny stories connected with different problems. . . . He rattles on at a splendid pace and makes mathematics anything but a dry subject. . . . I never enjoyed

anything so much before." In 1843 Galton decided to finish his work in medicine, and therefore took a poll degree (a maneuver which was a graceful way of allowing students to retain connections with the university even though they were in imminent danger of flunking), preparatory to resuming his medical studies at St. George's Hospital. Samuel Tertius Galton was worried over his son's roving tendencies. "The study of medicine will tie him down a bit," he confided to his wife. To his son he wrote: "I am extremely glad that you take so fondly to your profession . . . an occupation useful to yourself and others and a source of pecuniary independence which after all it is among the number of our duties to promote."

Before entering the Birmingham General Hospital, Francis had a glimpse at continental hospital practice in the company of two medical students who traveled with him across Europe. His time is well accounted for in letters to the family, in which he details the ardors and the pleasures of the journey, the rounds of hospitals, museums, old canals, old cathedrals, the delays, an operation for his ingrown toenail by the two companions, and a myriad of impressions of a self-conscious youth. Back at the hospital, he reveled, like many another ward clerk, in an assumed callousness in the face of suffering, and in humor about the "humbug of medicine." He shone in the satisfaction of being a doctor, a "juvenile member of the Rag-tag." His first year was moderately successful, but social contacts were numerous and pressing, as may be judged by the frequent urgent letters to "Dear Governor." The "Governor" needed prodding on money matters, for he was a stickler on account-keeping, although not reluctant to supply his son's needs. In this first

year, because Francis's accounts were 3 shillings out of the way, Papa Galton presented him with an *Essay on Book-keeping.*

Medicine was fun, but not as much fun as cricket or riding, or even phrenology. Francis couldn't keep his hands off all sorts of scientific fads. He records in a letter his meeting with a great phrenologist whom he got "to paw my head. He gave me, I think, a very true character—self-esteem is remarkably full." As a student at Birmingham he had had a reading by a Cambridge examiner whose judgment was: "This boy has the largest organ of causality I ever saw in any head but one, and that is the bust of Dr. Erasmus Darwin." Phrenology was a friendly science; there was something complimentary in every reading.

Hard work and the demands of college life at Trinity began to tell on Francis, and by the beginning of the third year he was facing a breakdown. His mornings were filled with gloom. "I find myself quite unable to do anything in reading or [give] really deep attention to mathematics," he wrote. The vagaries of his condition puzzled him as an observer as much as they vexed him as a patient. "What annoys me is that my powers of reading vary so much on consecutive days, at one time being able to read some hours, at another not half one." Mental stagnation was again upon him and his studies became tedious. He was "disappointed when the Bobtail division of the inhabitants addressed [me] not with hurrahs but with T say, ould chap, gi'e us some medicine.' "

The second year in medicine was at King's College in London. The unenthusiastic student was just settling down to physiology and chemistry when his father died. The Gal-

tons took death, like any other natural event, calmly. After a decent period of bereavement, two of the unwed sisters married, brother Darwin retired to the country, and Francis shook himself loose from medical school. In fact, Francis had long since outgrown the guardianship of his elder sisters. "I always felt," he confessed later, "like an orphan among maiden aunts with my sisters." Francis's heart lay elsewhere than in the anatomy room and the amphitheater of King's College—where, he did not yet know. He was free and, he said a little proudly, still had his "wild oats" to sow. Father had left him ample means to insure against settling down to a career at the age of twenty-three. So Francis, like other sons of the social stratum to which he belonged, sought foreign adventure. He went to Alexandria on a lark. From northern Egypt he pressed on to the Sudan, in regions as yet not familiar to the English. Penetration of the area bordering the African desert was a task requiring daring and imagination.

About the next five years of his life there is no record. What he did during this period became a family secret; for some reason, his sister destroyed the letters of this impeccable observer, perhaps because his rebelliousness expressed itself then. Apparently it was an aimless, not always happy, period for him. A trip to Africa, other trips to the Continent, sports—anything but serious work. But it was this sporting interest that started him on a career of real scientific accomplishment. Galton had chosen well when he picked Africa as the land for his wanderings. In the 1840's and 1850's wondrous tales were brought back of the natives and the game life in darkest Africa by missionaries evolved into explorers. The London clubs were full of strange gossip

about the Cape Colony and the Victoria Falls. David Livingstone was every boy's idol and many a man's secret hero. Travel books sold well, and the meetings of the Royal Geographical Society in London were events of the first magnitude. Into this atmosphere young Sir Francis was thrust-when his cousin Captain Douglas Galton introduced him to the Geographical Society in 1849. His mood of uncertainty was lightening as he sat among his peers hearing of strange lands and customs. That winter he brought an invention for recording telegraphic messages to the society's meetings.

His emotions more balanced, Galton set out in April, 1850, for the trip that was to bring him an explorer's fame. Landing at Cape Colony, he passed into the interior, not to emerge for two solid years. The thrill of adventure and hunting brought him to Africa, but he returned a mature, thoughtful man, more scientist than adventurer. Damaraland was the first stopping place. He found himself intrigued by the habits of the Damara people, as well as by the antelopes and other game that abounded. He started making notes on what he called the "obtuseness" of the natives. The limitations of their culture struck him; they couldn't count beyond the fingers of one hand. When he wanted to exchange two sheep for four sticks of tobacco with the blacks, he had to make two operations of it, exchanging one sheep for two sticks of tobacco and repeating the process. Their primitiveness fascinated yet repelled him. While Andersson, his traveling companion, shot the lion, the rhinoceros, the hyena, and the bustard, Galton, the incurable student, made notes of the Damaras, of their dental and surgical practices, their marriage ceremonies, and a hundred other customs. Penetrating into the jungle, he met with the

Bushmen, who he instantly liked." Traveling on, they encountered the Ovampo tribe, a kindhearted, domestic people. Galton could not help noting their marked contrast to the primitive groups he met earlier. "I saw no pauperism there," he wrote, thinking of the poverty of the factory towns back in England, "They respect their elders, have a high notion of morality and I earnestly recommend this land to the notice of all who are interested in missionary enterprise."

Finally Galton returned to London with his notes, which he speedily turned into a volume, *Tropical South Africa.* It made quite a splash among his fellow sportsmen. In 1853 the Royal Geographical Society awarded him the Founder's Medal for the "excellent, manly style" of his volume. He was eager to set off again, but his hazardous African adventures had demanded too much of him physically. For several years he read, thought, and discussed travel, taking an active place among the gentlemen-explorers of the society. Travel and its by-product, anthropology, were interesting, but so were mathematics, statistics, and meteorology, on which he was working at the same time. Galton took a trip to Spain one year to witness the eclipse of the sun, which he duly reported in a brochure. Characteristically, he did not forget to include in his report a vivid word picture of the charm of old Bilbao and the peoples of northern Spain.

Whatever Galton did started as sport but ended as applied science. Playing with meteorology, he evolved the intricate methods utilized at present by weather bureaus. The shipping industry in the 1860's, as now, was vitally interested in the weather, and although there were competent

experts to be consulted, no one had brought the material[1] together so that a skipper going down to the sea could know with certainty what was in store for him. Galton saw the whole problem and set to work correlating the available knowledge into a "complete weather system." On a large sheet, he charted the reported observations made three times a day for one full month from many points on the coast and over the ocean. From this simultaneous record, Galton deduced the formation of Atlantic storms, proving that hot moist winds as they rise suck in cooler air moving in a definitely predictable counter-clockwise direction. The study of winds was so successful that the Meteorological Office, which issues weather reports daily in the London newspapers, now use modern apparatus for weather forecasting based on Galton's original instruments and tables. The automatic self-recording drum on which are recorded data of wind velocity, barometric height, temperature, rainfall, humidity, and so on is Galton's invention.

At the age of forty, Francis Galton took over the leadership of the new science, *anthropology.* With the publication in 1859 of Charles Darwin's *Origin of Species,* interest in man as a race of earth's creatures grew rapidly. Reading cousin Charles's book was the second critical event in Galton's life. It gave him "intellectual freedom," and a stimulus to unify his thoughts. When the majestic sweep of Darwin's evolutionary theories finally swept into his mind, a new Galton arose. Ideas, new tie-ups, new fields for investigation, tumbled about in his brain. For Sir Francis, science, not life, began at forty. His genius matured and his interests spread as he grew older, a child prodigy who fulfilled his promise. The intelligence quotient of 200, estimated after

Galton's death by psychologists to occur one in many millions, never did justice to his intellectual eminence or the intangible value of his name in science.

Anthropology was a crucial field for Galton to work in. It commenced in religion and morality and ended in evolution and eugenics. The Society of Friends had started in 1837 an association called the Aborigines Protective Society, organized to aid the natives of Britain's expanding colonial empire. Its secondary purpose was to study the habits and customs of the native blacks with whom the missionaries came in contact. The Society of Friends had been a powerful factor in many humane reforms in England. It was the feeling for social reform that pushed the Tukes to their revolution in the treatment of the insane at York, and this moral conviction of the Quakers to help unfortunates everywhere formed the background for the science of anthropology. In fact, the abolitionist movement that was soon to be settled by bloody civil war in the United States drew its initial inspiration from the Society of Friends.

Inevitably politics reached the Aborigines Protective Society as its members split on the question of practical help for the blacks of South and Central Africa. The majority of Friends were content to rest on the Biblical doctrine that the Lord in His wisdom made the various races of mankind; the best that decent Christians could do was to give the inferior "races" religious guidance and practical aid. A minority among them were dissatisfied with this particular view, preferring to study the ways of native peoples and note the differences in body and mind that separated them from the white peoples of Europe. Out of this schism, the Ethnological Society arose, composed of the

student group while the Anthropological Society embraced the "practical" men. Controversy arose as to the place of the Negro in the scale of humanity. The moves toward emancipation that Northerners were championing at the price of civil war in America made the theory that the black races were a separately created inferior race difficult to uphold. In 1862 Galton stepped into the controversy, bringing Darwin's evolutionary doctrine to prove that the blacks and the whites were related in the human family. His attack shook the Bible students who had rested on the premise that separate "races," with different abilities and destinies, had always existed as natural divisions of mankind.

Soon Galton was plunged into the center of the intellectual feud of the 19th century, theology versus evolution. To adhere to Darwin's theories was to be classed as an atheist in England. But Galton turned his objective measuring methods on the question of religion with the same emotional calm that he used on a hundred other problems. His friends of the cloth were always preaching the value of prayer. Their stories of prayers being answered did not satisfy him. Galton, like New York's former Governor Alfred E. Smith, said, "Let's look at the record." Using a table of longevity for men in the various learned professions collected in England from 1758 to 1843, he showed that the life expectancy for those for whom prayers were offered was the lowest. The longevity of members of the Royal family, whose health and long life were toasted and prayed for by every loyal subject, was briefest, 64.04 years, while the clergy, who are always praying for others, had a longer expectancy, 69.49 years. But in considering the members of the clergy who had distinguished themselves in the

larger centers, Galton found their longevity to be less than that of distinguished physicians. The longer life of country clergymen had something to do, apparently, with their life of relative ease rather than their piety. These studies demonstrated to Galton that the efficacy of prayer was overrated as a vehicle in stretching the life span, and he was not afraid to say so. Analyzing his own collected data, he went on to show that few mental differences, because of type of worship, existed between Catholics, Jews, Protestants—believers in general—and atheists. In the eyes of his Tory friends, he was still the odd, brilliant, unpredictable boy who had made a "hyperscope" to be able to look over the heads of crowds instead of watching the pageantry of Queen Victoria's coronation. Galton was the kind of anthropologist who believed in studying himself, his neighbor, his greengrocer, his fellow clubman, and his grandfather as well as the Ovampo blacks in Central Africa. Everything about people fascinated him; everything was put to the acid test of measurement. Once he made a Beauty Map of the British Isles in order to satisfy himself as to the relative pulchritude of women in different parts of the United Kingdom. As he walked about he carried a "needle mounted as a pricker" and a piece of paper in the form of a cross with a long lower leg. He used the upper end for "good," the cross bar for "medium," and the lower leg for "bad," pricking the paper unobtrusively in the appropriate place for each "attractive, indifferent, or repellent" girl he met on the streets. Then he would date his record and take it home to analyze the results. "Of course," conceded Sir Francis, "this was purely an individual estimate but it was consistent judging from the conformity of different attempts

in the same population. I found London to rank highest for beauty, Aberdeen lowest."

Another time he measured the mental and bodily capacities of the students at Marlborough College. He checked their judgment in weighing substances of varying heaviness, the force of their punch; their breathing capacity, their color sense, their reaction time, the presence of after-images of sight, hearing, their right- or left-handedness, the duration of impressions of their senses, and so on. Personal data of every kind were set down in his charts. He was constantly collecting data on the tastes, predilections, and actual performances in every field of all the aristocrats he knew, of their fathers, grandfathers, and great-grandfathers. Every university man and professional man whom he could corner was requested to furnish him with details of himself, and his family as far back as possible. This material he studied and analyzed, arising from his mass of statistics with the conviction that bright parents make for bright children, and strapping parents pass on their good physiques to their offspring. If eminent men are apt to have eminent sons, then a better race could be developed by choosing one's parents. Galton's passion was to improve the race of Englishmen, so he started from the top. This son of aristocracy wanted reform, not theories. Perhaps in his unconscious Galton was seeking to prove the superiority of the upper class in England; actually, he established the science of being well-born—*eugenics*. In 1869 appeared the epoch-making work *Hereditary Genius: English Men of Science*, which brought heredity into the focus of practical life. His thought took him into odd corners. By comparing the mental accomplishments of his contemporaries with

those of the ancient Greeks, he concluded that Athenian culture was as, far advanced beyond British culture as the British was beyond that of the Negro.

Galton looked at people with a new kind of detachment, outside the bustle of life. He was just a student watching nature at work "blindly, slowly, ruthlessly," and he couldn't help wondering if science could do the same job in a "provident, quick, and merciful manner." The Birmingham of his childhood, with its industrial enslavement of spindle-legged children and of thin, hollow-cheeked women, must have stuck in his mind. He watched Englishmen struggle to adapt themselves in an industrial civilization that would have been impossible for their forefathers. Here was a natural selection and a survival of the fittest worth doing something about. Cousin Darwin's principles of struggle for adaptation were as true in London or Manchester as they were for the animals in the tropical jungles.

A eugenical life—that is, one well-born—could and should be given to everyone within the reach of science. Galton, the visionary, was too practical to press his ideas of eugenics until the public was psychologically ready for them. Furthermore, he wanted to gather more facts about the British public whose lot he wished to improve. First he worked out the figures from the census of 1871, showing that the descendants of townsfolk in the cities are three-fourths (77 per cent) as numerous as the descendants of countryfolk in these cities. In two centuries the representatives of the townsfolk stock would be one-fifth as numerous as the other group. Poor housing, long hours of work, and above all, poor heredity, was deteriorating the population of England's cities.

The next move was to place his common-born friends against his measuring rods of mental and physical functions. The Anthropometric Laboratory, which opened at the International Health Exhibit and moved later to the South Kensington Museum, was the answer. He placed Sergeant Randal in charge as superintendent of the Science Galleries. The public enjoyed the experience. Mr. Gladstone had himself measured, being particularly anxious to get Galton's opinion on his large "Aberdeenshire" head. In the six years of its existence, 9,337 persons were measured, and Galton worked out data on 35 pairs of identical twins, 783 brothers, and 150 families. A good part of the material which found its way into Galton's statistical works was gathered there.

What he proposed in 1884 has become a reality only in our day. Physical and mental examinations for marriage, for vocational and professional adjustment, for entrance into school and college, are a new wrinkle in 1939, but in 1882 Sir Francis wrote: "When shall we have Anthropometric Laboratories, where a man may from time to time get himself and his children weighed, measured and rightly photographed, and have each of their bodily faculties tested, by the best methods known to modern science?"

Among the data taken down by Sergeant Randal were prints of the fingertips, which Galton had thought might help in classifying racial groups of people. Records were made of Basques, Jews, Red Indians, East Indians, Negroes, and. Chinese, but nothing distinctive was found in the fingerprints of these races. He conceived another idea; perhaps the designs on the fingertips were related to intelligence. Galton instructed his assistants to take the prints of Quakers, students of art and sciences with their assumed

differences in temperament, idiots in the Earlswood Asylum, and so on—still no significant findings that would allow one to distinguish a Jew from a Chinaman, or a brilliant student from a dolt. Another blind alley in anthropology! Examining the prints, Galton noticed that the whorls and loops of each individual print were different from those of the next one. Since no two were alike, he arranged a list, a "directory" he called it, of the individuals tested according to the arrangement of the loops on their tracings. Whenever a man was retested, Galton could tell his name without seeing him by checking up in his directory. This was something practical, even though it did not solve any anthropological questions, and Galton communicated with M. Bertillon in Paris, the founder of fingerprinting, proposing his "lexiconized" fingerprint system to the French anthropologist. Galton's system worked; a criminal once fingerprinted could always be identified by the particular arrangement of his whorls and loops. His system, merely a by-product of anthropometric tests, was accepted by Scotland Yard and is now used by criminal bureaus throughout the world.

The main issue, however, was improvement of the race,' and Galton began considering which feature was worth cultivating in his England of the future. To begin with, one would want to cultivate truly English faces, so he proceeded to find a characteristic British face. Sitting in Hyde Park all one sunny Sunday afternoon did not yield one John Bull face to the investigator. Perhaps if photographs were placed one on the other, that would provide an average face for any given group. Galton tried it, and came upon the composite picture. He gathered up all sorts of photographs,

superimposing one on the other in his specially set-up photograhic plate. He used photographs of professionals, of soldiers and officers of the Royal Engineers, of healthy persons and tubercular patients, of members of one family, and so on, until he could produce a type face for any group one selected. Just to show what a eugenist must avoid, Galton made composite photographs of criminals, which, when contrasted with the composite face of the Royal Engineers, show the basic "villainy" of the chronic criminal type. Composite pictures were a valuable contribution, but still a by-product.

Galton was not a trained psychologist, but his excursions into the field of experiment always ended with a practical gain for scientific psychology. Desiring to know more of the mental faculties of man, he determined to test the range of hearing. There was no instrument available that gave a numerical reading of high and low tones. Galton fitted a screw plug into the end of a metal tube which allowed the column of air in the tube to be shortened and lengthened to form high and low tones. It was a graduated whistle with very fine tone discriminations; the Galton whistle has become a standard piece of equipment in psychological laboratories. Subjecting his highborn and lowborn friends to his whistle, Galton found that the old tend to lose their hearing for high tones without being aware of it, while shrill tones are quite clear to young people. To make his sampling complete, he tested animals in the Zoological Gardens, placing his whistle in his walking stick so that he could squeeze it unseen and watch his subjects react. Cats and little dogs were sensitive to high tones, but large dogs paid him no heed. Big dogs may have thought him silly, dignified

elderly personages thought him impertinent, but he went on squeezing the bulb in his walking stick, calmly recording his observations of man and beast.

Examining the sense of smell, Galton found no usable test, so he invented one of his own. He arranged a series of bottles filled with aromatic chemicals, or attar of roses, camphor, peppermint, and so on in varying strengths, which gave him a check on the reported ability of people to smell keenly. Once he decided to count by odors instead of numbers. Training himself to forget what the numbers i, 2, 3, and 4 meant, he assigned number values for smells—peppermint, camphor, perfumes. Then he could add and subtract by thinking of odors instead of numbers. Out of this came a paper, "Arithmetic by Smell," which Galton read to his learned society members, who were polite but restless, barely tolerating the genius in their midst. This business of restlessness during lectures got under Galton's skin, so he proceeded to measure how many fidgets each of the Fellows of the Royal Geographical Society were guilty of. Hiding in the gallery of the lecture hall of the Royal Society behind two pillars, he could see a narrow strip of audience. To avoid attracting attention, in place of a watch he used his breathing rate, which he tapped out with one finger at the rate of fifteen per minute. Then he counted the total number of fidgets of the strip of audience under observation, and calculated the number of fidgets indulged in per man at the beginning and the end of the lecture. Fatigue, he found, increased the number of fidgets, but the scientist cautioned against measuring the fidgets of philosophers, because they "are known to sit quietly for long periods of time."

The great measurer was regarded as something of a character at his club. When his fellows became a bit contemptuous at his questions, he genially went back to his guinea pigs in the Anthropometric Laboratory in South Kensington Park. One of the perception problems that interested him was the ability of subjects to perceive differences in weight. There was no reliable test known, so again Galton worked one out. A series of cartridge cases were filled with cotton wadding and shot, increasing in weight in geometric progression but identical in appearance externally. The subject was asked to arrange them in progressive order of weight, demonstrating thus the sensitivity of his discriminative judgment. He found that when the increase in stimuli (the weights) is in a geometric series, the sensations are perceived in an arithmetical series. The blocks that your child is given in psychological tests in school clinics are based directly on Galton's homemade cartridge boxes and his mathematical deductions therefrom.

Inquiring into these human faculties, Sir Francis came upon a curious visual experience in a young man who complained of seeing, in his mind's eye, numbers arranged in a circular form with a string of numbers tailing off from the circle in an undulating wave. No one else had described this type of mental imagery, and Galton hastened to put his discovery to the test by questioning everyone he met. At the Athenaeum Club, friends who were asked what kind of images they saw gave him a "contemptuous negative" reply. Even his scientific colleagues told him visual images were an abstraction. "If you mean seeing images in the mind's eye," said one, "you are dealing with a fallacy . . . it is only a figure of speech." Galton went back to his laboratory in the

park and asked the question again. To his surprise the common folk of London described all sorts of images, some with numbers, others with colors. It was astounding how frequent the experience was. People throughout the United Kingdom wrote him in thanks for recognizing as a common psychological observation what had seemed to them a dread affliction. One young man was in terror lest his habit of seeing numbers in curious geometric forms was the beginning of insanity. Galton sent out a questionnaire to various colleges asking detail about visual images,' to Princeton and Vassar College in the United States, and to a hundred English men of science. The data he received were arranged according to statistical principles and proved that one out of sixteen persons has perfectly clear mental images of things recollected. This was a fascinating field, now a recognized part of the psychology of the senses. In Galton's time, his colleagues were inclined to pooh-pooh the whole idea. To prove it, he invited to a good dinner six personal friends who had given him in private the records of their mental images and number forms, and then proceeded to the Anthropological Institute, where he displayed their images on charts before the audience. At the conclusion of the lecture, Galton turned/to his well-fed friends and serenely asked them to acknowledge that the portrayed images were really theirs. By this time psychologists elsewhere were admitting their own experiences with mental images. Examples multiplied, leading into the intriguing field of sensory synesthesias, combinations of senses, such as those of color and hearing, of vision and smell, of hearing and touch. As accounts poured in from schoolteachers, Galton stumbled upon the world of vivid mental imagery of children, who were more often than not

chided or punished for seeing spooks in the curtains or fairies in the tumbled bedclothes at night. His chapter on "Mental Imagery" in his book *Inquiry into the Human Faculties* is a mine of information and practical suggestions for educators.

Galton, interested in illusions and hallucinations seen by persons otherwise perfectly sane, tried to carry these images in himself to a point close to mental disease. By concentrating he was able to supplant ordinary thought by artificially colored ideas. On his walks from Rutland Gate down to Piccadilly Circus, he would practice his new art—imagining the delusion that everyone he met was spying on him. By straining his imagination he became so adept that by the time he reached Piccadilly he felt that the horses at the cab stand were watching him with pricked ears. These experiences were written down in a memoir called *The Visions of Sane Persons.* His production of artificial insanity did not detract from his reputation as an eccentric at the club.

Dabbling with visual images was bringing Galton close to important areas in psychology. His study of daydreams and of association of ideas was directly in line with the newer psychology which Sigmund Freud was soon to plumb, to the eternal benefit of psychiatry. Freud collected his data on dreams from patients, while Galton gathered his from himself. Freud studied the dream life seeking its connection with the illness of his patients, while Galton put his material through the statistical mill. Examining his own dreams and the mental associations evolved therefrom, he placed them in order of their frequency and percentile value—a statistical term he developed designating the relative position of any fact in a series of related facts. He explored his day-

dreams and their relation to bits of his childhood, such as Biblical scraps, family expressions, lines of poetry. These were tabulated; for example, 39 per cent of his mental associations were from boyhood and youth, 36 per cent from subsequent manhood, and 15 per cent from recent events. Being a measurer, Galton was carried just past the point at which modern psychopathology made its greatest contribution. But the fact did not escape his astute mind that whole masses of mental operations which have dropped into the subconscious can be revived by dreams, and the ideas brought out in mental associations. In looking back from our vantage point of modern psychiatry,- it is exciting to see how close this seer of statistics came to tapping the significance of the subconscious in mental life. He recognized that the memories that lurk there "lay bare the foundations of a man's thought with curious distinctness and exhibit his mental anatomy with more vividness and truth than he would probably care to publish to the world."

These "psychometric" experiments, as he called them, brought him to the edge of the problem of fantasy, or the "histrionic" elements of the mind which color our daydreams and even our adult thinking and acting, with the desires of childhood totally unrealized by us. To his colleagues, the quaint experiments published in his *Inquiries into Human Faculties* meant little, but to us who watch the gropings of mind explorers, they constitute one more thrust into the tangled underbrush of the mental life of man.

The Anthropometric Laboratory taught Galton much. It brought him face to face with the problem of intelligence. As he collected his physical data, he reasoned that the next step would be to "consider methods to measure the quick-

ness and accuracy of Higher Mental Processes." In 1884 an advertisement appeared offering £500 to anyone furnishing a full family record of the mental capacities of their antecedents. With this and other material, Galton finally entered his promised land—the inheritance of mental faculties. His vast array of facts regarding individuals allowed him to estimate that the chances of a bright person being born would be one in 4,300 times, the possibility of a brighter one was once in 79,000 times, and a genius would occur once in 1,000,000 times. What Galton was doing was to apply for the first time mathematical formulae to human measurements. Using the law of probability (the Gaussian curve) for the range of human error, he could conceive some idea of the range of human intelligence. Here was the first scale of intelligence and a basis for an exact "mental science."

From investigating human heredity and devising apparatus to test mental capacity arose Galton's greatest contribution—the statistical method. This had nothing to do with psychology when it appeared; it was simply a mathematical problem. But since then biological science, heredity and psychology, has come to depend on Galton's correlation coefficient. Mendel, the Austrian monk who worked out in the solitude of his garden the laws of heredity in plants, dealt with only simple unit characters in his pea plants, such as green or yellow, tall or short. Galton dealt with men, with their thousand variations. The question that he wanted to answer was "how was it possible for a population to remain alike in their features as a whole during successive generations, when children of a couple vary from their parents." Using the Gaussian law, which shows that the largest number of a series of individuals are grouped around the center,

or mean, and that the deviations from the mean can be represented mathematically, Galton proved that offspring never vary more than one-third from the characteristics of the parent. This principle goes by the imposing title of the *theory of filial regression.* Galton, who worked out the law from his family questionnaires, proved it by experiments with peas whose size had been carefully measured before being planted by friends in different parts of the country. The resulting plant offspring measured precisely as Galton predicted; that is, none were more than one-third larger or smaller than the parent pea. With further development of the methods of handling statistical material, especially the correlation coefficient, biological research could move forward with mathematical certainty. Sir Francis was impatient. "We cannot wait, whining for doles."

Knowing Nature's secrets, her laws of probabilities, having faith in the principles that Charles Darwin set down of natural selection and the evolution of biological forms through the struggle for survival, *the* time had come to move on to eugenics and the ordered life. Enough was known by the time the old gentleman was entering his eighth decade for the drive that had been his life's aim. Public pressure had softened, and the ideas of marrying to improve the species did not sound so strange. By the turn of the century Professor Karl Pearson, Galton's chief lieutenant, was broadening the new science that Galton created and fostered; the exact measurement of human probabilities, or *biometrics.* With proved facts as background, Sir Francis, knighted in the 20th century, pressed his eugenic program. By 1911, when his work on *Natural Inheritance* appeared,

the laboratory at the University of London was a beehive of^sociopsychological activity.

From anthropology to psychology ran the trajectory of Galton, touching every other science as it went. In his home-made way he was reversing the progress of the academic psychologists in Germany, who moved from psychology to anthropology. Strictly speaking, Galton worked on the edge of psychology proper. University professors, as we shall see, worked from philosophy through introspection to experimental psychology. Galton started with observation of man first as a physical creature, then as a mental being.

His aims were visionary in considering the race of mankind, yet his instruments were intensely practical and his methods were above all usable. What Galton wanted to know was the "total performance" of the individual; how his fellow man acted about the common things of life, not about "associations, perceptions or cognition." Galton's science was far from "the philosophical psychology of the Germans and the wordy English introspectionists. He brought forward the notion of individual differences in people, a tendency that colored, nay overthrew, the psychological direction of the earlier academic psychologists. It was not until the study of individual differences spelled the major preoccupation of psychologists that practical applications like intelligence tests could be evolved.

For only a few years of his long life was he a psychologist. His life had started with an aristocrat's appreciation of the vast differences between classes of people in English society. It finished with his passing on as a heritage a technique for measuring these differences. The Quaker zeal to

help his fellow man had been tamed into a piece of science, the statistics of heredity. This was his great purpose, to help the birth of a better England. In the pursuit of this high moral goal, Galton illuminated almost every field of science including psychology.

VIII: A Psychological Prima Donna

WILLIAM JAMES was the frontiersman of American psychology. He cleared the ground before the subject as it hid in college curricula behind the haziness of "moral philosophy." James brought it into the open and forced his students and colleagues to look it squarely in the face. He fostered the popular habit of reading scientific psychology, a habit which grows as time goes on and education spreads. His textbook sales reached a point close to those of Mark Twain's works at the peak of the beloved humorist's career. Alert Americans outside the select circle of the college-bred of the 1890^ knew about James by firsthand reading or through parlor conversation. He wrote like a novelist, lectured like a witty after-dinner speaker, conversed like a Bohemian cafe-sitter, and lived like a civilized man. James was far removed from the queer, one-sided laboratory scientist, the naive experimenter with his head in a test tube and his feet in unpolished boots. He was a man who sparkled yet still ran deep. A man who could live and write psychology

as he did could easily capture the hearts of his countrymen —and guide thrm painlessly into the maze of psychology and its problems.

Though William James towered above his contemporaries, he stood shoulder to shoulder with two other Jameses, his father Henry Senior, and brother Henry Junior, the novelist. His setting was the background of a "Family of Minds," as Hartley Grattan rightly named them. William James's swaddling clothes were steeped in culture of the broadest kind, and all his youth and maturity he breathed the air of culture. The Jameses were a shining example of the flowering of minds filled with European influence in ground fertilized by American vigor. To understand what he did and why we must go back to the grandfather, "Old Billy" James, as he arrived in 1789 in the little Dutch hamlet of Albany, which then numbered less than 5,000 souls. The young immigrant, it is said, had fled his native Ireland to avoid becoming a Presbyterian minister, but it is more likely that he harked to the greater opportunity which beckoned a man in the new nation. The stern moral qualities which would have distinguished William the First in the cloth, made him an eminent merchant, first in Albany, then in New York City. The James fortune was built to the point where it was second in New York State only to that of the Astors. From the time when the old Dutch patroons lost their grip in Albany through the War of 1812 and the boom following the completion of the Erie Canal, Old Billy James's position improved to the point where he became vice-president of an Albany bank (whose president was a Van Rensselaer) and trustee of Union Col-

lege, William the First was a huge material success; his descendants were intellectual successes.

Henry Senior, one of the youngest of the old man's thirteen children, became the head of the intellectual dynasty as the father of the psychologist and the novelist. Henry was twenty-one when his father died in 1832, leaving a will with elaborate provisions against his children's wasting either his estate or their time. Any one of his descendants who led a "grossly immoral, idle or dishonorable life" was to be cut off by the trustees. In fact, all the children were to be given a small annuity "sufficient to supply their probable actual wants." So intricate was the will that the court failed to sustain the safeguards set by the founder of the estate, and the James sons and daughters were established in affluence and leisure for the rest of their lives.

Henry made a valiant effort to fill the vacancy left by his father in the world of learning, attending Union College, which his father had practically owned. Grandfather William had been as acquisitive as he was pious. He had seen the will of God in plans for the Erie Canal and for the establishment of Union College and had willingly backed both projects. In fact it came to light long after the financial crisis of 1837 that [a] James contribution of a hundred thousand dollars to the trustees had resulted in his holding the mortgage for the property of Union College. But God and the vigor of the new nation, which accounted for the prosperity of the college, saved it from James, its benefactor. The college was an important institution in those days, ranking with Harvard and Yale as a national center of learning.

Three years **after** graduation Henry attended Princeton

Theological Seminary, where he only succeeded in emulating his father's resistance to doctrine. He left the seminary when he perceived that his classroom dissertations were contaminating other students with skepticism. From then on he pursued philosophical studies alone, fighting his own religious battles within and emerging with a unique variety of religious philosophy. Henry James was that most tenacious kind of student extant, an amateur philosopher. His nights and days were spent in reading, thinking, talking, trying to thresh out a satisfactory formula that would reconcile the presence of Divine Wisdom (God) in man, and the new theories of evolutionary science. He read Darwin, Spencer, and Huxley, but his essentially metaphysical soul couldn't stomach their arrogance. Imagine trying to explain man as a product of biological development along with a million other low forms of life! Man was far above the beasts—so far that the difference could only be accounted for by the presence of God in man. Henry was in the midst of the gigantic battle of the 19th century—religion versus evolution. It was the time of cults, and Swedenborgianism, the mystical philosophy, beckoned Henry James. But Henry James's religion was not too deep. His hardheaded sense of values came to his rescue, and he saw a way out through the views of the American disciples of Fourier, the Socialist. Man was a social being, not a mechanical contraption evolved from beasts; he could help himself out of his morass.

Fourier showed the way. The French Socialist proposed to divide society into "phalanges" of 1,600 persons each, who would live in a common building, drawing their sustenance from the common stock of the community. Labor

was to get as its share five-twelfths of the total, capital's **share** was four-twelfths, and talent would get three-twelfths. America's foremost thinkers backed Fourier's ideas and those of other early communists. Albert Brisbane, Horace Greeley, Charles A. Dana, and Nathaniel Hawthorne, as well as Henry James, were champions of the new cause. Emerson was a little skeptical, for which he was roundly criticized by James, his intimate friend. Henry James embraced the new economic reforms as though he were a little guilty about having inherited so much wealth.

What with Swedenborgianism and philosophy and economics, Henry James was in a whirl of activity. He lectured and wrote constantly. One of his son's earliest memories of his father was his hurrying off to a lecture after the children were trundled off to bed. The Jameses were a thinking people, and they lived in a thinking generation. Literature, poetry, oratory, and political liberalism were the passwords of the day. The Jameses were in the thick of Anglo-American intellectualism then. Thomas Carlyle was an intimate friend, although constantly in controversy with the elder James. Henry's New York was that of Poe and Audubon, as well as the great concourse of commerce that bound the old world and the new. European culture had not yet lost its dominance over that of America, although Emerson's speech in 1837 forecast the event: "Our day of dependence, our long apprenticeship to the learning of other lands, draws to **a** close." The philosophy of Old Billy James, the grandfather, and that of the father of Professor William James was the same; it was a family heirloom. The James philosophy was composed of the best of European tradition and American liberalism.

As though to ensure the critical and nonconformist heritage of his children, Henry had married the sister of a heretical fellow-student at Princeton. Mary Walsh was idealistic and shared her husband's beautiful indifference to worldly success. A woman of refinement and intelligence, she, like her husband, was the child of an Irish immigrant. They made a charming couple, and their life was happy, running over with joie de vivre.

The first child, William, was born at the Astor House in New York in January, 1842. He scarcely had an opportunity to get acquainted with his new world before the family moved to Washington Square in anticipation of Henry Junior, who came along the next year. Before the year was out the family traipsed off to Europe to give the youngsters a proper start on the road to culture. To ensure the children an introduction to modern languages, they were placed under a succession of French and German governesses. Returning to New York in 1852, the parents preserved the European experience for the children by surrounding them with Swiss and German maids. Education was the vocation and the avocation of the family. Within the space of three years William and Henry Junior had been in as many different schools. At the end of their first decade the boys had already a greater variety of experiences than many others three times their age. Life for a James was a swift series of new impressions and new ideas.

While the Jameses were again in Europe after their three-year visit to New York, William's native talent for drawing came up for consideration. Henry Senior, placed him under the best master he could find, William Morris Hunt, and William found the best student company he could—La

Farge. His pencil drawings were promising. "I shall know in a year or two whether I'm made to be an artist. If not it will be easy to retreat," he said. "There's nothing so despicable as a bad artist." It was less than a year before William discovered for himself that the attainments of a great painter lay beyond his ability. He would rather pore over anatomy books, or look through the microscope that his father had presented to him as a gift on his fifteenth birthday. Even in Europe he developed more enthusiasm for the beer and the friendship of his fellow students than for art. William was growing up, he was almost twenty, and the life of a scientist enthralled him. Suddenly he enrolled in the Lawrence Scientific School at Cambridge, his choice of a career settled. With inspiration and ambition mounting, and men like Charles W. Eliot in chemistry and Jeffries Wyman in physiology teaching him, the student William felt he was on the road to real accomplishment. Order had come into his life. "One year study chemistry, then spend one term at home, then one year with Wyman, then a medical education, then five or six years with Agassiz," he itemized. President Eliot fascinated him, so he remained an extra year in chemistry. Next comparative anatomy and physiology with Wyman, then Harvard Medical School. He was happy studying with Oliver Wendell Holmes and Brown-Sequard, the distinguished neurologist, but a vague restlessness seized him. Gradually his delicate physique began to complain. James may have sensed that this uneasy feeling was heading into a depression that was to amount to sickening despair. He needed release from his studies.

Opportunity came in the form of the Thayer expedition. Louis Agassiz was planning a trip to Brazil for the purpose

of collecting zoological specimens. James saw him at once. Could he come along? "Well, yes, but what we need is zoologists." "But let me go as the party philosopher!" They set sail for Brazil in April, 1865. More experience, more human contacts, a serious illness in Rio de Janeiro, and a chance to think and learn.

With Agassiz was Bishop Alonzo Potter and his third wife. The spirit of this scientific company was predominantly religious. Sunday sermons were the regular order of life aboard ship. James listened to everything. "I heard," he wrote, "the Bish. tell them that they must try to imitate the simple child-like devotion of our great leader. They must give up pet theories of transmutation, spontaneous generation, etc. and seek in nature what God put there rather than derive systems of human imagination." Long discussions of science and religion were the order of the day. James was a little amused when he saw Agassiz, the impeccable scientific observer, weep at the conscience-rending conflict. Agassiz, who loved concrete fact, joined the Bishop in defending the Church against the advance of evolution and materialism; and James himself was striving for harmony with the intellectual world with which the Bishop was at odds. Traditional religion could not make peace with science. Man could not become indifferent to his ultimate destiny; he could not deny the intelligence of God,[1] even if he could accept the biology of Darwin. The human mind, if it was simply a mechanism, had to be in tune with a divine universal scheme of reality. This was the problem which his father Henry struggled with. This conflict between religious principles and science must have sunk deeply into James's consciousness. He was groping for a solution, desperately needing a philos-

ophy of life; but of this he was only dihily aware. Except for an almost fatal illness, James knew only that he was enjoying himself thoroughly.

His mind was always busy. In the depths of Brazil, when Agassiz was busily classifying snakes, William observed the abundance of resources spread out to meet the simple needs of a simple people. The intricate social order from which he derived sprang to his mind in contrast. "The idea," he wrote to his mother, "of people swarming about as they do at home, killing themselves with thinking about things that have no connection with their merely external circumstances, studying themselves into fevers, going mad about religion, philosophy and such, seems almost incredible to me." These speculations did not lead to any solution; James returned to his feverish world in the same dilemma as when he had left it. His tie with religion was too strong to be broken by the tuggings of a distraught youthful mind. The materialistic philosophy of Herbert Spencer, the evolutionist, in which he steeped himself was hardly more satisfying than the opiate of religion.

Upon returning from the Brazilian adventure in the spring of 1866, James served for a summer as an interne in the Massachusetts General Hospital before re-entering medical school. Nor did he allow hospital work to interrupt his quest for more real interests. James attended lectures on philosophy and sat discussing abstruse problems with his friends. Sometimes the talk was over his head. The lectures by Charles S. Peirce fascinated him, but he wrote to his family that he "could not understand a word of it." For three years he continued at medical school, torn all the time by the storm within, until a deep depression had him in its

grip. James interpreted his low spirits as a preoccupation with the search for a spiritual goal. Hence he searched in philosophy for a credo to cure his yearning. Actually he was ill with a nervous disorder. During the next five years he was so harassed by the idea of suicide that he subsequently inclined to the idea that a man was not psychologically complete unless he had meditated self-destruction. A year and a half in Europe helped him little. In a restless state he wrote home: "I rather pine for a heart to beat in unison with, but on the whole I preserve that golden mean between an inane optimism and a stupid pessimism which has always distinguished me." He had gone to Europe because he wished to improve his understanding of the German language and to do some work in physiology. Plagued by his depression, he did little physiology and less reading.

He was a restless youth, working out his ennui by writing long, amiable letters home. We can see the edge of his impatience showing through a letter written to his father during this period. After bemoaning the fact that unless he made some philosophical discoveries of magnitude, he would be forced to consider his trip valueless, he wrote: "I have read your article several times carefully. . . . I must confess that the darkness which to me has always hung over what you have written on these subjects, is hardly at all cleared up." Perhaps William was justified, for Henry Senior dealt ponderously with ponderous subjects. What William did accomplish was tovisit a few learned German people, partly through his landlady's daughter. His impressions of Germany were a combination of respect for the hard work of her laboratory scientists, a liking for the "stoutness of hardy, homely German family life," and a

dislike for the "dull German physiognomy." Of this trip he later said that he learned that " 'twould be better to grow up in Germany than to live there." Dissatisfied, James suddenly decided that he would recover his equilibrium more quickly if he returned home.

Back at Harvard in 1868, he continued in the Medical School, receiving his medical degree after a year. Practical work was not the diet the future dean of American psychology could live on. In spite of very poor eyesight, he read prodigiously in philosophy. For three years he was a chronic invalid; his depression was abysmal—"philosophical pessimism" was the way he described his despair. During this intense period James developed a peculiar sympathy for abnormal individuals. They are the "chosen vehicles of the spirit," he said in sympathy and in desperation. Forty years later, when he encouraged Clifford W. Beers, the author of *The Mind That Found Itself*, this sympathy with the mentally ill gave impetus to the mental-hygiene movement. His precarious health would not permit him to enter the practice of medicine, much to his inner gratification; the closest he got to work was to plan a career in physiology.

Reading philosophy, reading evolution, discussing metaphysics with Peirce and with Chauncey Wright, were his only outlets. But the canker of indecision gnawed at him. James was a man struggling with the pains of growing to intellectual maturity. It was a horrible experience. "I wondered," he wrote, "how I had ever lived, so unconscious of the pit of insecurity beneath the surface of life." Science, with its emphasis on man as part of a long series of developing animals, frightened rather than soothed him. The intellectual world, with its lack of recognition of the rights

of man as an individual, would never do. What could psychology offer to help him out of his despair? Nothing; contemporary psychology was thoroughly inadequate, being full of talk about nervous function and empty of any consideration of the needs of the soul. There was something wrong with a psychology that could not help a man to solve his own soul conflicts.

Suddenly a solution appeared. The hint came from Renouvier, a French philosopher, whose book on the will he stumbled on in his wide reading. James recorded his impression in his notebook on April 30, 1870, as he came upon the thought to which he never failed to give credit for the recovery of his balance. "I think that yesterday was a crisis in my life. I finished the first part of Renouvier's second *Essais* and see no reason why his definition of Free Will—'the sustaining of a thought because I choose to when I might have another thought'— need be the definition of an illusion. At any rate," he resolved, " I will assume for the present—until next year—that it is no illusion. My first act of free will shall be to believe in free will." It was an idea foreign to the psychologists he had studied—that personal experience itself had a real validity. The gloom began to lift, and a life of semi-invalidism changed to one of interest and action.

His solution was the erection of a new idea in psychology. He swept everything aside, and declared a value on man's individual and personal experience. He was getting the material to write a new psychology of a vital kind out of the seething caldron of his own mental life.

Man is an organism, announced James, asserting itself in its environment, experiencing, acting now with success,

now with failure, but always interested and adventurous. The mind is an advance agent that reaches out and tests the environment for the organism. This functioning of the organism is the experience of activity, and that in turn is consciousness. In this sense of being active and expectant in life, James found his redeeming philosophy. It had taken a long time to come to this concept and so recapture the joy of living.

Several years had now passed since James had been in active academic life. When Professor Eliot became president of Harvard, he recalled James's talent and in 1872 appointed his former student to an instructorship in physiology. True, he lectured on physiology, but all the while he was edging his way toward psychology and philosophy, toward the development of the secret of life that he had discovered. He would at times interrupt his class lecture in physiology and deliver a philosophical discourse, devote a whole hour to the subject. In class he would suddenly slap himself on the forehead with vigor—"What was I saying?" He didn't lecture, he thought out loud as informally and as honestly as he dressed. In class he wore brown tweeds, his face shone with health. "He looks more like a sportsman than a professor," said a visitor who came to be overwhelmed by his learning.

Now James became an active psychological writer and controversialist. It was his intention to ally psychology with physiology and neurology, having read and admired Charcot's and Janet's handling of hysterical cases. But James was constitutionally unable to bring about the marriage of his own philosophical deductions to cold laboratory and clinical work. He had too little actual knowledge of experi-

mental work in the first place, and in the second place, he had nothing but dislike for laboratory work. James's bias was more on the side of the British introspectionists. But monism, the explanation of things physical and mental by *one* principle, annoyed him; it was vague. He wanted psychology to get close to life. The philosophy of Spencer was a feeble monster alongside James's army of the "data of life."

As for the name of his doctrine, James was little concerned. Later it was to be the philosophy of Pragmatism. "Pragmatism," explained a commentator on James, "is not a philosophy, but only a working theory, an attitude of utility, a method rather than a system." James himself said truth was only the expedient in our way of thinking, just as right is the expedient in our way of behaving. For the present *he felt* his new pragmatic philosophy, and gloried in being able finally to work.

James's thinking was becoming clearer and bolder, and his friend Charles Peirce, a brilliant mathematical mind, gave him courage to think. It was Peirce who had observed the practical aspect of the experimenter's attitude toward observed phenomena. He explained how a scientist's acceptance of a workable hypothesis could change the course of scientific thought. James drew heavily on Peirce's concept and made it the basis of his definition of truth, which he said means agreement with reality. This was where James ruffled the tempers of philosophers who labored with their God, the idea of "Absolute Truth." James swept it all aside. Truth was determined by *practical* consequences. That was the essence of Pragmatism, James's most enduring contribution to philosophy.

A workable philosophy, a charming wife, a busy, happy life—James had left behind forever the slough of despair through which he had passed. Academic circles outside of Cambridge began to hear of James. *Mind,* an English journal, published his papers, and in 1878 he contracted with Henry Holt for a textbook on psychology to be delivered in two years. It was 1890, however, before *The Principles of Psychology* saw the printing presses. Writing this work proved to be a laborious and torturing process for James, but the two volumes established the work as a classic. The material was vivid and real; his principles of psychology were helpful in everyday life; the writing was literature. People were astounded at his clarity. Psychology had never been like this. When a reader asked for the James book, a witty librarian countered, "Do you mean the psychologist who writes novels or the novelist who writes psychology?" The professional psychologists weren't so sure about James's work. Stanley Hall of Clark University was contemptuous because there was nothing in the books about genetic psychology. Lincoln Steffens the journalist, then a student with Professor Wundt in Leipzig, brought the volumes to the German dean of experimentalists. Wundt read them at one sitting and brought them back to the laboratory with a grave air. Steffens looked at him quickly. "How did you like it?" Thoughtfully the Professor replied: "It is literature, it is beautiful, but it is not psychology."

James returned the compliment. He had little patience with experiment or experimentalists. They didn't understand a real "mental" psychology. He scoffed at their method of studying isolated bits of mental life. This "microscopic psychology" was leading the younger men astray, tak-

ing them away from the heart of the subject. "The simple and open method of attack having done what it can, the method of patience starving out,' and harassing to death, is tried; the Mind must submit to a regular siege. . . . There is little of the grand style about these new prism, pendulum, and chronograph-philosophers. They mean business, not chivalry." Mental life, full of thoughts, feelings, memories, habits, and mixed spiritual and corporeal experience, was beyond experiment.

James deplored the new complications which experimentalists were introducing into an already complicated subject. "This method taxes patience to the utmost and could hardly have arisen in a country whose natives could be *bored.* Such Germans as Weber, Fechner, Vierordt, and Wundt obviously cannot; and their success has brought into the field an array of younger experimental psychologists, bent on studying the *elements* of the mental life, dissecting them out from the gross results in which they are embedded, and as far as possible reducing them to quantitative scales." James could not restrain his indignation at this piecemeal psychology. Fechner,' through laborious testing, had demonstrated what he called the *law of psychophysic.* This law states that when we increase the strength of a sensory stimulus, for example touch, the strength of the sensation we perceive increases as the logarithm of the exciting cause. Fechner's law became gospel for more than twenty years for German experimenters, who checked it in every conceivable way for every kind of sensation. To James, the outcome of all this work was "just nothing."

James's idea of the proper subject matter for psychological study was mental life as a whole, i.e. the stream of

consciousness itself. But how to attack it? What does a nonexperimental psychologist do anyhow? Where does he work, what does he work with? Chiefly, the introspectionist thinks—he thinks while sitting, lying, walking, lecturing to classes, arguing with friends, listening to music. He has no set work time, but is at his desk for hours raptly reading articles and books that come pouring in. He reads experimental reports, surveys of work done, novels, and especially the writings of his own critics. His job is to test both new and old ideas found in scientific articles against his theories of how the mind works. Then he sets out to modify his own theories or refute another's. He examines his own stream of consciousness as it passes by, trying to plumb its depths first in himself,' then in his colleagues, his wife, the janitor or his students.

What stands out as most attractive in the introspectionist's work is the practical application of his theories transposed into the currency of daily life. Whether the automaton theory of mind or the mind-stuff theory was more correct in James's time may have been important *to* the professors, but it is hard for the average reader interested in his business, politics, the weather, and his favorite baseball team to work up any enthusiasm in these matters. How can he comprehend these theories in terms of his own mental life? What the layman begs psychologists to teach him is how his habits, memory concentration, feelings, and emotions are to be handled. The nonprofessional reader wants to know if psychology can teach him to control his tongue when his mother-in-law steps across the threshold for a week's visit, can improve his memory so that he can remember the first names of the business men whom he

wants to cultivate, or can make his mind a dynamo of concentration and efficiency. He wants psychology to help him get that raise in pay he dreams of.

And here is where James's *Principles* rose above previous books on psychology. James wrote for himself as a man striving to understand what psychology was in common-sense terms. The dean of psychology weighed what he set down, looked critically at reasons given for phenomena, instead of abstracting abstracts of older writers. That was why his book took twelve years to write. He was thinking out loud, thinking through all the philosophy, physiology, and psychology that he read in his forty-odd years of education, and putting it into fourteen hundred pages of readable psychology.

What did James ponder over? For one thing, he thought about whether there was an "unconscious" mind or not. Many psychologists discredited the idea, but James felt there were excellent reasons for assuming its presence. One proof could be seen in the learning of any skilled activity. When a person learns to drive a car he studies his every movement with care and anxiety. Soon the movements become automatic. What originally required full conscious attention is carried out on an unconscious level. A similar thing happens when the solution of a vexing question that we "sleep on" overnight is obvious in the morning. Everyone has had the surprising experience of suddenly mastering a complicated muscular movement, such as a dance routine, after a long rest following weeks of practice, when hard practice itself has been unavailing. Learning how to skate in the summer or how to swim over the winter involves apparently some muscular learning or co-ordination that goes on

without our conscious attention to the process. When attention is diverted or an object once thought of is forgotten, some portion of our mental apparatus still continues its activity; it is this process that really is the "unconscious." Automatic decisions that we make by the thousand daily are made with a part of our deciding apparatus other than the conscious *attending* part. Our daily conduct,' observed James, is in accordance with our total mind-drift, which is never clearly before us.

Again in the somnambulistic state persons definitely unconscious, in a deep sleep, carry out complicated movements or answer questions, as they do in hypnotic trances, without the knowledge of their conscious selves. The English psychologist F. H. W. Myers, working with psychic mediums, collected much data on automatic writing that indicated a second kind of consciousness, which he thought belonged to a *subliminal* part of the self. James was one of the first psychologists—some of them are still scoffing at it—to second the notion of the subliminal self as a part of the personality which registers and "thinks" of experience beyond the bounds of the conscious state. James, like Galton, was on the edge of the discovery of the importance of that slumbering giant of mental life. The unconscious was the genii that Freud was soon to uncover and examine for its role in the causation of neurotic symptoms.

Another aspect of his subject that interested James was the attempt to link up the action of the brain and the spinal cord with the function of the mind as we know this thinking, feeling, knowing machine. His book started on the premise that brain physiology is properly a part of psychology, and every textbook since has adopted this principle.

A Psychological Prima Donna

For a psychologist who spurned dividing mental life into tiny elements for study and utilized the method of introspection, the proper course would be to investigate the worth of his working tools. Introspection is the method of scrutinizing one's own mind at work. It notes the mind's content and behavior under different conditions, such as perceiving sensations of weight, size, or shape through touch, or paying attention to close or distant sounds, or measuring the time sense. In a brilliant chapter on the mind as a working tool James cleared the ground of previous speculation, demonstrating clearly the relations between thought and consciousness. Every thought, James insisted, has certain recognizable qualities. Thinking tends to be part of our personal consciousness; thinking is a continuous yet ever changing process, just as we remain ourselves all our lives no matter what happens; thinking appears to deal with objects independent of itself, choosing or rejecting what is of interest to it. The characteristics of thought enunciated here sound fairly obvious to us as we read, but it took James months of cogitation to establish these laws.

The next problem was to scrutinize the instrument that does the thinking, namely, the ego or self. So James dived into the problem of what self is, and came up with the definition that "in its widest possible sense, a man's Self is the sum total of all he CAN call his." It includes the *material* self reflected in his attitude towards his body, his clothes (which come to represent him as an individual even to their very creases), his wealth and possessions, whether they be wife, children, summerhome, yacht, or dog. Here James was treading close to the human characteristic of self-love, or narcissism—the regard we have for our bodies and every-

thing belonging to it—which Freud found to be part of everyone's personality. In addition to the material there is the *social* self, embracing our gregarious or herd instincts; and finally the *spiritual* self, man's inner subjective being and the 'pure' ego or personal unity of the philosophers. Using these concepts, James concluded that the self *is* the stream of thought or consciousness that pays particular attention to the objects that interest the "me" in us. The importance of James's analysis was that he thrust out the metaphysical question of "why" the self exists and showed what kind of a self the introspectionist dealt with in his study of man's consciousness.

This notion of a consciousness—something not chopped into bits but flowing as a stream of subjective life—was a real contribution to the psychology of James's time.- The notion was above all one that lent itself to practical affairs. For if the subjective "mental" life flowed along from cradle to grave, it was our *attention* that made us pick out the parts of it for use. Hence, man could accomplish more through concentration, development of correct habits of thinking and doing, and the courage to act. At the back of all his psychology was the idea of free will and its exercise. The hint from Renouvier that first gave him his freedom from the insecurity of his depression—the freedom of a human being to *act*—became the central part of his psychology. With the aid of selective attention and concentration, a man could develop his brain and really get the most out of the million unused brain cells he carried in his cortex. And so James insisted that his fellow Americans first free themselves from the little acts of daily life that require no decision. "Make . . . [your] nervous system your ally.

. . . Keep the faculty of effort alive in you by a little gratuitous exercise every day," he counseled, for the formation of a habit is only "a new pathway of discharge formed in the brain by which certain incoming currents ever after tend to escape." When habit about small things is established, the mind is free for larger ventures and constructive thinking.

James well knew the torture of vacillation for the one "in whom nothing is habitual but indecision, and for whom the lighting of every cigar, the drinking of every cup, the time of rising and going to bed every day, and the beginning of every bit of work, are subjects of express volitional deliberations." Such persons spend half their time deciding or regretting their every act. Let habit do it. Start every new idea or emotion into action as a habit at once. "Habit is thus the enormous fly-wheel of society, its most precious conservative agent," he wrote. Small wonder that alert teachers and clergymen who saw the need of teaching more than the three R's and religious doctrine opened their eyes to psychology as a practical science of daily life. A psychologist who urged action was a welcome rarity after the tedious experimentalists with their talk of sensation thresholds and fatigue kymographic records. James's ideas fell in with the practical, pushing spirit of the America of the 1890's. His psychology fitted in with the American spirit that built, worked, and expanded.

James had an adventurous mind. He loved the element of risk when he set out to explore. During the twelve years he worked on *The Principles of Psychology,* his greatest joy was that of anticipation, not accomplishment. James thought that the best definition of a man's character possi-

bly was that particular mental or moral attitude in which he felt himself most deeply and intensely active and alive. His life was never fuller or more intense. When his message was finished, James laid aside psychology and ascended to grapple with the problems of philosophy. He never liked the limitations of laboratory psychology anyway; a little feeble experimentation early in checking Galton's observations on mental images satisfied him. James had great respect for the investigations by which Galton opened up the field of visual imagery. But for himself the proper tool for mental problems was thought. Let the laboratory men shun philosophy. James couldn't afford to; for him metaphysics meant "only an unusually obstinate attempt to think clearly and consistently." The labor of fashioning a usable psychology in language which James thought was at least clear, and which readers hailed as brilliant and exciting, tired him. When he turned in his manuscript of *The Principles of Psychology,* he remarked, "Nasty little subject. . . . All one cares to know lies outside."

By now he had been established as professor of psychology at Harvard, but within a few years he turned the job over to Professor Miinsterberg and took the chair of philosophy. James's invitations to lecture were becoming numerous; he talked at the University of California and he lectured at a summer Chautauqua meeting in New York State. He taught everywhere, but he also learned. Even the flatness of the Chautauqua meeting, its "blamelessness and goodness," which James, fresh from the intellectual atmosphere at Cambridge, abhorred, started him thinking anew. The Chautauqua was tedious, he reasoned, because there was no danger, no sweat or effort, none of the struggle re-

quired by a conquering "human nature strained to its uttermost and on the rack, yet getting through alive, and then turning its back on its success to pursue another more and rare and arduous still." This business of really living towered so formidably to James that he set out to formulate it in psychological terms. Out of this grew Pragmatism, the philosophy that brought his colleagues down on him.

The basic attitude in judging the value of a philosophical notion was, according to James, the difference it would make to anyone in his own life.

Others wanted to know truth for its own sake, but James, utilizing his old friend Peirce's idea that truth must be tested by investigation, asked other "questions. A religious precept, a philosophical concept, a moral preachment, had to be looked at in this way: "What sensible difference to anybody will its truth make? How will truth be realized? What experiences will be different from those which would obtain if the belief were false? What, in short, is the truth's cash value in experimental terms?" Why talk of "absolute" truths or ideas in a world that is always changing and striving? This in a nutshell is the philosophy of pragmatism. Charles Peirce's article "How to Make Our Ideas Clear," published in 1878, expressed the viewpoint which James developed into his philosophy. Peirce's notion was that in order to get the meaning of an idea, one must look for the action it leads to; truth is what happens to an idea, not the idea itself. Pragmatism was a reaction against the Hegelian "absolute" idealism, which had dominated German philosophy; it was a reaction against all idealism by a man impatient to make philosophy mean something in life. James's philosophy was like his temperament. Professional philoso-

phers, like George Santayana at Harvard, couldn't digest such impetuousness. But the pragmatic philosophy made its mark on American thought and on thinkers elsewhere by its insistence that reality and not logic was the final test for any set of ideas. Giovanni Papini, the Italian, became James's staunch supporter, and James developed so great an enthusiasm about Italian philosophy that he proclaimed the new home of the living philosophy to have left Germany for Rome. "Papini is a jewel . . . the Cyrano de Bergerac of Philosophy." John Dewey in Chicago and H. G. Wells were swept into the pragmatic camp, and even the Behaviorists under John B. Watson took James's philosophy for their guiding theory. James's insistence on "use" and his check with "reality" made a brand-new business for philosophy; and the philosophers when they had recovered their poise countered by admitting that James *was* a great psychologist indeed, but thoroughly misled as a philosopher.

Living in the charming bookish atmosphere of Cambridge, James stepped out into life more than any other psychologist or philosopher of his circle. He reacted to everything about him, the Spanish-American War and America's beginning imperialism, the national pastime of worship of the "bitch goddess success." James's complaint was against the immorality of wasting man power in war, and against the accummulation of great wealth as an act with no possibility for moral sanction. America was big enough, there was enough clean energy in the West and enough opportunity for the exercise of personal enterprise, and no need for the concentration of wealth in a few hands. William James, like his grandfather and his father, was an individualist; he had no feeling for the larger social forces

at work in his America, diabolically bending people's lives slowly and silently away from their desires. The Jameses' cosmos was a striving, working, thinking, *individual* one. For William James there was one political party—the Republican. In the battle of the McKinley-Bryan days, there was only one money standard—gold. His reaction to the Haymarket riots and strikes in Chicago in the 1890's, where labor was struggling to get a foothold, was that all anarchists are foreigners, and all strikers are anarchists. Like a good Republican, he knew that the "senseless . . . riots" were "the work of a lot of pathological Germans and Poles."

But in Cambridge his individualistic bent had more room in philosophy for expression without contradiction by social forces. How he loved the sparkling, professional skirmishes at Harvard! Josiah Royce, professor of philosophy, was his chief antagonist, a charming enemy, and a dear friend. Royce espoused an idealistic philosophy, where the world is the expression of idea as an absolute thing. In his lectures James praised his fellow philosopher, but he flayed his writings with the same verve that he used in boosting him personally: "In spite of the great technical freight he carries, and his extraordinary mental vigor, he belongs essentially among the lighter skirmishers of philosophy. A sketcher, a popularizer, not a pile-driver, foundation-layer or wall-builder." Royce, the idealist, was to James a man who dealt in philosophical fancywork, for which he had little patience. But George Santayana caught the spirit of James's restlessness more accurately. "Philosophy to him," wrote Santayana, "was rather like a maze in which he happened to find himself wandering. What he was looking for

was a way out. . . . He lived all his life among them [theories] as a child lives among grown-up people." James returned the compliment to the urbane Santayana: "What a perfection of rottenness in a philosophy. I don't think I ever knew the anti-realistic view to be propounded with so impudently superior an air."

The real importance of James's Pragmatism was its influence on young Americans. John Dewey, whose attitude on education and its purposes has revolutionized pedagogy, received his stimulus from James. The revolt against old "realities" and their "absolute" origin was started by James. Dewey took it up and showed how reality is changing, growing, developing, and how education must also change and grow away from fixed and rule-of-thumb methods.

William James's long preparation in physiology, medicine, psychology, and belles-lettres had one aim—philosophy. Even at twenty-three, when he classified snakes in the Brazilian jungles with Agassiz, he recognized his ultimate calling. To brother Henry he wrote: "When I get home, I'm going to study philosophy all my days." Study was not enough for the surging brain of James; he had to create a philosophy, of the kind which could help him with his personal problems and incidentally the personal problems of his fellow Americans. After all, philosophy is a determined effort to understand all the facts and experiences of our lives, to sweep it all into a system that will make human life intelligible and livable. The tradition in which James grew up was the "monistic" one that treated man as the effect of some sort of primitive substance which filled and made the world. Man was part of the universal mind, God, whose ex-

tensions were into every cranny of thought and life. One principle, one universal mind, one enveloping primordial yet everlasting Idea—that was monism. From this position philosophers worked with concepts like the Absolute, the Truth, and Knowledge, using the language of logic and the intellect as a mathematician works with symbols and formulae. That also was where James started to lead the reaction away from monism to the opposite philosophic position—that of Pluralism.

The kind of thinking his monistic friends indulged in did not touch the realities of life experience, said James. Why talk about Abstract Truth when the world is full of actual problems; the Absolute as philosophers think of it "stands outside of history." James, the man of action, urged anr other view, Pluralism. In a world full of multiplicity, oppositions, cross-purposes, and where a man can appreciate biological and mechanical science as well as abstractions like metaphysics, there can be no one principle, no Universal Mind. So Pluralism was the only realistic attitude for a philosopher to take. It corresponded to the way people really thought. Pluralism fits nature, fits our minds, and allows us to aspire, to try new things, to *do* something about our earthly problems. This is far from the monist's position, who deals with the Absolute. In a world like ours, where there are never less than two sides to any question, why is a "one"-principle philosophy more true than another with "forty-three" or "two million and ten principles?"

Monism argues for a finished universe. But that cannot be, for chance is a factor not to be underestimated, just as the potentialities of a human will are not to be underestimated. James' championing of Pluralism/ like his espousing

of Pragmatism, stirred up a storm in the intellectual world. The Catholic commentators saw in James's Pluralism a rebellion against the moral law, an opening wedge to pantheism. The professional philosophers, of course, had a lot to say in technical journals. An article titled "Is Psychology Taught at Harvard a National Peril?" by Dr. Witmer of the University of Pennsylvania appeared in a popular journal. The "Psychological Pillar of Harvard Temple," it bawled, was suffering from intellectual asthenia . . . from . . . the boredom of an emotional and mystical temperament forced to dig when it would like to fly." Criticism was directed at the anti-intellectual attitude of James. He had joined the rising young French-Jewish philosopher Henri Bergson in denying the importance of logic. "Life is a flux, reality can only be known by living it," said Bergson, and James echoed, "Precisely." "The experiences of life are outside of logic," said Bergson. "I found it necessary," emphasized James, "to give up logic fairly, squarely, irrevocably." James's philosophy was a fearless attempt to bring a psychologist's inability to get away from the "facts" of tnental experience into philosophy. And through William James's writings, one can see him carrying the burden of the science-religion problem which disturbed his father, the amateur philosopher.

He constantly endeavored to reconcile the practical and the supernatural. Such widely divergent subjects as spiritualism and mental disease occupied his penetrating mind. When the English Society for Psychical Research had organized, he helped establish a similar group here. He studied all sorts of reported experiences, second sight, ghost-seeing, concentration exercises of the Yogi, messages

transmitted from the dead by mediums, and so on. Out of this interest came his sympathy with the idea that the mind had a "subliminal" self, a portion of consciousness where all kinds of forgotten abilities, memories, and controlled emotional feelings lay. The concept of "subliminal" was very close to that of the "unconscious mind" as the source of many mental twists and neurotic symptoms. Out of James's fascination with all sorts of mental experiences came also his defense of religious feeling, which grew later into a famous work, *The Varieties of Religions Experience.* Even though his critics dubbed his book "Wild Religions I have Known," and looked askance at his desertion of psychology for religion, James knew what he was after. It was the search for a clear formulation of what religion means to the human personality.

The evolutionary theory and the materialistic philosophy were hacking away at the significance of religion in the mental life of the ordinary man. Deep religious feeling could not be discounted as fanaticism. Revelation was not restricted to a few fanatics, but could occur to men who were sound of mind and sincere of purpose. Any man who turned from a grubbing, unwholesome preoccupation with misery to healthy-mindedness could be said to have undergone conversion. "Getting religion" transforms the character, not in a wild orgy of feeling, but as a steady growth of the personality into a wider self. That development of a higher power of the self, a broader personality that comes from true absorption of the idea of God, is the psychological advantage of religion. To the idea that God is the source of mental power, the stimulant to moral action, James added an explanatory note. The sight of a psychol-

ogist dipping into religious conversion was really a new one. James explained in psychological terms how the subconscious or subliminal self stored deposits of life experiences that incubated and matured out of sight of the person, to emerge in the flowering of the whole personality.

James was not a dogmatic believer in doctrine. In fact he fought against the blind acceptance of religion evolved from the word of the priest or Gospel. He saw beyond the moral issue of religion into its practical psychological aspect, its pragmatic or realistic value. Belief in God brings power and breadth of personality to a man. It is all part of his interest in "healthy-mindedness"; it is the same realistic drive toward the one aim that James always held in mind—increase in mental efficiency. Where he pushed moral preachments it was only to stimulate his followers to a fuller life, not necessarily a better one in the ordinary sense. William James was not a fundamentalist, or a die-hard doctrinaire; he was a philosopher trying to get some psychological sense out of the ethical aspects of religion. An institution like religion which had served man in and out of season for centuries must have something hidden behind its dogma so solid that the honest psychologist could ill afford to push it aside as unscientific. Religion had worked miracles for all sorts of people in all sorts of ages, while biology and evolution and physical science, shining and brilliant in their appeal to the intellect, had yet to prove their mettle *to* people who relied on the heart first and the brain later. So he argued, but the truth was that James could *not* get God out of his system. Just as his father, Henry Senior, had hung on the two horns of the dilemma: mystical philosophy (Swedenborgianism) and science (evolution) : so William

was torn, in his proper sphere—philosophy—between morality and intellectualism. As he approached the height of his mental powers, the influence of a true religious background peeped through his thought. Slowly, as his theories of philosophy and psychology evolved, the moral aspects of his make-up pressed his intellect into service. Everything that James thought seemed to have a moral purpose. His masterly exposition in *The Principles of Psychology* had as its root the wish to help his audience to train their minds. James loved to teach; when he lectured or wrote or conversed, he always exhorted his students and readers. "Hortatory" was the adjective thrown at James the psychologist and teacher, but its severity had to be modified, for all that he said was said charmingly, wittily, and inoffensively.

In 1899 appeared a work based on lectures to teachers, which was dedicated to changing the aims of education from that of knowledge-stuffing to mind-training. It was refreshing to hear the country's foremost psychologist talk in terms that did not hide behind obscurites. "Let us make our nervous system our ally instead of our enemy," he told his audience, and to do this one must work with the positive functions of mental life. Habit was one of the most important of these functions. James urged the teachers to build up their own and their students' automatic habit-machine in order to free and train the intellect for complex problems in their studies. "The aim of education is to fund and capitalize our acquisitions and live at ease upon the interest of the fund." That was the talk the man in the street could understand; it ran hand in hand with the notion of Pragmatism—the method that considers the "cash value" of

truth. On the surface it sounded so man-in-the-streetish that James Huneker snorted from the depths of his critical spirit that James's notions were "the philosophy of Philistines," and James's exhortations were a kind of psychological salesmanship. Three maxims were commended by James for the strengthening of moral habits. They were based on good psychological reasons, and furthermore, they worked. The first maxim stated that one must launch a new habit with a strong initial effort. Second, one must never suffer an exception to occur till the new habit is securely rooted; only continuity of effort makes a permanent groove in the nervous system. The third maxim was to seize the very first possible opportunity to act on every resolutiqn and every emotional prompting one feels. The reasons behind this vital third rule is that the *forming* of the resolution is far less effective than the actual *doing* of the act. To put the idea into motor terms is to secure the growth of it into a habit. Without the *discharge* of mental-activity ideation into muscular activity, we would be far from the goal of good habit-formation. We would be wallowing in the "fine glow of feeling" of the "nerveless sentimentalist," which James abhorred. The nerve cells, the fibers, and the molecules of the brain take no account of promises we make ourselves. Unlike Rip Van Winkle, who said about each drink, "I won't count this one," the elements of the nervous system count everything. Each separate act can be the start of a new habit or a dangerous procrastination. To misuse the will, man's priceless possession, was criminal in James's eyes. The moralist side of James peeps through his psychology. "Every smallest stroke of virtue or of vice leaves its never so little scar. . . Could the young but realize how soon they will be-

come mere walking bundles of habits, they would give more heed to their conduct while in the plastic state."

But James was never superficial; it was only his readiness to bring what he learned to the problems of living beings that sounded like Philistinism. Nor was he uncritical of his own field and the painstaking work he had done in it. At the end of the monumental two volumes on psychology which brought the subject to life stands this epitaph:

> [Psychology is, in short] a string of raw facts: a little gossip and wrangle about opinions: a little classification and generalization on the mere descriptive level: a strong prejudice that we have states of mind, and that our brain conditions them: but not a single law in the sense in which physics shows us laws, not a single proposition from which any consequence can causally be deduced. We don't even know the terms between which the elementary laws would obtain if we had them. This is no science, it is only the hope of a science.
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He knew what the vacillation and despair of a depression meant in terms of emotional suffering. Even the greatest genius could ill afford to neglect his own emotional life and its training. Charles Darwin, James often pointed out, found after thirty that he could no longer enjoy music, art, and that reading Shakespeare "nauseated him." All science and no art had made Darwin a "machine for grinding out general laws." The love for literature as a habit in his life had been lost. If only he could live life over again, Darwin declared, UI would make it a rule to read poetry or listen to music once a week."

James's interest in mental hygiene, then a visionary idea, led him to endorse the habit of relaxation. America is too nervous, too highly keyed, too ambitious. It was a national disease at the turn of the century, as it is now; this habit of tension must be broken if we were not to develop into a

nation of neurotics. James saw it all clearly, the germ of the era of present-day "jitters" and "nerves," only James called it the "bottled-lightning quality in us Americans." Like a true physician, he had a remedy instead of theories to offer. "When a decision is reached, dismiss all responsibility and care about the outcome. *Unclamp* your intellectual and practical machinery—the results will be twice as good." To control oneself, one must control the *action* first; control of *feeling* will follow. "To feel brave, act as if you were brave, use all your will to that end, and a courage-fit will very likely replace the fit of fear. . . . The sovereign voluntary path »to cheerfulness . . . is to act cheerfully,' and to act and speak as if cheerfulness were already there." This was no idle advice, but a profound psychological law known as the *James-Lange theory of emotions.* Until James worked on the problem it was thought that first emotions are aroused and then the physical symptoms follow. Thus first fear is experienced, then palpitation of the heart, dryness of the throat, trembling, tendency to flight, and so on follow. James and Lange, a Dane who worked independently, thought otherwise; the bodily sensations of fear precede the emotion. Were one to meet a bear unexpectedly face to face, James argued, the tendency to run would bring out the emotion of fear; we feel sad *because* we weep; and so on. Action precedes feeling, so we must turn to action to control feeling.

James held emotional quietude and mental relaxation to be another crying need for the mental life of Americans. He endorsed any attempt to bring psychological truths to the public, even if espoused by laymen. The book *Power Through Repose* by Annie Payson Call he held in high es-

teem and recommended to his students. Horatio Dresser, the successor to Phineas Quimby (Mary Baker Eddy's teacher), Trine, and others who were pouring pamphlets on health through will and mental work, received James's attention as eagerly as did his ponderous colleagues writing in psychological journals. Even Horace Fletcher, who saw the birth of a new life in thorough chewing of food, was worth investigation by the dean of America's psychologists. James tried to "Fletcherize" his food—a technique which meant chewing each mouthful of food, even each sip of milk, for minutes to extract the maximum of nourishment from it. "I tried it," said James ruefully, "but it nearly killed me." His fascination with the odd corners of mental study, such as supernaturalism and the mind-curers, was part of his lust for life.

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Everything interested him. When James accepted an invitation to lecture at Stanford University—against his physician's advice—he arrived in time to witness the San Francisco earthquake. It interfered with his lectures, but not with his joy of observation. The fortitude of the people of the city in the face of catastrophe warmed his heart; he saw again the indomitable will of the American people. He himself went into the midst of destruction to search for the aunt of a friend of the family. The vigor of cosmic forces was no stranger to James. The damage to the University made it impossible to give the lectures, so he returned East to the Lowell Institute and Columbia University. New York with its four millions stimulated him; the life in the city, its subways, always delighted him. Talking, writing, thinking, were wearying this combination of iron will and frail body, but there was no thought of retirement. Between trips to the

Adirondacks or to Europe in search of health, James managed to give the Gifford Lectures at Edinburgh on the *Varieties of Religions Experience*, the Hibbert Lectures at Oxford, to receive an honorary degree of Doctor of Laws at Harvard, and to attend a Philosophical Congress at Rome. When he quietly registered at the congress, the city pounced upon him gathering to do him honor. Papini and his fellow philosophers went wild about "Weelyum Yames," James wrote home proudly about the woman registrar who almost fainted when she took his name; he was proud of his popularity among the Roman public.

Cures at European spas, a visit to brother Henry in England—himself a tired old man—had no perceptible benefit on his health. He turned his face homeward with just enough strength to reach his New Hampshire country home for the end in August, 1910.

There are many bigger names in academic psychology than we have encountered. Men like Wilhelm Wundt, who worked slowly with a martyrdom to precision and an interest only in facts, facts demonstrable and provable in anyone's laboratory. Or men like Ebbinghaus, who studied the laws of memory and spent years in training the miracle horse Hans and an Arabian steed, Muhamed, to perform calculations like addition, subtraction, and even extracting square roots. There were many serious students, chiefly in Germany, who slaved away establishing the laws of mental fatigue, of attention and comprehension, of volition and cognition and sensation. Their contributions were invaluable, but somehow the contributions of the American school of psychologists seem more vital, more meaningful, and closer to daily problems of life. James led the valiant band with his insist-

ence on using laws of habit and attention for the improvement of one's capacities. Stanley Hall talked himself out of university positions by persisting in questioning every kind of mental action, even in children. The German experimentalists had followers in America, but they did not achieve the distinction or possess the dash of men like James, Hall, and Cattell. These mind explorers used the laboratory as a furnace for forging psychological laws into shape for the teacher, the parent, the advertising expert, the industrial tycoon, and the leader of men in their practical problems.

Our mind explorers for the next few chapters will be laboratory men, but not necessarily scientific mummies of the kind who emerge from year to year with a formula writ in Sanskrit or obscure mathematics. Stanley Hall, the genetic psychologist, and McKeen Cattell, the patriarch of Fort Defiance, typified them—intelligent, scrupulously scientific (another word for honest), yet alive to human psychological needs and anxious to know where their beloved subject was heading.

IX: A Sire of American Psychology

WILLIAM JAMES and G. Stanley Hall were the fathers of psychology in America. James made it a respected branch of learning and geared it up to the needs of life about him. He popularized introspection, and in the process it could become an attractive part of the mental life of his fellow-Americans. Stanley Hall gave psychology breadth, spreading it to include the mental life of children. He gave psychologists the dignity of an association, and organized journals for their writings. He founded the science of psychologic pedagogy. James intrigued people into the study of psychology; Hall with his superhuman energy forced them into it. James *started* things, but Hall, as Professor Boring says, *founded* them. Without a coddling solicitude for the growing infant science, Hall exposed it to all kinds of new and untried adventures, feeling that if it was worthy of its parentage, it would survive. Both James and Hall sired psychology in America, but while James's attitude was paternal, Hall's was avuncular. James was philosophical in

his own mental interests, Hall was experimentally incline James worked and thought in his study at Harvar used the highways, the cafes, the entire world. Both men were of the finest type of mind explorers; like the Colossus of Rhodes, each stood astride the academic world of the 1880's and 1890's, and through their legs passed the youthful workers who were to carry the torch of psychological learning in America.

Like all great men, Hall was regarded as being a little peculiar. Since earliest childhood Stanley had puzzled his parents. Bred in a Puritan atmosphere, he showed a wide vein of rebelliousness at the repressions of his environment. At three he burst into the kitchen with a pailful of flowers, spilled them into his mother's lap, and announced proudly: "God told me not to pick them, Mbther, but sometimes I don't mind God." Precocious and imaginative, he frequently ran away from home, climbed hills and dreamily watched the sun set. While he dutifully busied himself with his chores his fancy ran riot. Dark closets were the lairs where Bluebeard stowed away his eight wives; a pile of rocks was Abraham's altar; the infant Moses lay among the rushes below the dam; the frost on the windows, the flames on the hearth, filled his imaginary world. A strange offspring for farmer Granville Bascom Hall and his good wife, the devout Abigail Beale Hall. The Halls were country folk, for the most part farmers in western Massachusetts. Of New England Puritan stock, the traditions of hard work, piety, and simplicity of life were bred into them. They had a great respect for the morality of effort, and were conservative about innovations that might suggest shirking. For Grand-

father Hall it was a painful transition to supplant horses with oxen in farm work.

On the farm Stanley took the life of labor, from sunup to sundown, as a matter of course. He grew up in the days of country "bees," of "raising day," when the able-bodied men of the community constructed the framework of a wooden building for a neighbor; of the annual road-mending gathering where storytelling and practical joking were interwoven with hard work. Rainy days on the farm, the tale-telling of long Sunday evenings, gave him contact with beliefs and feelings of common folk which made him sensitive to the verities of mental life.

Although the Halls were a practical, almost austere tribe, they did not spurn learning more than was acceptable to that generation. Hall's mother, a woman of even temper, had a real feeling for scholarship. As a girl she studied at the Albany Female Academy, although she would rather have attended the newly opened Mt. Holyoke College, a step forward in higher education for women. She never ceased being intellectually eager, reading to her children at night, at nron, even in the busy haying season, from the *Springfield Republican,* the *Spectator,* or well-chosen books by Dickens. Along with the classics went the Scriptures; Mother Hall is said to have read the Bible through fourteen times.

Stanley was frequently absent from Ashfield, not least because of his belligerent disposition. Mrs. Hall was sensitive, one of these women who dread disharmony; she shrank from the bickering of her three children. She sought refuge from a hard life by her constant justification of man's ways as being dictated by God. Hall's father was true to his

origins, religious, devoted to his family, but not above harsh censure and punishment. On the surface life in Ashfield *was* emotionally placid, forbiddingly placid. Never had the farm boy seen his parents kiss or display the slightest personal emotion. Deep affection was there, but duty to God and to work came first. The appearance of adolescent longings and physiological changes was dealt with by the uneasy father in the old familiar way. Sex was sinful, and brain-softening the price of self-indulgence. Later, when Hall brought out his famous study called *Adolescence* he spoke with rare understanding,' as no psychologist had before, of the mental torture of this trying period of life. The basic Puritan upbringing and his pagan revolt fashioned Stanley Hall as a man and forced him into the kind of psychology he brought into being. Hard work, contempt for softness and intellectual laziness, constant striving even through defeat, colored his work, while a consuming wish to ease the sexual and other repressions of youth gave direction to his psychological interests. On the surface, as student and as professor he was a wag, a play-actor, an unconventional Bohemian, but underneath one could sense a reserved, even repressed New Englander.

And so Granville Stanley Hall, the quixotic farm boy, worked, read, and studied until at sixteen he received his certificate to teach a country school. His first assignment was among students some of whom were much older than he, and some had previously been his schoolmates. One of the problems he met was the older boys' habit of chewing tobacco in school; one recalcitrant member had to be trounced, and another brought a note from his father saying his son had chewed tobacco for years and the teacher had

no right to stop him. The teacher boarded from house to house, sometimes being called upon to discharge the office of nurse to the younger members of the family when their parents went a-visiting. The year he started to teach was the year of the outbreak of the War between the States. His father safeguarded him from the draft by buying a physician's "exempt" certificate for a minor knee injury. Hall's neighbors said something to the effect that Father Hall loved his son better than his country, but Stanley admitted that he was a coward at heart himself and would rather show his patriotism through scientific service to his country than by fighting.

Soon he had enough money to enter Williams College. Hall's four years in Williamstown were not remarkable, and he graduated below the middle of his class. President Mark Hopkins thought him "too heterodox" and frowned upon his passion for Darwin's recently issued *Origin of Species.* His college mates, however, were attracted by Hall's "fine head and glorious eyes" and agreed that "when Stan gets to thinking clearly, he will think greatly." For Stanley the regular curriculum was unexciting. The intellectual character of the faculty was low; the same textbooks and lectures were used from year to year. Courses in religion and philosophy formed the keystone of learning at the college. As in his mother's day, moral philosophy was studied out of volumes like Paley's *Natural Theology,* Kame's *Elements of Criticism,* or Coleridge's *The Aids to Reflection.* Stanley read Bishop Butler's *The Analogy of Religion, Natural and Revealed, to the Course and Constitution of Nature,* but added the philosophy of Kant and Berkeley.

College finished, Hall was ready for his professional training. In the fall of 1867 he enrolled in the Union Theo logical Seminary, then at 9 University Place, New York City, to be trained as a minister in the Congregational Church, his mothers denomination. Stanley Hall fell in love with New York at first sight. His behavior, strange for a student of the cloth, betrayed his infatuation. By day, he absorbed homiletics and pastoral theology. By night, the young student spent crowded, fascinated hours in the first large city he had ever seen. He roamed Greene, Bleecker, and other notorious streets, chumming with streetwalkers, pimps, confidence men. He slipped into churches and synagogues; went to Greek-Orthodox temples and from Seventh Day Adventists and Spiritists to the Roman Catholic cathedrals. He hung over the gallery rail of the theaters, listening to the classic accents of Ristori, Lester Wallack, Charlotte Cushman, Clara Morris, and especially Edwin Booth. He was equally fond of Tony Pastor and *The Black Crook, The White Fawn* and the risque exhibitions at Niblo's Garden. He dug up $2 to hear Dickens read in Steinway Hall and $5 to have his own "bumps" read at Fowler and Wells Emporium on Broadway; and had a private seance with the grasping medium, Slade the slate-writer. He saw the fire that leveled Phineas T. Barnum's museum; visited police courts and the morning line-up, the grim old Morgue at the foot of East Twenty-sixth Street, and the foundling home where unwed mothers, with no questions asked, were allowed to deposit their burdens.

The radical debates at Cooper Union drew him inevitably. Once he was invited to the palatial Murray Hill residence of Victoria Woodhull, purchased for her, rumor had it, by

none other than Cornelius Vanderbilt, Sr., where Theodore Tilton was the principal speaker. Henry Ward Beecher was the leading minister of the day, and once a week the great man received a selected number of students from the theological seminary. The moment they met, Beecher and Hall flew into each other's souls. Often, thereafter, Hall sat alone with Dr. Beecher in the latter's study on Brooklyn Heights overlooking New York Harbor. Beecher told Hall how he prepared his famous sermons: "During the week I jot down random thoughts, throw them into a drawer and early Sunday morning go over them. I write out the first page or two of my sermon, then trust to inspiration for the rest."

In June, 1868, Hall was required, as were the other young seminarians, to preach a trial sermon before President Skinner of the seminary. Hall's paper was a broad plea for the brotherhood of man, on nonsectarian lines, with fulsome eulogy of two great ethical leaders who always retained his greatest admiration, Buddha and Jesus. When he had concluded, feeble, saintly old Professor Skinner sank trembling to his knees and solemnly prayed: "O God our Father, show this young man the true light-and save him from mortal errors of doctrine."

Hall was ordained in due course. While on a summer pastorate in a small Pennsylvania town, he received a letter from Henry Ward Beecher asking him to come to New York because he had something important to communicate. Hall rushed back to the city. After a few moments' conversation, Beecher said : "Young man, have your theological studies made you more, or less, devout?"

"Less, sir," replied Hall without hesitation.

"Good," said Beecher. "You are honest. You ought *to go* to Germany and study philosophy until you find yourself^ Tomorrow morning you take a note I shall give you *to my* friend Henry W. Sage, the merchant, and he will lend you $1,000 and take in exchange your note, bearing interest but payable at your convenience. Go to Germany on the first boat you can catch, and God bless you!"

The young minister found himself in Sage's office the next morning with the letter in his hand. Sage mumbled something about Beecher's annoying practice of sending theological students to him. But after a few minutes of fencing conversation he turned to Hall, still with an expression of vexation, and said: "Here is your check. Give me your note. Take the first boat to Europe and don't bother me any more."

A week later, walking on air, Stanley Hall—the lad who wouldn't even obey God when he wanted to pick flowers—sailed for Germany, mother of the world's most eminent philosophers, where was spawning a new adventure in thought and human relationship—scientific psychology. It was the beginning of a great career. The ship docked at Rotterdam and Hall made posthaste for Bonn, where he entered the university, taking the summer semester of Bona Meyer and Lange, the latter making the young American a guest in his home. He mastered German during a month's walking tour with a young German who knew no English. They tramped from Bonn up the Rhine through Switzerland by the Grindelwald Glacier, over the spur of the Matterhorn, and through a countryside made famous by the legend of William Tell. Wherever sunset found them they tapped the door of peasant huts, eating bonnyclabber and

black bread, and often paying for their food and lodging by cutting wood. The entire trip cost Hall less than $5, and he returned to Bonn speaking almost flawless German.

Later in the fall he entered the University of Berlin and for the next two years wallowed in the intellectual feast spread before him. He gobbled up lecture courses on every subject from anatomy to psychiatry. He read prodigiously and gained a fair knowledge of Italian and French. Hall crowded in physics, theology, philosophy, anthropology, under Virchow, the great pathologist,' and attended Westphal's mental clinics at the vast charity hospital. He boarded for $1 a week with a family named Gildmeister. There were four daughters, and the evenings were passed reading the German classics. Hall left time to indulge his passion for the theater and for prowling. He sipped his beer, learned German love songs and practiced them with various fraulein, and danced many a night away, far from rocky, repressed New England. Yet, as bright and early as the morning itself, the husky young American with the broad shoulders, deep chest, big boxlike head, and shining, questing eyes was always on hand for his lecture courses.

If New York had been a sort of peepshow to him, Berlin was an entrancing symphony of sights, sounds, and experience. He felt himself treading a vaster stage in this Germany of old Kaiser Wilhelm I, of Von Moltke and the gargantuan Bismarck, to whom Hall was introduced by the American Minister, George Bancroft.

In the spring of 1870, when the Franco-Prussian War burst upon Europe, the university closed and Hall's classmates rushed to the colors. He himself was offered a post as war correspondent by Dr. Jacobs, Berlin correspondent of

the *New York Tribune* and other American papers. Hall's first post was at Stettin on the Baltic, where it was feared the French might attempt a landing. They didn't, and aiffcef' several weeks of loafing about the little fishing village of Heringsdorf, Hall was sent to the front. He heard the roar of the artillery at Sedan and watched the wounded as they were brought to the rear. His account of the battle appeared in the *New York Tribune.* In the fall Hall returned to Berlin and re-entered the university. He witnessed the great victory parade through the Brandenburger Thor, led by Wilhelm I, Bismarck, and Von Moltke, and realized as he watched the pageantry that in the heart of every German that day "a new self-consciousness" was rising.

Funds low and his head cram-jammed with a vast variety of fact and experience, Hall returned to New York in 1871 and sought a post in a college or university in any capacity. The University of Minnesota, he learned through an agency, was seeking an instructor of logic and ethics, but after considerable correspondence, the President turned Hall down on the ground that he might "unsettle men and teach them to hold no opinions." It was the same story elsewhere. "My trouble was," Hall used to explain laughingly in later years, "that I had been bitten by every bug that bites. These conservative old college prexies were afraid of me. Probably they were right."

In despair, he re-entered the Union Theological Seminary, took his Bachelor of Divinity degree in a few months, and was assigned by the American Missionary Society as pastor of a little church in Cowdersport, Pennsylvania. Preaching orthodoxy to a yawning congregation of working people was deadly to Hall. So he resigned abruptly and re-

turned to New York, the city he had grown to love—without money and without a job. His mother, a descendant in the seventh generation of the famous John Alden, one of the signers of the Mayflower compact, was puzzled and hurt. His father, descendant in the eighth generation of another Mayflower pioneer, Elder William Brewster, wrote: "Quit your traipsing around, Stanley. Come on home and help me run the farm."

Things looked black. Stanley was twenty-seven and still hadn't found himself. He had even harked to 'old Uncle Billy's homely cautioning delivered after his graduation: "So you gradooated. . . . If all you knowed was writ in a book, 'twould just about go in there"—pointing to his vest pocket—"and if all you don't know was writ in another book 'twould be so big that Heenan and Sayers [heavyweights of the time] might put their shoulders under the 'kiver' and boost till they died but couldn't lift it." But Stanley could not allow his horizon to be bounded by a hundred and twenty-five acres of New England farm land. When it seemed that he must submit to this, chance stepped in. Jesse Seligman the banker, whose elegant mansion was on Gramercy Park, was looking for a tutor for his five children. Hall got the job. It was a fortunate connection. The young tutor came into contact with the finest Jewish families in New York, learned to play billiards, mastered Hebrew, drew a nice salary, and had time to attend medical lectures and read a great deal of the history of German philosophy. His year with the Seligmans was a breathing spell, giving him rest to digest the vast mass of material he had crammed into his head. In the spring of 1872, James K. Hosmer, an old Berlin friend, called upon him and told him

that he, Hosmer, was resigning the chair of English literature at Antioch College in Ohio. Would Stanley like the post? He leapt at the opportunity.

"It wasn't a chair I occupied at Antioch," Hall used to remark, "it was a whole settee! Officially, I was Professor of Modern Languages and Literature, teaching at first French, German and English and conducting classes and readings of standard authors and plays. The following year they handed the Chair of Philosophy to me and that, lad, was duck soup for me. I literally soaked myself in Darwin, Spencer, Huxley and all I could absorb on the subject of evolution. I began forming my own theories of genetic psychology." The story of man's progress, inch by inch and century by century, from slimy amoeba *to* six feet of upstanding protoplasm, became a reality *in* the clear mind of the young Antiochian. Occasionally, for week ends, Hall would journey to St. Louis to sit at the feet of the great educator William T. Harris, and discuss Georg Wilhelm Friedrich Hegel and kindred topics.

These talks touched off the spark. Soon, in Harris's *Journal of Speculative Philosophy,* there appeared an article entitled "Hegel as the National Philosopher of Germany." Hall's wings were spreading. In 1874, when Wundt's *Elements of Physiological Psychology* first appeared, Hall read it and became so entranced that he decided to return to Germany and enter Wundt's psychological laboratory, the first in the world.

In his exuberance he thought first to visit his brother Robert in Cambridge, Massachusetts. There he encountered that brilliant scholar, President Eliot of Harvard. Eliot offered him a tutorship in English at $1,000 a year. Hall

accepted and remained in that rarefied atmosphere for two years. Teaching was monotonous, but he found time to attend medical courses on Boylston Street under Dr. H. P. Bowditch. He also struck up an acquaintance with a frail, piercing-eyed, brilliant professor called William James. In a tiny room under the stairway of the Agassiz Museum, James had installed a so-called psychological laboratory. James's "laboratory" consisted of a metronome, a device for whirling a frog, a horopter chart, and one or two other bits of apparatus.

In June, 1878, Hall won his Doctorate of Philosophy with a paper on "The Muscular Perception of Space," and immediately set sail for his second trip to Germany. He went at once to Berlin and re-entered the university, devoting his time to the study of physiology. He attended Helmholtz's lectures, and the following year enrolled at Leipzig in Wilhelm Wundt's psychology course. Wundt was his passion, but on the side he leaped from course to course: Dermer in theology; Trendelenberg's seminar on Aristotle; logic; comparative religion; biology and anatomy; and even chemistry. For a Congregationalist minister his mental diet was quite solid. He added physiology under Du Bois-Reymond, listened to Virchow and Bastian on anthropology, went to France to see the great Charcot, visited Nancy and the aged Liebeault. Here he was taken through the wards by Bernheim and rewarded by seeing a demonstration of hypnosis on a dozen patients.

The irrepressible American was delighted. He was amused by the formal, awesome atmosphere with which the German savant-professors surrounded themselves! Each Herr Doktor would come into his lecture room preceded by

a beadle shouting "silence I" and bearing water and the Herr Doktor's manuscript. The professor sat or stood on a high dais. They were men of many idiosyncrasies. One while lecturing habitually gazed at a knot in a tree outside ap*f was thrown completely off balance when a storm felled the tree. Another would lower his voice to a whisper at important points, the students tiptoeing nearer in order not to miss a single precious syllable. The emotional flood waxed higher when the object of his adoration, Cornelia Fisher, whom he had first met at the home of President Hosmer at Antioch, came to Berlin to study music. Under the *gemutlich* influence of Berlin they were drawn closer together, and were married in September, 1879. Even getting married was a lark. Cutting through the red tape of Teutonic officialdom amused them so much that they wrote an anonymous sketch entitled "Getting Married in Germany," which the *Atlantic Monthly* published.

During the academic year 1879-80, Dr. and Mrs. Hall honeymooned and studied in Leipzig. Hall passed many days in the physiological laboratory with Ludwig, learning about laboratory technique, about psychology, maturing and expanding. At thirty-seven he was about ready to burgeon. His opportunity came in the fall of 1880, when he and Ccfrnelia, returning to America, leased a tiny apartment in a small house on the outskirts of Medford, Massachusetts, soon crammed with psychological books and paraphernalia.

Many ideas spun around in Hall's head, but one of them was really remarkable; it led to the field of genetic psychology. The idea was to discover, if possible, what the average child stored in its mind when formal schooling was begun. Hall had always been fascinated by his childhood.

Looking back, he was annoyed at the painful experiences a child had to live through. He remembered his own dread of lightning, his fear of hell-fire, the bullying of his brothers, his cherished wish to be a "boy's boy" born of fear of being considered a weakling, his abhorrence of kissing games, the struggles with the engulfing sexual impulse of his adolescence. But in his memory the first four years were a blank. These years must be vital; so many things happen then to give a child the basis for its character. What an important field psychologists had neglected! Freud with his insistence on the importance of the infantile life in analyzing the adult's mind had the correct idea. In America the Freudian psychology boasted no well-trained disciples, so Hall turned to the actual life of the child to see what could be learned of the infant mind.

Others had been stimulated to rescue children from the neglect of the Victorian admonition "Children should be seen and not heard." One Professor Lazarus in Germany had studied in 1872 the contents of the minds of children entering the Berlin schools. A few Boston physicians had examined school children in a routine way some years later, but no one had delved deeply into their mental life. In 1883 Hall determined on a frontal attack on his pet problem—what children think about before they are subjected to schoolteaching. The only method he could use was that of questionnaires. At his own expense, an eighteen-page pamphlet covering topics that he thought might be revealing was prepared. He brought it to the Boston school authorities, who co-operated by lending him Mrs. Quincy Shaw. She assigned four excellent teachers from her comprehensive kindergartens to act as special investigators and "question-

nairists" under Hall's direction. They interrogated the children on one hundred items in the first questionnaire. The inquiries were about anger and dolls, feeling for inanimate objects, feeling for animate objects, about imagination, reverie, tickling, fun, wit, humor, laughing, the only chiJdHfn a family, about migrations, tramps, truancy, running away, love of home, spontaneously invented toys, amusements, and so on. One hundred and ninety-four articles appeared by Hall and his coworkers between 1894 and 1897 detailing what children think or feel. The results were startling in showing the extent of child ignorance and the peculiarity of child preconceptions. The investigation showed the tremendous depth of the chasm that yawns between the infantile mind and the adult mind. The result of three years' study was published as *The Contents of Children's Minds on Entering School.* It attracted world-wide attention and was translated into many languages. The work was received with amazement and enthusiasm. Hall, though he disclaimed the honor, became the "Father of Child Psychology."

When Hall gave his first lectures on "pedagogy" at Harvard in 1880, President Eliot was loath to use that newfangled term. It was a hard fight to place pedagogy on the college curriculum, but Hall won the fight. Teaching was quite rigid in those days; a child had no individuality—he was "a little man." Hall's investigations into children's minds showed how wrong this theory was. Why pour into a child's mind formal learning in carefully measured quantities hoping that in time everything will come out well and the "little man" will grow into a reasonable adult? What colossal ignorance! Learn the child's perceptive capacity

first, then let the child develop with what knowledge it can absorb. A child is a human being in its own right. This was psychology that made sense; it was the beginning of a scientific pedagogy.

Meanwhile Hall earned the rent and subsistence for Cornelia and the two children, Bob and Julia, by lecturing on educational problems under the auspices of Harvard in Bumstead Hall on Bromfield Street, Boston. Tickets sold at $5 for the course, and Hall literally packed the auditorium. His talks on the narrowness of the entire system of education in America literally dripped with rich figures of speech. He was the most stimulating speaker Boston had ever listened to; and aristocratic, hidebound Back Bay, languishing in boredom, flocked to Bumstead Hall as overnight Stanley Hall became a sensation.

At that time the most prominent center of learning in America was the new Johns Hopkins University. Mr. Johns Hopkins, a merchant prince of Baltimore, dying in 1873, had left his fortune of $7,000,000 to establish a university and a hospital. The university opened very modestly in 1876 under the presidency of Daniel Coit Gilman, limited to a philosophical faculty. But it was apparent from the first that this university, under the able and understanding Gilman, was to differ gloriously from others in America. It was to become a research center where masters and pupils could unite in the scientific investigation of human problems.

In 1882, President Gilman offered Hall a lectureship in psychology together with a grant of $1,000 a year to establish a psychological laboratory. This was the atmosphere for which Hall yearned. The next year he founded and con-

ducted the first real psychological laboratory in the Western Hemisphere. For seven years, happy as a colt in clover, he taught psychology and pedagogics. His lectures based on solid laboratory experiment covered such a wide range as the senses, space, the time sense,' and the psychophysk^ law; association, memory, habit, the will, and the feelings; instinct in animals, psychogenesis in children, the psychological aspects of anthropology, and morbid psychology. He attracted as students men who later attained eminence. Among them were John Dewey, James McKeen Cattell, E. C. Sanford, Joseph Jastrow, and many others.

For some years Hall had longed to establish a journal devoted to the new psychology. A gentleman wjio had heard him lecture in Philadelphia offered, in 1887, to contribute $500 toward this, and in November of that year appeared the first issue of 1,500 copies of the *American Journal of Psychology.* At first Hall did most of the work himself. The journal, however, was soon able to attract other writers and became self-supporting. Early in 1888, Senator George F. Hoar of Massachusetts informed Hall that Jonas Gilman Clark, a wealthy retired manufacturer of Worcester, had conceived a plan *to* establish a university in that city, and that Hall might possibly expect a call to its presidency.

Jonas Clark was a self-made man. Beginning as a wagonmaker in Worcester, he had followed the forty-niners to California and reaped a fortune selling mining tools and implements. He was at once narrow and broad-minded, cautious yet imaginative. At seventy-three he had agreed to put aside $1,000,000, with an implied promise of more to come, to establish Clark University.

HalFs enthusiasm flamed at the prospect. He met Mr.

Clark and members of the Board of Trustees and outlined plans for a graduate university to surpass anything yet established. Mr. Clark's original idea had not extended much beyond that of a conventional college for men of the standardized New England type. Hall wanted a school of the most advanced grade, with special attention devoted to original research. Clark agreed cautiously to the plan for a graduate institution. While ground was broken for the buildings under the founder's personal supervision, Hall dashed off on a nine months' foreign tour, visiting every country in Europe except Portugal and acquainting himself with the latest methods in European educational systems. The tour was a rapturous triumph for Hall.

Clark University opened with impressive ceremonies on October 2, 1889. Hall assembled a faculty of eminent and serious men of science to conduct five departments for graduate work only—mathematics, physics, chemistry, biology, and psychology. These were housed in solid, substantial buildings on an eight-acre tract on Main Street, a mile and a half from the business district of Worcester. A new threshold in American education was being crossed. But Hall's buoyancy was to be punctured. In the midst of activity he was stricken by an attack of diphtheria. He was in the country recuperating when his wife and daughter were found dead in a gas-filled room in Worcester. Hall went to California for a few months to reorient himself. Upon his return he faced further blows.

Friction (it was inevitable) soon developed between Mr. Clark and Professor Hall. The old wagonmaker was not temperamentally in tune with the turbulent, volatile president of his university. Relations soon became strained. At

this time the endowment consisted of two notes, bearing interest at 4 per cent, one for $600,000 for the General Endowment Fund, and one for $1,000,000 for the Library Fund. Hall could not persuade the cautious old founder to "loosen up" further; accordingly he attempted to carry cmfr his own grandiose educational ideas on a meager budget of $28,000 annually. Opening its fourth year in late September, 1892, Clark University had twelve instructors and forty students. The $28,000 wasn't enough to pay even faculty salaries, not to mention upkeep and overhead. At this juncture, President Harper of John D. Rockefeller's richly endowed new University of Chicago quietly slipped into Worcester; under Hall's very nose he signed up and took away some of Clark's faculty. It was a typical Rockefeller raid. In a stormy scene, which neither man bver forgot, Hall told Harper that his act "was comparable to that of a housekeeper who would steal in at the back door to engage servants at a higher price." Perhaps this was why the University of Chicago was called the "Standard Oil Institution" at the height of Rockefeller unpopularity.

Harper retired with his quarry. Hall tightened his belt, dropped all departments except psychology and mathematics, and plunged straight ahead. He founded the *Pedagogical Seminary,* and the American Psychological Association,' of which he became the first president, in which he drew about him, by sheer force of his genius, courage, and personality, the most notable group of young professors and research students ever assembled. Among the men awarded Clark degrees were Arnold Gesell, the famous child psychologist, now of Yale; Lewis M. Terman, the

famous intelligence-test research savant; Harry Elmer Barnes; and a host of others.

In 1900, when the founder Clark died, it was learned that his will provided definitely for an undergraduate college which was to have its own president and faculty and with which Hall could have no connection. This was a blow from which Hall never quite recovered, for teaching was his real gift to psychology. But he gave no sign of his keen disappointment, continuing with original research problems with his excellent staff of young professors and graduate research students.

Stanley Hall had a genius for stimulating men. "Hall used his ideas to dynamite holes in the sky for his students/' wrote Lorine Pruette. One student said that he reaped a lot from reading Hall's books without believing much that was in them. Hall was courageous in his thinking and courageous in his everyday life. A scholar with insatiable curiosity, he was an institution rather than a man, a quixotic personality eager to mop up human experiences. His serious-minded wife Cornelia was quite convinced that her handsome husband was a little mad. Once Simon Newcomb the astronomer, President Gilman of Johns Hopkins, and Hall started to visit all the spirit mediums, astrologers, and fortune tellers in Philadelphia. The others tired after a couple of days but Hall kept on. The stories told of him are legion.

A young man of earnest mien, with the long jaw and the big teeth of the Northern Irish, attended Hall's lecture course one year and took psychology as his minor. One afternoon when the two were walking in the country the student asked Hall's advice as to whether he was not better fitted to become a psychologist than to remain in history

and politics. Hall advised against the shift. The young man was Thomas Woodrow Wilson. On another walk, a student and Hall came upon a millpond where a "No Swimming" sign was posted. "Can you read the language on that signboard?" asked Hall. "Perhaps my ancestors, in ages long ago used that tongue. . . . Let's take a swim." 11is human, qualities were outstanding in that day of stuffy and moralistic pedagogues. It was recounted that once he visited the attic room of a student and lunched at a table covered by a newspaper; he ate an orange, shredded wheat, a few figs and raisins, and took a glass of milk, all of which he reported he enjoyed immensely.

Hall loved to play. He would step down from his study to do a clog step to gramophone music as readily as lie would argue philosophy with a colleague. Dancing meant sublimation of sexual feelings and was ideal for youth. So was hill-climbing. Release of emotion through muscular activity was a tonic Hall prescribed on psychological grounds. Hall was one of those scientists who tried his own theories on himself. Sublimation, or the channeling off of a deeper instinctive tendency into a substitute activity, struck him as a tremendously vital and practical doctrine. So he preached and practiced dancing, climbed the Massachusetts hills into his seventh decade, and sublimated his sexual energies in prodigious reading and study all his life.

The work prospered at Clark. His "pedagogy" was hailed as a real contribution to science. The questionnaire method he introduced was becoming a popular tool of psychological investigation, although most fellow scientists dismissed it as being too selected a method to have statistical validity. This was the method that gave Hall insight into

the hidden corners of the human personality. He could not be expected to respect the rules of scientific method when it was facts and the truth that he sought.

Now in the late i89o's, realizing that nowhere in the world was the child and his problems more neglected than in materialistic America, Hall unleased the full energies of his pupils and himself into a monumental study of adolescence. It was a link in the chain of his bold attempt to formulate the principles of a workable, common-sense genetic psychology that had been growing in him since he had first read Darwin. *Adolescence,* published in 1904 in two volumes totaling some fourteen thousand pages, proved a scientific sensation, sweeping over everything hitherto written or attempted in child study. It was, of course, not final, but it posed a host of new problems upon which hundreds of investigators have been working since. Indeed the term "adolescence" had never before appeared in pedagogical literature as a definition indicating a critical and important epoch in an individual's intellectual, moral, and psychological development. Today virtually all secondary-school problems are studied in the light of what we know of adolescence. The ideas of Hail and his aides have proved revolutionary in secondary education.

One of those who aided in assembling material for this monumental work was Florence E. Smith, a kindergarten teacher of Newton, Massachusetts. Hall married her in July, 1899, nine years after the tragic death of his first wife. Tragedy seemed to stalk Professor Hall, for a mental condition soon afflicted his second wife. One Monday evening, at the usual weekly seminar In President Hall's roomy old mansion, the second Mrs. Hall, young, lovely to look at,

appeared in her bedroom slippers. Another night she rose abruptly, left her guests, and went upstairs to take a bath. Soon she became very extravagant, tried to borrow money from people on the campus, and talked wildly. More odd behavior, a paralytic stroke—and Hall was again a widower.

But nothing stopped his work. Those privileged to attend the Monday-night seminars never forgot them. They were devoted to sharpening the mind by dialogue and discussion. Every shade of religious and social thought was given free expression. Among the guests at various times were Catholics, Jews, Protestants, Chinese, Japanese, Germans, Armenians, Anarchists, Mormons, extreme Socialists, materialists, idealists, spiritualists. On several occasions discussions were staged, under Hall's tirbane guidance, between Southern students and Negroes. On and on plunged our restless genius. In addition to administering the college he wrote and lectured prolifically. *Youth* and *Aspects of Child Life and Education* appeared in 1907; *Educational Problems* in 1911; *Jesus, the Christy in the Light of Psychology* in 1920; and the best-selling and revelatory *Life and Confessions of a Psychologist* in 1923.

These books and literally hundreds upon hundreds of articles, fiction, and descriptive bits were written with the aid of secretaries and research assistants, in his study at Worcester. This was a shabby old room where Hall swung his chair back, hoisted his feet on top of his desk until they had worn a little groove there, and smoked innumerable 5-cent cigars. Often when the phrases and ideas wouldn't marshal themselves into line as he wished, he would swear like a Portuguese sailor. Like that of his father, his temper was

explosive but soon spent itself so completely that there was no container left for hatred. He was a great believer in the "hygienic properties of anger," insisting that one could not really know his friends until he had made them seethe with anger. He believed that anger should serve a social purpose, such as the teaching of boxing to boys.

In 1909, the twentieth anniversary of the founding of Clark University, Hall put on a great psychological show. Savants came from all over the world to help him celebrate. He brought together twenty-seven distinct types of child-welfare organizations, and helped form a national association, a job of no mean dimensions. Freud, Jung, and Adler were summoned from Europe to receive honorary degrees at the Clark University celebration for their advances in psychology. From the beginning Hall had taken keen interest in the new psychology, seeing in psychoanalysis a corroboration of his pet genetic psychology. At the time psychoanalysis was causing as much of a disturbance for its emphasis on sex and childhood as Darwinism did among the clergy when *The Origin of the Species* was published. Storms of criticism descended on Hall's head, but he paid no attention to these assaults from press, pulpit, and technical journals; the more critics lambasted him, the better his books sold and the higher went his fees for lectures. Why psychology had to stay in the pre-Darwinian stage was beyond Hall. He was close to eighty years of age when he expressed his farsighted views on the new psychology: "I believe I am the only professor outside of medical schools who belongs to our Psycho-Analytic Association," but a mental science that "analyzes philosophers, gives a new basis for religion, a new interpretation of history, a new

conception of the child, a just view of disease, of all kinds of psychic troubles, is looming up and a few of the stock psychologists are beginning to see the writing on the wall. My own study in this field has rejuvenated me."

In September, 1920, having reached the ripe age of seventy-six, Hall resigned the presidency of Clark University and Dr. Wallace W. Atwood, popular professor o1 geography at Harvard, became president of both Clark University and Clark College. Atwood, who wished to make a *smart* college out of both, was pained at the lack of "college spirit," of athletic teams and the folderol that covers collegiate life like an ivy vine. He wrought such changes in the set-up, with geography as his keystone, that one professor committed suicide, others resigned, and a committee was appointed by the American Association of University Professors to investigate the situation.

When''he left the university, Hall took stock of himself. He had specialists go over his heart, lungs, and liver, took advice as to what to eat, drink, and smoke, and then proceeded to do as he pleased. His activity, even in the last years of his life, was amazing. He tended his own furnace, often went coasting secretly at night, learned to drive a car, planned to go to China; wrote *Senescence: The Last Half of Life* and the story of his life. In 1923-24 he was again paid the high compliment of election to the presidency of the American Psychological Association. That year he was planning his greatest opus on the emotions and sensations. But this was destined never to be completed. For, even the magnificent constitution of the farm-boy psychologist had finally to succumb.

What was Hall's place in psychology? Like other great teachers, he stimulated a generation of workers. Beyond that, he fashioned almost single-handed a genetic psychology, that branch of psychology which looks at mental life not so much as a set of mental states but the product of a billion years of biological development. For that he had to be and was an evolutionist. The word "evolution," Hall was fond of saying, "was music to my ears and seemed to fit my mouth better than any other." All his thought was wrapped in this evolutionary covering. To understand man's "present mental equipment, we must know how he slowly developed out of time and space, out of matter and the primordial slime, out of the one-celled amoeba through aeons of growth, to achieve the status of an upright mammal. This is where Hall started his psychology and his pedagogy. Man to him was a creature with millions of years behind him, who developed first hand skills, then speech, memory, and thought, and finally morality and the higher attainments of the human spirit. Every child had the possibilities of this tremendous growth within him. Childhood was older than adulthood, and education must give the child every chance to develop the tremendous potentialities which this slow evolution foreshadowed. Hence evolution was in the center of his school of psychology. The entire world of educational psychology that flourishes today in child-guidance centers, in progressive schools, even in the curriculum of our public schools, was pushed forward by Hall. Hall never published a systemic psychology, a venture that is often the summation of a scientist's life. But he brought into being a viewpoint which in the end colored other systems of psychology. His ambition so modestly ex-

pressed was fulfilled—"To contribute ever so little to introduce concepts in psychology, where they were practically unknown, and to advance the view that there were just as many rudiments and vestiges in our psychic activity and make-up as in our bodies and that the former was just as much a product of slow evolutionary tendencies as the latter/' These, he concluded, "comprise about all my insights and ambitions." He forgot to add that in so doing he practically made a new science of psychological pedagogy.

X: The Theater of Psychology

IT IS time now for the reader to draw a breath and look back at the upgrade along which he has traveled. We have followed psychology's ascent since it became detached from philosophy, the ultimate source of scientific thought. Our attention up to now has been fixed on individuals: physiologists, neurologists, educators, and humanitarians who, struggling alone, have with mighty thrusts advanced the mental sciences. But in following their individual fortunes we may have lost sight of the larger movements of the science as each laborious discovery gave a new direction or a new value to the total structure of psychology.

As time passed, psychological thought was organized into systems in which the various psychological theories were gathered. As in any science, the thought of different thinkers split off, lines of cleavage developing. The ideas of one great man, rounded off and extended by his pupils, were built into a "school," which with further additions finally became a "movement" in psychology. For years this move-

ment would influence almost everyone in the field, until a group with opposing ideas initiated a second "school" based *on* other premises. Thus the various schools of psychological thought lined themselves up along a few major fronts, as Behaviorists, Introspectionists, Associationists, Psychobiologists, and so on. Moreover, these movements were constantly modified by new techniques or viewpoints arising in other sciences—mathematics, chemistry, medicine. Thus the evolutionary theory gave psychological thought a developmental twist; knowledge of biochemistry and electricity brought changed methods of psychological study into the laboratory.

The school of psychological thought that a scientist evolves often grows out of inner, perhaps unperceived, drives. The psychoanalyst would say he is* reacting to unconscious drives. What the influences were in his boyhood, what the/problems of his generations were, and the solutions his social class offered have much to do with his contributions to science. The very direction of his life interest is determined by attempts to adjust to inner stresses.

We have seen many examples of this spotted throughout our story of the mind explorers. Philippe Pinel was by temperament a pacifist, and his moral treatment was fashioned out of the structure of his personality. Franz Gall fretted throughout his life because he did not have the well-shaped head or the graceful height of an Austrian courtier. Vanity about his ungainly head led him into skull measurements, from there to craniology, thence on to neurology. The psychopathic twist toward mysticism of Friedrich Mesmer, which was as much the man as his name, pushed him into animal magnetism and hypnotism. Sir Francis Galton, a

member of the leisure class in England who could have lived his days in graceful comfort immersed in books, did more for practical psychology than any other scientist in the field. Stanley Hall, the scion of Puritan parents and a product of the New England conscience, forced the sexual life of the adolescent and the emotional struggles of the child into the open. William James, beset with neurotic tensions and inferiority feelings during his early life, erected a psychology of the will. John B. Watson, the indifferent schoolboy—whom we shall meet later—threw up his hands at the piddling of introspectionists and made a science based entirely on observed behavior.

Truly, a man's psychology is a reflection of his inner self. For this reason, the biographies of our early mind explorers are vital in our understanding of their contributions, but as science becomes more organized, the importance of the personal history decreases.

In the later chapters, beginning with Cattell, we shall see scientists in an already organized milieu attacking different kinds of problems. The momentum of established psychological science will bear them easily. Their personal characteristics will loom less significant; they will be less conspicuously personalities and more dearly workers.

But let us review the psychological panorama before we resume the trail of the modern mind explorer.

The theater of psychology presents a dramatic performance that unfolds ever so slowly. Our mind explorers are headliners in this theater, stars around whom students and followers cluster, interpreting, improving, and applying their views. All the actors, whether nonentities or satellites, whether they snarl and scoff at or worship each other, are

devoted to their art. They have one passion—the solution of the mystery of mysteries, man's mind. Through the performance runs that leitmotiv which can be traced by us through the major movements of psychologic thought.

The scientific awakening in Europe during the 17th century, and the loosening of the hold of the Church of Rome on philosophy and learning, cleared the way for psychology's growth. Science made the natural philosophers hold, allowing them to hold a *mechanistic* theory of the action of the mind. When Descartes declared the nervous system was a system of reflex actions, his fellow French philosophers could see the logic of regarding man as a physiological machine. Such a view, characteristic of the rationalism of 18th-century France, dispelled the mysticism that surrounded the workings of the human mind. Psychologists were free/then to neglect the "souP as synonymous with mind and to put faith in a part of the body—that is, in the brain as the site of mental activity. When Gall with his craniology appeared, the way was open for locating mental faculties in the various lobes in the brain. Though Gall's speculations were far-fetched, he made it easy to regard the brain and its separate lobes as the seat of mental life. By the time the year 1800 rolled around, the mechanistic theory was firmly entrenched in psychology and the "faculty" psychologists were sure of their ground.

While the French were forging ahead with their anatomical study of brain function, the Germans were examining mental life from a new viewpoint. The orientation of German psychology was dictated by Wolff and Kant, the reigning philosophers of the **18th** century. Psychology in

Germany could not be specific or exact, as it was in France, for philosophy stated clearly that reason was the only measure for obtaining truth and that mental operations could never be measured accurately. Hence the German approach, that the psychic energy of an individual represents the mental life, becomes the true object of psychological study. Herbart, who introduced the "new" psychology in Germany in the early part of the 19th century, showed that ideas were part of this mental life. The mind, according to Herbart, was formed out of mental units or ideas; one related to the next. It was not a matter of separate faculties, such as benevolence, love, hate, philoprogenitiveness; it was a question of so many mental units that go to build up each mental state. Such psychology was not unlike the Associationism of the Scottish and British philosophers who, led by James Mill and Thomas Brown, were developing the notion of *mental associations* as a basis of psychic life. The sum and substance of English psychology in the early i8oo's, and for half a century thereafter, was the Associationist theory. Mill especially could see nothing in the "faculty theory"; to him ideas were the irreducible elements of the mind built up from sensations and perceptions of the outside world and linked to other ideas by their similarity.

During this time, new discoveries in the physics of the central nervous system were changing the scope of psychology. Sir Charles Bell in England, and Magendie in France, studying the action of individual nerves, such as those of vision and hearing, learned much that explained the human mind. Miiller and Helmholtz, working like Trojans, learned the laws of vision in the optic nerves, the lens, and the retina, and put them into mathematical terms. Robert

Young, whose name is linked with that of Helmholtz in the* theory of color vision, shed further light on the mechanics of sight. Soon Weber and Fechner in Germany attacked the question of the perception of touch, measuring the thresholds of touch sensation and the thousand minute problems it raised. Fechner discovered *psychophysics,* and a real scientific psychology was at last in the making.

Now the shift was definitely to the laboratory, away from speculation to proved facts. The middle third of the 19th century was a busy time for physiologists, whose discoveries were illuminating the psychology of sensation and perception, about which the older Associationists had talked with such assurance. But the hope was premature; the physiology of the senses explained much, but it did not explain everything about the human *mind.* Under Wilhelrm Wundt, the dean of German scientists, experimental psychology took a new turn. Ir|stead of vision, touch, or hearing, *mind experience* became the sole subject of the psychologist's study. In the first laboratory exclusively devoted to psychology in Leipzig, Wundt investigated the reaction time of complex mental functions such as volition, attention, sensations, ideas, and feelings with his chronometers, kymographs, and balances. Wundt introduced the method of laboratory analysis of complex mental states, welding the older "mental unit" with the newer "physiological" approaches into what was considered a strictly scientific psychology.

While the Germans were hacking away at "pure science," modifications were proceeding in the old association theory of Mill by those who still dealt with a "mental" psychology. Bain was one of those who rebelled against Associationism as being too stiff and mechanical. The mind as an "acting"

organism became the new rallying cry. This new attitude, which opposed looking at'psychic life as made up of mental "units" one hooked to another like so many links to a chain, was called Empiricism. Ward and Sully led the attack of the anti-Associationists. They brought a new element into the discussion, the notion of the "self" as an experiencing, acting organism. The self was for this new group the center of psychological processes. From "self-psychology" it was but a step to Introspectionism, the examination within oneself of the moving mental activity that makes up our conscious lives. By the latter part of the 19th century, introspection became the heart of systematic psychology, and Associationism was cast out forever. The experimentalists still held a high place in psychology, although under William James the cleavage between the experimental and the introspectionist psychologists became almost complete. Except for inevitable skirmishes, there was a kind of temporary truce established just before the turn of the century between the psychological schools as each continued on its way.

The French say the only thing in this world that is changeless is change itself. To this psychology is no exception. The change that was to swing it away from Introspectionism was the epoch-making discovery of Charles Darwin of the evolution of the human species from lower forms. It was Herbert Spencer, aided by Stanley Hall, who brought the central idea of Darwin's evolution—the idea of adaptation of the organism to the difficulties of its environment—into psychology, making clear the way for Behaviorism, genetic psychology, and even psychoanalysis and present-day comparative cultural psychology. This evolutionary, bio-

logical approach in time changed the complexion of psychological thought. The mind was no longer a static group of sensations, ideas, and perceptions, as the Associationists supposed, but an amorphous mass of function modified constantly through the life of the race and the individual by a changing physical environment. One had to study the mind as a growing thing, not a fixed organ equipped from birth with a set of instincts, sensations, or possibilities for the formation of mental associations.

Twenty years later Watson with his Behaviorism was pressing in the direction in which experiments on animals of the great Pavlov were also pointing. Behaviorism, pushing the older experiments and introspection aside, was the 20th-century product of a 19th-century revolution. The old landmarks of "instincts" and "basic emotions" were slipping; instincts were recognized merely as conditioned reactions that grow with the growing organism in its reaction to its human and inanimate environment. Behaviorism was a way of looking at mental life that had little to do with the famed "consciousness" of man. The mind of man to the Behaviorists was a mass of conditioned reflexes that have become so packed down as to be conveniently called "instinctive." The "mind" was, in the last analysis, an organism like any other that grew as man grew in his million years on earth.

Other schools were breaking off in the melee, each following its own leads. Those who stuck to the mental processes were proceeding by subjecting functions such as memory and attention to an enormous amount of investigation. Ebbinghaus in Germany and Ribot in France performed some remarkable experiments on memory. Others,

such as Kiilpe, who led the Wurzburg school, combated introspection as a method of study of mental processes. He, as well as Woodworth of the functional school in America, stressed the idea that studying the total mental attitude of the individual is the only aspect of psychology worth studying. Close to this idea was that of McDougall the Anglo-American, who emphasized the purposive drive in human beings and drew attention to the psychology of striving. Psychology was leaving the mental-unit idea far behind. The easy formula of the earlier scientists: sensation plus perception, plus concept equals idea: was no longer valid. Its simplicity was disarming and did not do justice to the complexity of the mind. Since the World War, another development which pursued the trend away from Associationism and discouraged the tendency to study part functions of the mind is known as the *Gestalt* school. Originated by three Germans, Wertheimer, Kohler, and Koffka, the Gestaltists have done a tremendous amount of experimental work to prove that the mind operates (that is, perceives or even thinks) in wholes rather than in parts, the word "Gestalt" meaning "figure" or "configuration." This group, whose number is growing constantly, discovered the major principles through subjecting animals such as apes to test situations in a laboratory. How apes solve a problem taught them how the human brain perceives and proceeds to solve a problem. And here we note a new technique of study through the use of animal experimentation. Setting up a maze or a simple puzzle for a white mouse or a chimpanzee to solve under the constant observation of a scientist offered a method which far outstripped in accuracy those of the faculty psychologists or the Introspectionists. In the psy-

chologies of the 20th century, animal experimentation has lifted the laboratory back to its earlier place of eminence.

While the more modern ideas were being developed, a new clinical influence was gradually impinging onto psychology proper. Its background was empirical. Applied to clinical cases of morbid mental conditions directly, this approach dropped all theories of mental life and asked; "What can we learn of mental happenings from the patient?"

With the rise of the French school of clinical neurology, starting with Charcot and his championing of hypnosis, the new approach shed amazing light on the working of the deeper layers of the mind. Charcot, Janet, and Freud, delving into the mechanics of hysteria, came upon the tremendous importance of the unconscious part of our mental activity. A new field, psychopathology, was opened up, attached at first to psychiatry, but gradually coming into relation with the findings of the body of psychological knowledge.

By now the reader is aware that the changing scenes in our theater of psychology are taking on a distinctly psychiatric hue. He has seen how philosophy was slowly unyoked, how psychological theories based on insufficient facts were discarded, how gradually the laboratory came to contribute factual foci around which theories developed. While this evolution was progressing psychiatry was working its way toward psychology. In the last quarter-century the two fields have come closer to each other. With this approach to a merger comes the emphasis on the practical functions of the part of psychology in intelligence-testing, in aptitude- and personality-trait testing, and in education. Meanwhile psychiatry has been moving away from the deeper morbid

conditions to those encountered in daily life. The mental sciences have come down out of their ivory tower, and the group of mind explorers that we shall encounter from this point on will be essentially practical men. We resume our narrative with Cattell, one of the founders of educational psychology in America.

Today not one in a thousand has heard of the name, yet Cattell's original researches have profoundly affected the lives and habits of his fellow Americans. His discoveries, extended by a group of brilliant Cattell-trained men, made over educational theory and practice. One result has been the complete revamping of our methods of teaching children to read.

XI: The Patriarch of Fort Defiance

WHEN James McKeen Cattell decided some threescore years ago to become a psychologist, he planted his plough in virgin soil. James and Hall were still buried in their reading or indulging their taste for living. Professorships in psychology did not exist; the subject was taught by college presidents and clergymen as mental and moral philosophy under the soothing cloak of Protestant orthodoxy. The only academic voice that called loudly for more attention to psychology was that of doughty Dr. James McCosh, president of Princeton University from 1866 to 1888. Under the shield of Scotch Presbyterianism McCosh sheltered the bugbear of the 19th-century churchman, evolution—and its grandchild genetic psychology. What happened before Cattell, the defiant champion of educational progress, appeared the reader already knows.

In 1880, at the age of twenty, James Cattell took his degree at Lafayette College in Bethlehem, Pennsylvania. For the eager Bachelor of Science fascinated by the science of

the mind, the year was pregnant with portents. A few short months ago, Wilhelm Wundt had established the psychological laboratory in Leipzig, Ribot had published in France, Francis Galton had brought out his "psychometric experiments" and William James of Harvard had written the first chapter of his work on psychology. A new world was opened to the eager eyes of young Cattell. As soon as he was freed of the restraints of undergraduate life, he went to Leipzig, the fountainhead of psychology in Europe. He arrived at Wundt's laboratory with a set of psychological problems which had preoccupied him at college. His idea was to *measure* the various human capacities of each person, such as perception, will, judgment of time, distance, color, and a thousand things we commonly accept in daily life. Galton had already shown the way to this psychology of individual differences, a field opposed to general psychology. Cattell's series of astonishing experiments on individual differences contributed directly later to the well-known intelligence test. But before his work went very far, Cattell took Wundt aside. "Professor, you need an assistant . . . and I'll be it." The Professor could do nothing but bow to the direct American spirit of this young foreigner. From Germany, Cattell went to England and became a fellow in Cambridge University. Here he sat at the feet of Francis Galton—"the greatest human being I have ever known"—and married an English lady, Josephine Owens.

Cattell's story is that of a working psychologist. Work was his food, his mental life. His aim and attainment was to be a laboratory psychologist. In 1888 he returned to America and was appointed professor of psychology at the University of Pennsylvania. Within three years Cattell was called

to Columbia University in New York as professor of psychology. During twenty-six years he developed his department into one of the strongest of its kind in America.

In Leipzig, the push started toward quantitative measurements, on which stands Cattell's greatness. He had always been interested in the measurements of individual versus general capacities. He wanted to know how each deviated from the average, or rather the mean. Why talk of "consciousness," of "will" and "cognition," when we have actual subjects to deal with? And so he*went to work devising instruments and methods. Out of this campaign evolved the notion of "reaction time," a vital link in the chain that led to the development of the "mental test." Cattell put the whole problem in simple language: What we want to find is the "time it takes to see and na&ie objects." He devised series of letters and showed them to subjects for short, then for increasing, periods of time. Here he stumbled upon the "range of attention" finding, namely, that one can see more letters when they form a word than when they stand alone. This was soon to be put to use in Cattell's studies on reading. These "mental-measurements" experiments became classic in time as the psychology of mental testing became better developed.

CattelPs great initial discovery was that the average literate person is able to see, recognize, and digest many whole words in less time than it requires him to see a single letter. Cattell asserted and proved that in reading the human eye perceives not individual letters or syllables as such, but a whok word or several words as a unit. This resulted in widespread reform in teaching children to read. In the modern school the child is no longer taught letters

and phonograms so that he may recognize words. From the very beginning he is trained to recognize whole words assembled in meaningful sentences.

The result has been a vast increase in the speed of reading. The average cultured adult is able to read about 250 words a minute. In ordinary conversation we speak about 160 words a minute. Tests have demonstrated that a great many people, even those who read omnivorously, fail to exceed this rate of speech. Dr. Gates, a specialist in reading at Teachers College, Columbia University, points out that this limitation is usually due to the oral reading drill that was formerly used in teaching and which, as a result of the studies initiated by Dr. Cattell, has since been abolished in progressive schools.

At the present time, any child of average intelligence is expected before it reaches the end of the sixth grade to be able to read silently at twice the rate of speaking. What is more important, many adults, despite their long habituation to the old, inadequate methods, can and do greatly increase their speed of reading. In fact they are often able to double it after a few weeks' retraining. As a conservative estimate, it may be said that if every literate American over fifteen years of age who spends two hours or more a day in reading could be given such training for a month, the saving in time required to do the nation's workaday reading if valued at 50 cents an hour would amount to more than $5,000,000,000 a year.

Dr. Cattell brought his ideas into a field that had been taken for granted up to then. For thirty years he advocated the need for revision of the alphabet and punctuation. In a series of exhaustive reading tests he first measured the

legibility of types and letters. *E* was found to be the most illegible of the capitals, *s* of the small letters, and these are the letters most frequently used. They are hard to see because the field is divided into two parts. Other letters are hard to discriminate owing to their similarity, such as *i, I, f,* and t, which we continually mistake for one another.

"Our letters," says Cattell, "have been handed down from the past, like much else in our civilization, and should be adjusted to meet modern conditions. They were developed largely for ease in writing, whereas since the invention of the printing press we are concerned only with the ease in reading. Punctuation marks are hard to see. If in printing spaces were left equal to the pauses in reading and the normal rate of understanding, reading woi^ld be easier, and writing and printing would become more of a fine art. The short lines developed by the newspaper are easier to read than the long lines of books, and it would save fatigue if the lines were not adjusted to make them exactly fill the space, as the moving eye could then more readily follow the text."

To make education fit the child was the aim of Dr. Cattell. He set out to learn the age curve for learning. He discovered, for instance, that a child can learn to pronounce its own or a foreign language best at the age of about three. There is then a drop, and after about twelve he cannot learn correct enunciations.

With these discoveries he attacked the educational system boldly. "Our primary school system," explained Cattell, "consists largely in trying to teach children, with much labor and resulting stupidity on the part of both teacher and pupils, mathematical relations a couple of years before the

organism is ready for it and could respond to them without effort. Then, as this is the easiest subject in which to examine children, they are promoted from grade to grade mainly on performances in arithmetic without regard to individual differences in other kinds of work."

As a direct result of Cattell's trail-blazing explorations, a new branch of educational psychology has been worked out. It is a fascinating field, that of diagnosing and correcting disabilities in reading, and holds much that had been totally unsuspected. As far as anyone knew, a child was taught to read and if he didn't succeed it was due to stupidity or laziness. Everyone read the same way; why bother with a child who can't read? But the modern reading laboratory today uses perhaps half a hundred distinct and separate tests, and its methods of diagnosis are as accurate as any in medicine.

A case of a boy who had been unable to learn to read after spending two and a half years in school came before Professor Gates, one of Cattell's students. The boy's teachers despaired of further progress; they dubbed him a case of "congenital word-blindness," which means a native inaptitude for reading or spelling or both. The subject M was eight and a half when brought to the "reading" laboratory for diagnosis. He was first given a series of standardized tests in reading. These verified what his teachers had reported—that he was incapable of reading with understanding material of the most elementary nature. The next step was the regular Stanford-Binet test designed to indicate the degree of general intelligence and the child's native capacity for mastering school subjects. The intelligence quotient scored was 116, considerably above the average. The

child's inability to read could not be due to feeble-mindedness.

What was to be done next? Dr. Gates turned to an examination of other native capacities that are involved in learning to read, since a deficiency in any one capacity might throw the reading mechanism off balance. For example, defective vision can seriously interfere with the processes of perception required in reading, but the boy did well on tests of visual acuity; his vision was normal. Further tests of his ability to perceive small figures, such as the printed letter or small pictures, showed that his visual perception was above the average in dealing with almost every type of image. The doctors were convinced then that M's difficulty in reading could not be attributed to any constitutional incapacity in discriminating between small visual figures. Next they went to his hearing. Then came a series of searching tests dealing with hearing and auditory discrimination. Here again the lad was normal. Nor was he deficient in memory, or what psychologists term the "memory span" or "immediate memory." Words, numbers, sounds, pictures, and figures were all remembered.

Now his "associative capacities," the ability to connect printed symbols with definite meaning, were tested. It was found, however, that the youngster was painfully slow in working out the recognition and the meaning of many words observed in isolation or out of context. Often he could not bring sense into a passage even when he seemed to recognize some of the words.

The translation of letters into their equivalent sounds, or such phonograms as *re, th, br, ought,* and the like into familiar sounds, was unbelievably difficult for him. There

was a curious condition, a lack of co-ordination between the seeing of letters or words that he recognized and their sound. Often he could not identify the common visual elements; the main difficulty was that his phonetic translation was extremely faulty, and he made numerous misrecognitions of words. *That* to him was *the* or *they,* or sometimes *at* or *her.* A word like *was* would sometimes be reversed and called *saw,* or even *as.* Words like *on* became *in* or *no,* or even *not.*

The child had never mastered the simplest technique of word perception. He had not learned to sweep a word through from the left to the right and to observe the first part of the word first. Sometimes he appeared to see the tail end of the word first and so to study the word in reverse order; again, he seemed to perceive the middle of the word first, then to jump either forward or backward, creating a hopeless jumble.

Before CattelFs day, M would have been doomed to go through life unable to read or write. Now, however, his methods of word perception could be changed and reorganized. He was taught systematically to develop a left-to-right progression across the face of a word, and drilled to recognize the many telling features of word forms. In three months he was reading avidly and well; in a year he was far ahead of his classmates.

If M and tens of thousands of others like him ever accomplish any useful intellectual achievement, Cattell is the man they will have principally to thank. Practically all progressive modern schools maintain a psychologist who diagnoses disabilities in reading, spelling, arithmetic. The problem of the boy who doesn't like to study, although he

is expert with his hands, is reopened. The amazing progress made in this field of educational psychology promises to have vast social and economic implications.

Dr. Cattell was always tremendously interested in industrial and engineering psychology, and improved methods of work with techniques such as the Taylor shop-practice system. His idea was not to speed up production, but to lessen fatigue and put the right man in the right job. Inevitably this increases production, but it also increases health and happiness.

This work has made enormous strides since 1921 when Cattell headed a group of leading psychologists in founding the Psychological Corporation—a semipublic body designed for practical research.

"The human psychological organism," explained Cattell, "has through long ages adjusted itself to the world in which it lives. It was not adapted to the innumerable new demands of modern civilization, though it has proved itself plastic to an extraordinary degree." But he felt it the business of psychology to obtain scientific knowledge for the benefit of both industry and life. A new vista was opening. The British Institute of Psychology had, before Cattell founded the Psychological Corporation, obtained an increased production by 40 per cent through decreased fatigue. "In every field of activity, from the use of pick and shovel, of typewriter and ledger, through the factory and office, to the organization of the work of the Executive or the Congress of the nation, investigations might be made which, if put into effect, would add from *ten* to one hundred per cent to effective productivity and lessen to an equal extent

fatigue and effort." Laboratory psychology not only was becoming practical—it was paying for itself.

Cattell's interests raced on. When he was in Germany, the idea was generating of measuring the mind and the speed of mental reactions. He wanted to ascertain the *reaction* time of different people. The subject was asked to touch an electric key at the sound of a stimulus, an electric buzzer. Reaction time became an important tool of psychological research. Cattell started much of the work in association tests in this country, developing his own apparatus and methods. He instilled zeal and love of work in his students. Among Cattell-trained men are many who have made their name in science: Thorndike and R. S. Woodworth; S. I. Franz, famous for his work*on the localization of cerebral functions; Clark Wissler, the anthropologist; W. F. Dearborn, Harvard's educational psychologist; F. L. Wells, the champion of psychometrics at the Boston Psychopathic Hospital; H. L. Hollingworth, author of many volumes on abnormal psychology; A. T. Poffenberger, and Woodworth, CattelFs chief supporters at Columbia; and several others. Cattell and his students created an irresistible atmosphere for psychologic progress at Columbia University.

Early in this century Cattell became tremendously interested in the problem of "eminent men in science," edited *American Men of Science,* and invented what he called a "method of order of merit," explaining: "It is surely time for scientific men to apply scientific methods to determine the circumstances that promote or hinder advancement of science." He evolved at Columbia a psychology of human capacity that breathed life into practical psychology.

Though his years at Columbia University were distin-

guished by immense scientific productivity, they were marked also by controversies which became causes celebres, and constantly involved Cattell in clashes with President Butler and the trustees. Cattell, even when in a minority of one, has always been outspoken in his views and expressions of opinion. He and Butler entertained a mutual dislike that gradually developed into a first-class academic feud.

In 1910 Cattell boldly attacked the entire Carnegie pension scheme for college professors as subversive of academic freedom; and at once he and Butler locked horns. A resolution to dismiss Cattell was placed before the trustees. It was tabled, but in a few months there was a fresh uproar. In order to force his resignation, Cattell charged President Butler with stripping the psychological laboratory of its six rooms for research, built and equipped"with funds obtained by Cattell.

Three years later Cattell returned to the attack, publishing a book, *University Control,* in which he denounced the type of discipline and power exercised by Wall Street trustees. This time passage of a resolution retiring Cattell was prevented only by official protests from the committees of the three graduate faculties and the division of philosphy, psychology, and anthropology. In the spring of 1917, Cattell, in a letter to the Faculty Club, referred to Dr. Butler as "our much climbing and many talented president." Again the hornets began to buzz, but this furor was as nothing compared to the uproar that greeted a letter addressed by Cattell to members of Congress in support of pending legislation exempting from combatant service in Europe conscripts who objected to war.

War fever was at white heat. In the passion of the times

it was forgotten that Cattell was organizing committees of scientific *men* to serve under the National Research Council; that he was preparing mental tests for use in the army; and that his son McKeen had gone to France with the first group of volunteers in May, 1917.

CattelFs case was brought before the Federal grand jury. His house was raided in the night, without search warrant, by some fifty drunken soldiers. And on October 1, 1917, the Columbia trustees summarily dismissed him from the chair of psychology. The grounds were "treason," "sedition," and "opposition to the enforcement of the laws of the United States."

Even in that overheated period, the battle was far from over. The American Association of University Professors and other scientific bodies leaped to Cattell's defense. He demanded his pension and accrued salary, entered suits for libel against President Butler and the trustees, "who violate the intellectual integrity of university teachers and turn a temple into a house of ill-fame." The man who dictated the direction of American science could also do something with broader issues. As a social feudist he was alert and clear.

Brushing aside the illegality of the trustees' action in refusing him his salary, Cattell pointed to the basic social issues involved. "The men of wealth, society leaders and others of the upper classes who direct our educational corporations have their own codes of morals. They may not understand that for the professor or the investigator the most debasing of evils is to suffer a compulsion to suppress or distort the truth as he sees it. My criticisms of the Carnegie pensions and of university administration by a presidential autocracy subject only to uniformed trustees—which

were the real grounds for my dismissal—were protests against an economic control that leads to the moral and intellectual enslavement of the teacher. . . . President Butler once wrote in the *Educational Review:* 'Professor Cattell is one of the few men of science now living who can write so as to be easily understood.' I have here written as clearly as I can, but you will not fully understand my meaning. You control the lives of University teachers, but your world of Wall Street and Fifth Avenue is remote from their ways."

This reasoning was unavailing; his invectives fell on deaf ears, and when he accused the trustees of their Wall Street influence, he was accounted an annoying radical.

Finally, after almost five years of unremitting warfare, Dr. Cattell received the pension allowance for which he had fought. Meanwhile, he had been elected president of the American Association for the Advancement of Science, and in 1921 he founded the Psychological Corporation, becoming its first president. This is a stock corporation with branches in different states, all of the stock being held by some one hundred and seventy psychologists of high standing. Profits must be used to promote psychological research. The income of the corporation is derived from the sale of its services: special investigations, individual tests, advice on personnel problems, and so on.

As America's recognized senior psychologist, Cattell in 1929 was elected president of the Ninth International Congress of Psychology, the first to be held in this country. In his address he discussed the future of his chosen science. In the sixty years since America took up psychology seriously, much had been accomplished. What made the remarkable

academic advance of psychology from 1883 to 1900 possible was the growth of our universities with the adoption of the elective system permitting the introduction of a new science. "Our people," remarked Cattell, "had curiosity, acquisitiveness and energy with ever-increasing wealth. We were able to take over what we wanted from abroad; we were not bound by precedent and tradition. The psychologist has some reason to thank God when he is born a happy and irresponsible American child."

Cattell himself has expended, and still expends, his enormous physical and mental energy in a wide range. Approaching eighty, he lives an hour's climb (for a good walker) out of Garrison-on-Hudson. His home of stone and sturdy timbers is self-designed, and when it was building, he was the busiest workman on the place. The house is called Fort Defiance after the hill which it crests. Here Cattell and his equally agile intellectual wife reared their seven children. In his defense of his lifelong defiance of conventional limitations, and his overenthusiasm, Cattell observed dryly: "Even our swarms of cranks in the air above and our shoals of charlatans in the waters beneath may be found to have contributed their bit, when natural selection and survival of the fit are given ample time."

But psychology must be practical. It must deal with daily life, measure it, and control it. CattelPs dream was to bring the systematized knowledge of psychology to bear upon the control of human nature. "If each man," he went on, "were given the work he is most competent to do and were prepared for this work in the best way, the work of the world all the way from the highest manifestations of genius to the humblest daily labor would be more than doubled. I see no

reason why the application of systematized knowledge to the control of human nature may not in the course of the present century accomplish results commensurate with the nineteenth century applications of physical science to the material world.'[1] For in the last analysis every social institution whether it be educational, church, court, or government, is an example of applied psychology.

XII: The Measurement of Intelligence

WHEN the new psychology came in, the old pedagogy went out. Hammering the three R's into childish minds in the time-honored way was no longer justifiable in the face of discoveries made by Hall and Cattell. Every parent knew that children varied in their capacity to learn, that there were sharp lads, dull-witted Jacks, and bright-eyed Janes. But that was not enough for psychologists; they had to know more accurately to what degree Jack differed from Jane. When Alfred Binet, one of Charcot's brilliant students, was requested in 1904 by the Minister of Public Instruction of Paris to teach them how to separate normal from subnormal school children, he could find nothing in the tomes on psychology or psychiatry to help him. It was not even definitely established whether the problem of mental subnormality was one for the physician, the psychologist, or the teacher to decide. Little had been done since Itard's day about the question of diagnosis of mental deficiency. Pinel's dictum had been that the differentiating sign

between idiocy and imbecility was this: The idiot's "attention is fugitive, while the imbecile's attention is fleeting." Of course, there were Francis Galton's tests of mental and physical capacity gathered in the Anthropometric Laboratory some forty years before, but they were not adapted to children. Dr. Binet himself, in the days when he was an amateur in psychology, had made careful measurements of his two daughters' mentality, of their habits, growth of language, and their ability to discriminate between an angle of from 40^0 to 43^0.

For practical purposes, measuring the intelligence of children was a virgin field for Binet and his confrere Simon. Their first job was to grade the questions they asked of school children in order of difficulty. Then the test questions were checked against a hundred peasant and shop-folk subjects to find what an average group of adults would answer to such graded questions. After innumerable tedious trials a satisfactory series of questions was worked out and standardized against various groups of normal individuals. The Binet-Simon test became an instant success—in schools where the grading of subnormal children was desired. In 1908 Henry Goddard, then in charge of the Research Laboratory at the Institution for Backward Children at Vineland, New Jersey, the man who applied the term "moron" to the higher type of feeble-minded, brought the Binet-Simon test to America. The test for grades of intelligence looked so simple that his colleagues were against its use; prolonged opposition threatened. As a method of grading mental defectives the test far outstripped the old "guess" technique, which depended for diagnosis of feeblemindedness on the "look" of the child. As usual, there were

idie-hards who called the intelligence test "arbitrary and inconclusive." As late as 1916 Judge Goff of the Supreme Court in New York had harsh things to say of those who meddle with measurement of the human mind. In the case of a wayward minor, one Esther Meyer, whom psychologists had diagnosed as a moron, the jurist, as quoted by the *New York Herald* of July 19, 1916, stated: "It is acknowledged that the girl was not insane, and not burdened with any mental malady. . . . The question involved rests upon the assertion that she is feeble-minded. . . . Standardizing the mind is as futile as standardizing electricity and the votaries of science and pseudo-science in their enthusiasm are liable to confound theory and hypothesis."

Scientists who agreed with Dickens' Mr. Bumble that "the law is an ass" continued to perfect their tests. The man with whom we are concerned in this story, who adapted the intelligence test to American children and adults, was Lewis Terman, now professor of psychology at Leland Stanford University, California.

Lewis Madison Terman, born a Hoosier farm boy, showed his interest in child intelligence early. The school friends he chose were case studies, difficult enough to challenge the adult Terman at his best. One was a feeble-minded boy still in his first reader at the age of eighteen; another was a crippled lad given to fits of temper and stealing; a boy who was a "lightning calculator," and a playmate who started his career as a magnificent liar and ended it as a swindler and multimurdercr made up his intimate group. Terman as a youth of fifteen entered the Central Normal College in Danville, Indiana, to prepare for teaching; intelligence testing was probably still an ungerminated seed

in his mind: Central Normal was one of the numerous schools that sprang up in the Middle West in the 1870's and i88o's in answer to the section's passionate yearning for "higher" education, and which in a few ten-week terms transformed raw country youths into "graduated" teachers. It was a homespun environment, but it centered Terman's thoughts on the psychological aspects of education. Up to the time he left Central Normal in 1898, he had never heard of Binet or Cattell and barely recognized the names of Galton, Wundt, and G. Stanley Hall. "Child study" was just beginning to be recognized, but the Danville professors spoke of it as something in the misty future.

At twenty-one, weighted down with three degrees that meant little beyond the orbit of local school boards, Lewis Terman left Central Normal and became principal of a township high school in his home county. He married, and in less than a year their first baby was born, "And now, truly," Terman said, "I was introduced to the child-study movement!" By now his ambition had crystallized into an ambition to teach psychology or pedagogy. A degree from a standard university was essential— an A.B., possibly an M.A., or (vague dream) a Ph.D. degree. The Termans sat down with paper and pencil and figured that for $1,200 he could support his family and take a two-year graduate course in Indiana University. They borrowed the money and moved to Bloomington, seat of Indiana University, fifty miles away.

Those two years at Indiana were crowded. In two years, including summer grinding, Terman managed to collect three and one-half years of credit, to win his degrees, and to determine upon practical psychology as his lifework.

In the first year at Indiana University another baby had

come, and by the end of the second year the borrowed $1,200 had quite evaporated. The young scholar was looking around for a job when, quite unexpectedly, there came an offer of a fellowship from Clark University in faraway Worcester, Massachusetts. Clark, under Stanley Hall, was the Mecca for aspiring young psychologists. Terman hesitated. His wife urged him to explain the situation to his father and older brother. He did, and they offered to back him to the extent of another $1,200. Terman did not tell his family that doctors had warned him of a tendency to tuberculosis.

The fall of 1903 found the Terman family ensconced in modest rooms in Worcester. President Stanley Hall as a man entranced Terman, but Hall as a scientist evoked reservations in his mind. The atmosphere at Clark, the informality, the freedom from academic red tape, permeated every fiber of his being. There were no hampering rules and regulations; it was a scholar's paradise. A fellow registered merely by giving his name to Hall's secretary, selecting what courses he willed. Hall and his staff were there to guide students, not to regiment them. To a person of Terman's temperament, Clark University was like sun to a flower bed.

HalFs Monday-evening seminars, which the reader has encountered before, were unique. Each week two students reported on work that had occupied most of their time for several months, reading from carefully prepared manuscripts. Hall would first comment generously upon the paper, then express a shade of doubt as to some of the conclusions drawn, and finally call for "reactions." This was the signal for the deluge. Some among the company, postgraduate stu-

dents of education, philosophy, or psychology, would question a fundamental proposition, and then the dogs would growl and bark at the youthful scientist.

"I always went home dazed and intoxicated," recalled Terman, "laying awake for hours rehearsing the drama and formulating the clever things I should have said and did not. If there is any pedagogical device better adapted to put a man on his mettle than a seminar thus conducted, I do not know what it is. To know that his contribution would be subjected to merciless criticism from every angle was enough to arouse even a naturally indolent person to Herculean effort."

Terman, like other critical students, rejected President Hall's questionnaire method as being, too loose. He searched for more solid footing in studying the mental life of gifted and defective children. This led to minute examination of practically everything that had appeared upon the subject of mental tests and their methods. This subject he determined to adopt for his thesis for the doctorate. "I wanted to find out," he explained, "what types *of* mental processes are involved in the thing we are accustomed to call intelligence. I thereupon selected two groups of subjects of nearly the same age, a "bright" group and a "dull" group, and proceeded to look for tests that would bring out differences in their performances." He did not then realize the extent to which this was dependent upon the intellectual level of the subjects.

While working on this thesis, Terman suffered a pulmonary hemorrhage, his third warning. He rested a week or two and went back to work, but the doctors warned him that a congenial climate was essential. Some $2,500 in debt, a

Doctor of Philosophy, Terman left Clark University in search of a position in a warm, mild climate. The principalship of a high school at San Bernardino, California, seemed to fill his requirements. A year at San Bernardino, with gradually increasing health and strength, was followed by an offer from the Los Angeles State Normal School of the professorship of child study and pedagogy. The drive toward research was still active, but had to be curtailed. "I tried to forget that I was ever interested in research," Terman says of this period when *he* devoted himself to the pursuit of health. But the work of Binet and of Henry Goddard, who was using the Binet scale with the feeble-minded at the Vineland School in New Jersey, reached his ears. He was urged to start some work at once with the Binet 1908 scale for measuring intelligence. A classmate, E. B. Huey, recommended Terman for the newly created professorship of educational psychology in the Department of Education at Stanford University. Terman was stronger, and eager for active experimental experience. Stanford called and Terman accepted. With a light teaching schedule, he plunged at once into an experimental study of the Binet tests, a study that led six years later to his famous Stanford Revision and the publication of his first major book, *The Measurement of Intelligence.*

After exhaustive experiments, involving 250,000 California school children, Terman drew up a list of some ninety tests, arranged at age levels ranging from three to fourteen, many divided into bimonthly periods, together with two higher levels, called "average" and "superior" adult. These tests were given orally by trained examiners, beginning at a point well within the child's ability and pro-

ceeding to an age level where all the tests are failed. The clarity of the picture of the child's mental capacities obtained with these tests is startling. The intellectual development of the child is contrasted with his chronological age to ascertain whether the child is developed mentally for its age. This is called the *intelligence quotient,* or more popularly, I.Q. The I.Q. of the average child, based upon tens of thousands of tests, is set down as ioo. If an eight-year-old child is able to pass tests designed for ten-year-olds, then his I.Q. is 10/8, or 125. If the eight-year-old can pass only tests designed for six-year-olds, then his I.Q. is 6/8, or 75. For example:

At age three, a child is asked to name familiar objects. The examiner shows the child a key and asks: "What is this?" and similarly with a penny, a closed knife, a watch, a pencil. If three responses are correct, the test is passed.

At age jour, the examiner asks the child questions involving comprehension, (a) What must you do when you are sleepy? (b) What ought you to do when you are cold? (c) What ought you to do when you are hungry? Two correct responses are required for a passing mark.

At age jive, two weights, of 3 and 15 grams, are placed before the child two or three inches apart. The examiner says: "You see these blocks. They look just alike, but one of them is heavy and one is light. Try them and tell me which one is heavier." Three trials with the position of the blocks changed are given. Credit is allowed if two of the three comparisons are correct.

At age six, a standard card is shown with faces having parts omitted. The examiner says: "There is something wrong with this face. It is not all there. Part of it is left

out. Look carefully and tell me what part of the face is not there." Credit is allowed if three out of four answers are correct

At age eight, the examiner says: "I am going to name two things which are alike in some way and I want you to tell me how they are alike. Wood and coal, in what way are they alike? In what way are an apple and a peach alike? In what way are iron and silver alike? In what way are a ship and an automobile alike?" Credit is given if two out of four answers are correct.

At age ten, the test is naming sixty words. The examiner says: "Now I want to see how many different words you can name in three minutes. When I say ready you must begin and name the words as fast as you can and I will count them. Do you understand? Be sure to do your very best and remember that just any words will do, like 'clouds/ 'dog,' 'chair,' 'happy'; ready; go ahead!" If sixty individual words are given within the time limit, the test is passed.

At age twelve; the test is of dissected sentences. The examiner points to three groups of words such as: TO ASKED PAPER MY TEACHER CORRECT I MY, and says, "Here is a sentence that has the words all mixed up, so that they don't make any sense. If the words were changed around in the right order they would make a good sentence. Look carefully and see if you can tell me how the sentence ought to read." Credit is given if two out of three answers are correct, with a time limit of one minute for each sentence.

In prosaic type,[1] these exercises seem simple. Yet they, and the other tests in the Revised Stanford-Binet, represent tens of thousands of hours of devoted labor by Terman and

his associates, and were strained from files and reports containing millions upon millions of words.

Terman was surprised and pleased by the favorable reception of his publications in the testing field. He felt that his revision of the Binet-Simon tests was superior to any then available, but foresaw neither its surprising vogue nor the fact that it was to become a standard and an enduring classic. Because of the scornful attitude of old-line psychologists, Terman had no idea that mental tests would gain acceptance nearly so quickly as they did.

Then came the war, a new world of experience with opportunities to know and work with the leading psychologists of America. Terman served on the committee that devised the army mental tests, first as Director of Research and as a member of the Committee on Classification of Personnel and later as historical collaborator with Robert M. Yerkes, Edwin G. Boring, and others. More firmly convinced than ever of the value of mental tests, Terman returned to Stanford and devoted much of his time to devising new tests, including the Terman Group Test of Mental Ability and the Stanford Achievement Tests.

Finally, through a liberal grant from the Commonwealth Fund, came a long wished-for opportunity to undertake a major research with gifted children. The result was the publication, at intervals from 1924 to 1930, of three fascinating volumes: *Genetic Studies of Genius.* These marked an epochal advance in the mental-test movement. Terman went into the public schools of the larger California cities on a hunt for one thousand exceptionally gifted children whose I.Q.'s measured 140 or above. In a few weeks the experimental groups were selected. The "main group/' ranging in

age from six to thirteen, was made up of 352 boys and 291 girls. There were 309 in the high-school group, 200 boys and 109 girls. A third group comprised 26 children selected for special talent in art, music, and the like. In all, the Terman psychological microscope was focused upon 978 gifted children.

These children were analyzed thoroughly. Following the intelligence tests, there were tests of the desire for work, mechanical skill, love of pets, knowledge of games, wish for a life vocation, and so on, and to all this were added twenty-four pages of detailed material about them from their teachers and parents. Sifting the thousands of facts brought him, Terman reached the following conclusions: A gifted child is about equal to the ordinary child physically, but is much superior in character development, has an insatiable capacity for acquiring knowledge, and,' in general, a great love of nature and of the arts. Moreover, he has a preponderance of famous people among his kin and a large percentage of professional members of his immediate family.

Professor Terman's idea was to follow up these superior children to see whether the promise they gave early in life was realized. This he did six years later in a volume called *The Promise of Youth: Follow-up Studies of Thousands of Gifted Children.* Re-examination six years later showed that these children were above the average intellectually and superior physically. Many had entered or were entering college; some had even attained first rank in the arts. Terman looked forward to the time when exceptional children will get exceptional training. He would attach a "psychological Boswell" to every living genius to collect data concerning

the great man's childhood, so that science can "evaluate the influences of nature and nurture that have entered to make him become what he has become." Terman explains:

"A meteor strikes the earth, a comet approaches our planetary system. We go to great pains to solve the mystery. Yet infinitely more important to mankind are the human meteors and comets: the Aristotles, da Vincis, Shakespeares, Newtons, Goethes, Beethovens, Einsteins. Let us find out, if possible, how such golden eggs are laid and nurtured." From this Terman moved on to another field, one that is just on the verge of being developed, the field of personality testing. Galton's plans to educate the race according to their capabilities and fitness are being realized more and more. Recently Terman and Catharine Cox Miles published together a study called *Sex and Personality* which reviews the whole problem of what constitutes masculine traits and feminine traits. It is not only mental capacity that is important to life success, but personality traits also. Even now, at the time of this writing, vocational-guidance bureaus are developing, court clinics are studying personality traits, and practicing psychiatrists are treating more and more individuals with so-called character neuroses: the socially unassimilable type, the excitable, the distrustful, the peculiar —people with a thousand and one quirks that never amount to mental disease but make social relationships difficult. These are ambitious undertakings, but psychiatry and psychology are very rapidly getting into a position where they can take them on.

A knowledge of the child's aptitude for music before it is pushed into a musical education is of vital importance. Information as to whether a student will be wasting his time

Mind Explorers

Henri Fabre, the French naturalist who developed the science of insect psychology, magnifying glass in hand, devoted years to following the fortunes of ants. Animal psychology has become a respectable branch of experimental science today; it brings a new viewpoint to scientists when they look up from their labors to see a blank wall blocking further progress. Hail to the *men* in white coats I May their tribe increase!

America has taken to this branch of psychology eagerly. A foreign visitor once said: "American psychology has two symbols—the white rat and the I.Q."

Of the group of animal experimenters in America, Robert Mearns Yerkes stands in the foreground. For forty patient years, he and his wife, Ada Watterson Yerkes, have devoted themselves to the study of the inner mental life of the gorilla, the orangutan, the chimpanzee, and the anthropoid apes, the form of life which structurally most closely resembles man. From these manlike creatures Yerkes and his associates have constructed a fascinating picture of genetic and mental development. He has observed and traced the development of his apes from womb to tomb: their emotional traits and expression; their mode of life, social, familial; parental relations; and the operations of their minds and bodies. His findings demonstrate clearly that these animals have individuality, personality, understanding, and just as fine a sense of social organization as man or that politically aware insect, the ant. Yet there are significant differences between man and ape, differences that exalt and dignify human existence. "As our knowledge and understanding of anthropoid life increases," Yerkes writes, "so also does our thankfulness that we are man."

The primate ape, when it wishes,' is capable of intelligent co-operation with man. Security, comradeship, natural decency, willingness to live and let live, are present. The primate, though it doesn't speak, has a soul. Its gesture of conciliation toward a stranger is to extend its wrist limp or to place its hand in the other's mouth, with palm open. Its distinct sense of gratitude is evident when it pats an experimenter on the shoulder gently and affectionately in return for a service. In its natural state the gorilla, the chimpanzee, or the orangutan is neither vicious nor malicious; in fact, to the Yerkeses the ape possesses "kinds and degrees of behaviorial adaptiveness" known to no other type of organism except man.

The man who studied our simian cousins and learned about people from them was born on a Pennsylvania farm, the cradle of America's great. Robert Yerkes's psychological life began when, stricken by scarlet fever, his life was saved by Dr. John Beans Carrell, a cousin. The long, hard battle for life changed Yerkes's disposition "for the better" and turned his mind toward medicine. The road seemed closed until an uncle, a homeopathic physician in Collegeville, Pennsylvania, the site of Ursinus College, offered the lad an opportunity to work his way through college.

Yerkes graduated from Ursinus College in June, 1897. His mind was a tree with two main branches, one a desire to devote his life to practical, useful work as a physician, the other an equally strong pull toward constructive work in the biological sciences. Chance decided for him. It took the form of a $1,000 loan for graduate work in biology, psychology, and philosophy at Harvard University. For a young fellow of Yerkes's disposition Cambridge, in the fall

of 1897, was a fascinating center. He met the great Josiah Royce and fell in love with him intellectually. Exit medicine, enter philosophy. On the way he stumbled over a new educational stone,' "comparative psychology," and straightway he was granted the doctorate in psychology and offered an instructorship in comparative psychology at Harvard at a salary of $1,000 a year, with half-time for research.

"Can you afford to accept it, Yerkes?" asked Professor Hugo Miinsterberg. "No, sir," replied the young man from Pennsylvania. "But I shall."

Early in these years a vision came to Yerkes for the establishment of an institute of comparative psychobiology in which varied problems of life could be studied through the employment of all natural sciences. President Eliot had approved the plan, but retired before the idea could be developed. The new administration bluntly informed Yerkes that if he wished to point himself toward the precious goal of a Harvard professorship, he had best go in for educational psychology. Yerkes never became a Harvard professor, but thirty years later, at Yale, he did get his institute of comparative psychobiology.

The years between 1902 and the World War were crowded with travel, study, and work. To supplement his slender collegiate income, Yerkes lectured and taught in Radcliffe College, Harvard Summer School, and the University Extension Department in Boston. As psychologist of the Psychopathic Department of the Boston State Hospital Yerkes was brought back close to medicine. He was selected for this position by Ernest E. Southard, professor of neuropathology in the Harvard Medical School and director of the Boston Psychopathic Hospital.

Practical psychopathology so interested **Yerkes** that **for five** years he devoted half of his time to it. He learned much **of** the needs of psychiatry for improved techniques of psychobiological examination and measurement. He learned much also from dancing mice, reptiles, fish, worms, and savage rats (for a brief period). But in 1916 Yerkes was against one of those experimental blank walls that psychobiologists often meet. He concluded that the story of man and mind could best be spelled out by close and exhaustive investigation of the great apes.

This was the state of things when the war drum beat in April, 1917. Newly elected the president of the American Psychological Association, Yerkes called together, informally, a group of experimental psychologists and suggested that they offer their services to the Government. The result was the most comprehensive experiment in human engineering in the history of the world.

Heading a special committee of five, working under the Medical Department of the United States Army, Yerkes and his fellows devised intelligence tests which in two years, 1917-18, were given to some 1,7,50,000 men. More than a half-million of these were illiterate, and were given a special examination. Of the 1,750,000, some 8,000 were recommended for discharge because of defective intelligence; 10,000 were transferred to labor battalions or some other army service where low-grade ability could be usefully employed; an equal number were placed in special battalions for observation and further training.

These intelligence tests became widely known as the Army Alpha and Beta Intelligence Examination. Yerkes and his committee were not consciously engaged in "stunt-

ing" or puzzle-making. On the contrary, they were seeking a cross section of young America's intellectual level. The Alpha test was given to literates, the Army Beta to illiterates. The Alpha was based upon their ability to (i) follow directions; (2) solve arithmetical problems; (3) display practical judgment; (4) supply synonym-antonym; (5) properly arrange disarranged sentences; (6) complete number series; (7) demonstrate familiarity with analogies; and (8) general information. A few items from the Alpha test will show its scope:

Under (2), arithmetical problems: "If it takes six men three days to dig a 180-foot drain, how many will dig it in half a day?"

Under (3), practical judgment: "Why is wheat better for food than corn? Because:

It is more nutritious.
It is more expensive.
It can be ground better.

(5), properly arranging disarranged sentences: "Ninety canal ago built Panama years was the." "Employ debaters irony never."

(8), general information: "The dictaphone is a kind of typewriter, multigraph, phonograph, adding machine." "Mauve is the name of a drink, color, fabric, food."

Soon critics declared these tests to be foolish and nonindicative of the mental level of the average adult American male. It was widely published during and after the World War that the mental age of the average American soldier was about fourteen. A nation of children! The intelligentsia noted this and rejoiced from their lofty positions. Mencken invented the phrase "boobus Americanus."

Terman, as we have seen, set the age for *maturity* of intelligence, through his revised Stanford-Binet scale, at sixteen. This "maturity of intelligence" age, whether placed

at sixteen or fifteen or fourteen (as it was later), fails to account for experience, specialized training, and facility at adult occupations. There were men who couldn't score D minus on the Army Alpha Test, who yet could perform tasks of manual and mechanical ability far beyond the reach of the learned gentlemen who were testing their intellectual level." These pointc were discussed frankly and impartially by Yerkes and his associate C. S. Yoakum in their manual *Army Mental Tests.* The problems raised were so knotty that Yerkes when discharged from the army soon after the Armistice decided to continue on in Washington as chairman of one of the divisions of the National Research Council. In addition to rounding out his war work and editing a tremendous volume on psychological tests of the drafted army, he wished to push on with his pet project.

He was convinced that for certain general problems the great apes promised to be supremely serviceable. His dream recurred with increasing vividness when the war clouds vanished. By the spring of 1924, Yale .University, under President James R. Angell, got around to seeing the magnitude of Yerkes's project to study all human mental activities through the apes. He was offered a professorship in the Institute of Psychology of Yale University. Yale offered a five-year contract and freedom for Yerkes to devote himself to comparative psychobiology and scientific study of the great apes. He left Washington and headed for Havana.

In the Cuban capital there was a large colony of primates, assembled by a remarkable woman, Senora Rosalia Abreu, with the co-operation of the Carnegie Institution of Washington. Both welcomed Yerkes, and that hot, sultry summer he spent in intensive preliminary researches with

the anthropoid beasts. In the fall the Yerkes family took a house in New Haven. There began the pathfinding experiments with the higher primates—gorilla, orangutan, and chimpanzee—which have filled many volumes and brochures. Their major study of anthropoid life, *The Great Apes,* (Yale University Press, 1929), is affectionately inscribed by Dr. and Mrs. Yerkes to their children: "With faith in their ability to carry forward the work which for a season was committed to us."

Dr. and Mrs. Yerkes and their associates were fortunate in winning the backing of the Carnegie Institution of Washington, the Rockefeller Foundation, the Laura Spellman Rockefeller Memorial and, above all, former President James R. Angell and his fellow Yale University trustees. He had constructive assistance from scientific colleagues in all parts of the world. The Yale-Yerkes special laboratories of primate biology are located in New Haven. They also maintain a subtropical anthropoid station near Jacksonville, Florida, where subjects.are bred and observed. Constant correspondence is being carried on with zoologists and scientists who are observing gorilla, chimpanzee, and so on in Africa and elsewhere. Working as a team, the four Yerkeses—mother, father, daughter, son—have pressed constantly forward and have amassed an immense mass of material which will require digestion and elaboration by their successors for many years to come. What Professor Yerkes hopes to solve he has described as an assemblage of problems which include "psychobiological, physiological, psychopathological, anthropological and sociological" ones.

In their use of a group of young chimpanzees for biological inquiry, the experimenters assumed from what was

then known that restraint would be essential. They therefore designed reaction and observation chambers, experiment cages, restraint chairs, standard observation grilles, hoods, and leashes. These devices produced an unexpected and interesting commentary on the psychobiological traits of their animals. It was at once discovered that any form of compulsion tended to lessen the reliability of responses. Harold C. Bingham, one of the workers, finally succeeded in training four chimpanzee subjects to submit willingly to instrumental measurements. But this success was achieved at a cost of time and patience which would ordinarily have been prohibitive. The experimenters became convinced of the truth of the old adage "The more haste, the less speed." Patience was indeed a virtue devoutly to be wished for in dealing with apes. As their experience accumulated, they discovered one fact; namely, that the chimp's adaptation would be furthered if mutual relations improved between experimenter and subject. Gradually their faith in the necessity for restraint and coercion weakened.

For a study of auditory acuity, James H. Elder, in the then current traditions of the laboratories, attempted to place his subjects in a specially constructed restraint chair. The animals objected strenuously,' and their adaptation to this apparatus was so slow and uncertain that the experimenter finally decided to try treating them as he would human subjects, seating them in a chair before the response key, placing the stimulus-delivering earphones on the head, and proceeding with the routine of experimentation. Success was almost immediate, and the restraint chair was never again used in the investigation. This experiment taught the investigators a lesson in social co-operation.

After Yerkes and his helpers had learned to co-operate with their anthropoid subjects, the sailing was smoother. The chimps submitted to time-reaction measurements, to finding their way out of mazes, and so on. Even adult chimpanzees who could tear a man to pieces have been trained to what Yerkes terms "desired forms of behavior." Several of the adult female chimps have even permitted, without demur, vaginal examination. With a bit of coaxing, the chimps have permitted anesthetization by rectal and hypodermic injection. In his latest publications, Yerkes asserts that security, confidence, and understanding are essential psychobiological conditions of the chimpanzees' co-operation with man. The observations on the emotional development parallel closely those on the childhood of the human infant.

Although timidity was natural in the infant chimpanzee, caution and specific fears (avoidances) appeared in general to be parent-taught. At birth the infant, strictly speaking, trusts either nothing or everything. After a time it comes to rely on the mother, and gradually its sense of security comes to include other sections of the environment. It is not a matter of first relying confidently on everything and of gradually learning to distinguish the harmful from the beneficial. Instead, trusts and fears are acquired day by day through social tradition as represented in the parents and through other forms of individual experience. The more discriminatingly and whole-heartedly an individual comes finally to trust its environment, and especially the social segments thereof, the more freely and efficiently it acts.

During life's first weeks, dependence upon the mother, Yerkes reports, is complete. But, by patient handling, this dependence may be shifted to the human caretaker or experimenter. At first the Yale experimenters mistook the whining and screaming of the juvenile subjects, as well as

the snarling hostility of adult chimpanzees, for perversity. Gradually they grew to realize that these exhibitions were merely indications of fear or timidity. "It required long experience, " said Yerkes, "to convince us that the difficulty was in us, not in our subjects." Yerkes learned a lot about human nature through his laboratory animals. "I have had," he wrote, "a sick and miserable little chimpanzee pat me on the shoulder gently in return for the kindness of considerate handling. . . . Difficult though it may be to believe, strong antagonisms towards man appear to be less frequent in chimpanzees than are correspondingly strong attachments, and neither disciplinary nor coercive measures necessarily lessen, friendliness. As evidence it may be reported that vindictiveness and retaliatory behavior have rarely been noted in the scores of instances in which a stream of water, a burning torch, a live snake or tortoise, or pistol fire have been used to induce a refractory animal to conform to the will of its caretaker or observer. There are individuals of extraordinarily strong will among apes as among men, and negativism is occasionally observed. Mischievousness also is commonly exhibited, and it is perfectly natural that the inexperienced person should at times mistake it for wilfulness or negativeness. Maliciousness and viciousness are almost unknown to us in our captive specimens."

Yerkes lists some of the vital questions of our social life which he says the great apes should be asked to help us answer:

How shall we increase unselfishness and co-operativeness throughout the development period of life? What is the basic psychological relation of selfishness *to* co-operation? Is our assumption that they are antithetical correct? Is un-

selfishness essential to social-mindedness? How can we best measure the social value of the essential motivating complex toward unselfishness? How can we maintain it at the optimum?

Politicians and social leaders plead for saner and more peaceful relationships, but how are they to be achieved? What forces in human nature should we work with? Yerkes thinks that before we can plead for a change in human nature we shall have to learn by patient objective inquiry vastly more than we know^now of the facts and conditions controlling animal behavior. "Surely," he writes, looking into the future, "it is not extravagant to prophesy that there will presently be written, with the mute assistance of this ape, a chapter in experimental sociology of surpassing human value."

In the fall of 1897, [a] future animal experimenter, then an imperturbable young man of twenty-three, stepped from a train in New York City carrying a basket containing a rooster and a hen. A casual observer, peeking into the hamper, might have thought him a country boy bringing a bit of the farm to his urban cousins. But this was not the case. For months the youth had educated, trained, and observed these chicks, and now they were intimately related to his own personal fortunes and to his immediate future. In fact, he intended enrolling them in college and inducing them to found a noble dynasty of superchicks. With easy dignity the young man settled himself and his feathered friends in a hansom and instructed the cabby to drive carefully to Columbia University. While this sedate journey is proceeding, let us quickly sketch in his background.

The traveler was Edward Lee Thorndike of Williamsburg, Massachusetts, honor man at Wesleyan University and Harvard, class of '96. Thorndike had been a generally good student with no particular predilections until his junior year at Wesleyan, when he was required to take a course in psychology, a word of which he had hardly heard previously. The subject as taught from the stolid formal textbooks of the period left him as it found him, a student without any particular predilections. Then he entered a prize essay competition which prescribed the reading of certain chapters from William James's newly issued *The Principles of Psychology.* He bought the books and devoured them. The two volumes set off a spark; Thorndike could think of nothing but psychology. In their beautiful, smooth prose and provocative ideas there was no hint of the frail Professor James's gnashing years of torture to fulfill a contract with a publishing firm. *The Principles* turned Thorndike toward psychology, William James, and Harvard.

Fellows in psychology usually start their apprenticeship by experimenting. Thorndike's notion was to attempt to measure the responsiveness of young children—from three to six—to unconscious facial expressions or movements of adults in their environment. In order to rule out the effect of the parents he chose the children in an orphanage for his subjects. Sitting opposite a child and mentally concentrating upon a letter or an object in the room, he would ask the child to guess what letter or object was in the experimenter's mind, and if the guess was correct, the subject would be rewarded with a piece of candy. The children loved the game, but the authorities thought the excitement too

any available way out. Then, quite by chance, it ran to the extreme right of the pen and found the broad, open highway to freedom. Bliss! But not for long. Again and again the rude hand of man enveloped the chick and returned it to its prison. Again and again it peeped and ran about aimlessly. Finally, after dozens upon dozens of trials, the chick learned the trick and very quietly walked to the proper exit and made its escape. Thorndike's experiments on fish, cats, dogs, and monkeys were equally compelling. Cattell, recognizing the possibility that Thorndike's experiments would shed light on important questions about the learning process, provided funds and laboratory equipment.

The young scientist swung into his stride. He chose every kind of creature in his attempt to learn how animals learn. His fish experiments were interesting. Thorndike kept his minnows in a small aquarium. Shunning sunlight, the fish were fed and permitted to remain most of the time in a shaded side of the pool. Gradually they were forced from the shady to the sunny side of the pool by means of a glass slide covering retreat. A second glass slide, containing openings sufficiently large for the fish to swim through and regain its coveted position in the shadow, was placed between sunlight and shade. The fish repeated, almost mathematically, the efforts of the chicks to escape from their prison. Over and over again one battered itself against its glass partition; finally it discovered the opening, and ultimately learned the trick of finding the way out. Simple as this experiment seems, Thorndike *had* demonstrated for the first time that vertebrates, though low in the evolutionary scale, can learn, in the sense that they develop "simple connecting-forming mental processes."

For cats, Thorndike designed puzzle boxes of varying difficulty for purposes of escape. The simple mechanisms provided merely that the cat pull a string, push a button, depress a lever, or pull a wire loop. The more difficult mechanisms required the animal, in order to escape and reach food, to perform two or more separate acts. At first the cat clawed, scratched, howled, and behaved generally in a hit-or-miss fashion. Then, when it suddenly fell upon a successful solution, it worked the escape mechanism almost automatically and reached its fish or meat. Chickens, fish, cats—for each, Thorndike compiled elaborate charts and "learning curves" and proved that after long and painstaking excursions into trial-and-success the animal's learning possibilities tended to be smoother. Still, this could not be considered evidence of real reasoning capacity.

Thorndike reached higher in the scale of living things, repeating the experiments on three small South American monkeys. He taught them to operate simple mechanical devices and release themselves from boxes. They also learned to manipulate a pulley that opened an aperture through which food was tossed to them. This was child's play for these agile little rascals. The learning rate of tfye monkeys was far superior to that of dogs and cats, yet, as Thorndike pointed out, this was to be expected, for not only are monkeys much keener of vision than dogs and cats, but for countless ages they have been accustomed to use their fingers and manipulate objects. This factor of superior "learnability" in monkeys lent emphasis to a sapient observation of Stanley Hall's: "The mind of man is hand-made."

Neither the monkeys nor the other animals showed any real ability to "think their way through" a problem; to

observe relations clearly; to use "ideas"; or to make inferences and comparisons. These "human" functions were beyond the animals' ken. Thorndike devised a series of elaborate experiments to test the manner in which the animal "chooses" between two alternatives. This was the way the experiment went. For many weeks when feeding his charges, he used only his left hand. When he picked up the food with his right hand, the monkeys were never fed. Again, he would ladle out the food only after repeating a sentence—"I must feed these monkeys"—or after displaying a visual signal, such as a large letter or a geometrical figure. The monkeys were tortuously slow in catching the general idea: that one stimulus (signal) meant food, while the other stimulus did not. Though famed for their quickness of wit, the monkeys apparently never formed a clear concept of what was essentially involved in making a choice. The fact that one thing occurred (food is given) *if* another thing occurred (a sentence is spoken) was beyond the monkey's comprehension, since it was in the realm of "thinking."

For a bright little kitten, it required a total of 380 trials before Puss learned that "I must feed those cats" meant food and "I will not feed those cats" meant no food. "This experiment," Thorndike remarks, "shows beautifully the animal method of acquisition." If at any stage the animal could have isolated the two ideas and brought them together with the sense impressions of hunger, this long and tedious process would have been unnecessary. The "learning curves" that Thorndike worked out for his chicks, cats, dogs, fish, and monkeys showed no clear evidence of observation or "reasoning" ability. At that time, 1911, he did not have the means to carry out his ambition to experiment with

the higher primates: chimpanzees, apes, and gorillas. Men like Yerkes have since experimented in this field, as we have seen.

Thorndike's findings, cold, implacable, conclusive, scattered the claims of animal intelligence and agreed with Yerkes's feeling of thankfulness that we are still men. Actual *thought* as we know it is foreign to monkeys. It is their general activity, their instinctive impulses to grab, drop, bite, rub, carry, move about, turn over, and so on, their assumption of all sorts of postures, and their performance of almost human acts that make us feel that monkeys or any other animals "think." Thorndike's observations of animal learning and behavior led hirtr to stumble upon Pavlov's famous "conditioned response" years before the world learned of the grand old Russian's pioneering work with dogs. Thorndike termed it "associative shifting." In simple words, it means that, in time, the animal will shift his response from the general situation (box or maze) to some element or detail of the total which possesses a special value, or from the original stimulus to some fact associated with it. Ordinary animal tricks by the score furnish illustrations of this principle. The cat taught first to come when,a saucer of milk is held in the hand will after a few times respond to the sight of the empty saucer, or that of the person who does the feeding.

From his animal experiments, Professor Thorndike framed the *law of recency* and the *law of vividness* or *intensity.* Performances recently learned tend to become habits, and to be smoother. The law of intensity means that if a person or an animal is truly interested, if he has "the will to learn," the process of learning will be a great deal

quicker. Modern business uses the principles of vividness and recency. Iteration and reiteration is the method of the billboards and the radio as the advertising experts' shouts "pound it in."

Doubtless, laboratory animals consider all these tests so much nonsense. To the animals it must be quite unimportant that man can reason, use ideas, and make verbal formulations. For purposes of social organization and contented living the instincts of many animals are superior to the so-called reasoning ability of rr\an. Yet we human beings, with our vast egos, measure the universe by our own pace. What we know, feel, see, taste, believe, and *are* must be the *right* way of life for all the beings on the earth. The lives of the little creatures who dwell in the grass and the trees and the water seem freer and more unrestricted than the tens of thousands of men, women, and children crowded into box-like apartments in the cities. Their Republic is truly a Platonic one. Unburdened with "thinking," they are born, live, and die in an environment that somehow, through beneficence of Nature's trial-and-success methods, rights itself.

Thorndike's work in animal intelligence led to his wide recognition. By successive stages he became adjunct professor of educational psychology, professor in Teachers College, and director of the Division of Psychology at Columbia University.

His productivity was not limited to animal experimentation. In the educational field he made two startling discoveries. One was the demonstration of the continuing ability of the mind to learn even into advanced age. The other was that there is no "transfer" of learning from one subject to another, from Latin to accountancy, for example. His most

thrilling experiments resulted in the establishment of a truth that is a major contribution to human happiness. He knocked into a cocked hat the ancient theory that old dogs can't learn new tricks. In memorizing, in developing motor skills conflicting with habits previously formed, as in mastering a new language, Thorndike has shown that the man of forty is fully as capable of learning as his son in the teens and is excelled only slightly by those in the golden decade for retentiveness and intellectual flexibility—from twenty to thirty. Thorndike has proved to the satisfaction of open-minded scholars that the chief reason why men of forty, fifty, or sixty seldom learn a new trade or a new language is not the lack of ability, but some other factor, such as the lack of opportunity or of desire. The mental functions are preserved provided interest and application continue. These findings, based on careful tests, have released the middle-aged from one of their dread obsessions—that they are losing mental elasticity. "Life begins at forty" is more than an encouraging platitude; it can easily be based on psychological fact.

The other psychological law enunciated by Thorndike and Woodworth, jointly, is not so pleasing to the overeducated. It is that improvement in any single mental function rarely brings about equal improvement in any other function. Each has to depend largely upon itself for its development and its highest exercise. In the nomenclature of psychology, these notable experiments are known as inquiries into "the transfer of training." Thorndike and Woodworth began this vital work in 1902, when the school curricula were based upon the belief that the mind was made up of a number of faculties or powers which it was the

function of education to improve. The chief task of the schoolmaster was to develop memory, will, reasoning, imagination, and other powers. These faculties were thought to have an organic basis comparable to the strength of a muscle, and systematic and rigid training would therefore develop the power of these faculties. This general theory led to the development of a curriculum that included many subjects introduced not because of their direct utility, but because of the mental exercise which they provided. It was assumed that the more formal and exacting the mental work, the more beneficial the results.

Questions of this type: "Alice has 3/8 of a dollar, Bertha 11/16, Mary 3/25, and Nan 3/4. How much have they together?" would occur in real life, Thorndike said, "only in an insane asylum." Greek, Hebrew, memorizing poetry, and the study of logic belonged to this grisly group. Train a lad in geometry, the old-school educators believed, and you strengthened his mind so that later in life he will be a better shoe, bond, or book salesman. These learned pundits of the McGuffey era, firmly convinced that the mind is made up of numerous distinct powers or faculties, felt that hard-riding discipline was the essential duty of education. Traditionally, Latin and mathematics were regarded as the sine qua non of the cultured mind. Woodrow Wilson, the pedagogue, wrote approvingly in 1902 :

"We speak of the disciplinary studies . . . having in our thought mathematics and geometry,? the Latin-Greek texts and grammars, the elements of English or of French or of German. . . . The mind takes fiber, facility, strength, adaptability, certainty of touch, from handling them, when the teacher knows his art and their power."

Thorndike and Woodworth, attacking this theory, studied human material by the thousands to test the transfer of training." In one test they selected 8,564 high-school students in grades 10, 11, and 12 and tried them out to determine the effect upon their intellectual achievements of a year's work in such subjects as Latin, mathematics, and history. The subjects were divided into two groups. Students whose subjects were English, geometry, history, and Latin were matched with other pupils who were studying English, geometry, history, and some subject other than Latin—for example, physics. At the end of a year the pupils were again tested and their average gains were computed. Thus the experimenters could calculate the training effect of Latin as matched with other subjects.

These seemingly simple experiments in reality required enormous clerical labor and ceaseless attention. When the savants finished their work, they learned that for general training of the mind school subjects ranked in this order: first mathematics, including bookkeeping and arithmetic; second, general science, physics, and chemistry. Latin fell below mathematics and science; it was about equaled by French, and excelled economics, sewing, stenography, manual training, and dramatic art. The ancient educational theory that Latin is far and away the best training for the mind was dealt a death blow. Thorndike summed up his findings as follows: The "transfer value" of even the best subjects is curiously low. The expectation of any large difference in general improvement of the mind from one study rather than another seems doomed to disappointment. The chief reason why good thinkers seem to have benefited by special "cultural" subjects is that good thinkers have an

inherent tendency to gain more than those poorly endowed from *any* study. When the good thinkers studied Greek and Latin, those studies seemed to make for good thinking. Now that the good thinkers studied physics and trigonometry, these appeared to make them good thinkers. If the abler pupils should all study physical education or dramatic art or cooking, these subjects would be likewise endorsed as brain-builders.

Dr. Thorndike has advanced the novel theory that intelligence, or learning ability, is very much more specialized than is commonly thought. He illustrated his point with an example: "A dog is extremely clever in learning things about the *position* of objects, how to dodge things and the like. When he is chasing a rabbit and comes to a fence, he thinks out, so to speak, a way of getting around it just about as well as you or I. He has the dog logic that enables him to handle the problem of the position of an interfering object in space; but, let the task be one of opening a gate to get through the fence, where he has to perform one simple movement such as raising a bar, then it becomes a very hard task for him." He cannot apply what he learned about *under* the gate to *over* the gate. Wasn't intelligence in many very much the same sort of thing? argued Thorndike. "Do we not learn some things by the try-try-again method, and other things by the putting two-and-two-together method, that is, by working with ideas? Are not our minds made up of an enormous number of highly specialized capacities to operate with particular kinds of problems? Do we have a mind with a capital M that can operate with any kind of material,' and on any kind of problem, or are we a bundle of specialized capacities to do particular things?"

Our savant believes that one of the great needs of the present is a yardstick that can measure intelligence wherever it is evidenced. This would provide a measuring scale beginning at zero intelligence and running up the scale to the highest genius. Experimenters have been puzzled as to how to determine the zero on such a scale. Some have suggested that an animal with barely enough intelligence to distinguish bitter from sweet be rated at zero. Yet the common earthworm has more intelligence than that.

Psychological problems seem to grow in complexity as scientists probe deeper. Years of work have still to be lived through, tons of records and volumes of notes have still to be made by animal psychologists who strive to penetrate the puzzle of intelligence. Alfred Binet succeeded in devising a technique to measure intelligence, and Lewis Terman in California perfected the intelligence tests for English-speaking children. Every type of intelligence—verbal, mechanical, social, manual, general, arithmetical—has been tested in human beings, but no one yet knows what intelligence *is.* Your I.Q. can be computed, whether you be idiot or genius, your aptitude for calculus, for piano-tuning, or for fixing stubborn timepieces can be measured and delivered to your doorstep in a neat score, but what makes you an Einstein, a Paderewski, or a Lindbergh is yet unknown. The precise nature of intelligence has not yielded to experiments performed on human beings. Countless animals in laboratories, and patient saints in long white coats, may yet solve this enigma. For this, the cold scientists are needed, men whose light produces intellectual brilliance but little heat. Such a one is our next subject, the brilliant experimentalist Karl Spencer Lashley of Harvard University.

Mind Explorers

When Robert Burns in his immortal verse coupled mice and men as creatures with a common fate, he was showing the insight that comes to poets and scientists alike. Poets see the human mind in an inspired flash; scientists come to the same results after years of labor. From the heaths of the Burns country to Lashley's laboratory at Harvard is a far cry, but Lashley's experiments to determine how the cerebral cortex of mice works bring them close together.

Many people look upon rats and mice merely as instruments of fright to females. But Karl Lashley has employed and is employing the sharp-toothed little creatures to throw light upon the intricate activities of the brains of men. By operating upon and destroying certain brain areas in rodents, Lashley has succeeded in pointing at answers to a great many questions that have puzzled scientists for centuries. His field of study is that of the cerebral cortex, that shell of gray matter which caps the brain. In this gray matter there are 92,000,000,000 nerve cells or neurons, each with a function. If the known complexity of the lines of nerve conduction within so simple a brain as that of a frog were mapped out in detail, they would make the wiring chart of the largest electrically driven factory look as simple as a country road map. And if one turns to the human brain, it is no exaggeration to say that a complete map of every circuit in all the telephone and telegraph lines of the North American continent would be incomparably simpler than such a chart of the nervous circuits of which we already have knowledge. And the half of our nervous equipment has never been described I

The reader will perceive that we are back in the field we left in Chapter II. He will remember how Gall's ideas of

localized areas in the brain for the "sentiments and faculties" stimulated Pierre Flourens to do his pioneer experiments in the early 1820's with the hope of proving the specific localization of brain functions. Flourens's conclusions remained as gospel until in 1902, when Shepherd Ivory Franz, Lashley's later coworker, re-examined the brain to determine the various areas for association and learning, and for the different senses. The localization theory had the support of neurologists who were confidently picking out the exact area of the brain involved by interpreting physical signs of blindness, deafness, aphasia, and so on in their patients. They were so certain of their clinical proofs for the specificity of brain areas serving special functions that their theories were thrown to their more precise cousins, the psychologists, for adoption. To careful scientific men such indirect reasoning was unacceptable. They had to prove these theories by taking the experiments to nature—by proving them on animals.

So Dr. Franz went to work with the care only a laboratory man can know, and dealt a blow to complete acceptance of the theory of exact localization. His experiments indicated that cerebral "areas" and "centers" could not be mapped out as one would map out the squares of a checkerboard; and that the destruction of an area, while it might abolish some past acquisition, nevertheless did not interfere with the general brain function. Using boxes, mazes, and hurdles, with food (meat, fish, milk) placed outside the prison as a reward, Franz taught three hungry cats to escape in from two to six seconds, by stepping upon a mechanical platform, pushing against a cord, and pressing a button up or down. After the escape habit had been fixed so

that it had become practically automatic, Franz anesthetized his subjects and operated upon their brains. He cut away both frontal lobes (lying, as in man, just behind the forehead), leaving the severed portions, however, within the skull. Then the cats were allowed to recover from the operation and were retested in the escape box. In each case the habit *newly learned* had been quite lost; though old habits (mouse-chasing, purring, and so on) were perfectly retained. Exactly the same results were attained in a similar experiment with half a dozen small monkeys.

In other cats and monkeys, portions of the parietal lobes, which lie behind the frontals, were severed. All these animals retained, more or less perfectly, *recently acquired* habits of learning. In other experiments with his animal subjects, Dr. Franz cut away the frontal lobes *before* the animals had learned any escape habit whatsoever. In each case the animals were able to learn to escape from the puzzle box with a facility equal to that of perfectly normal, "unoperated" subjects. These experiments mean that one part of the brain can take over the function of another part vicariously, or by substitution. It seems evident from Franz's results that in cats and monkeys recently formed associations are normally carried on by the frontal lobes. But if the habits are well formed—that is, fairly automatic—they persist even when parts of the frontal lobes are lost, being carried on apparently through the agency of other parts of the brain. His findings were directly opposed to the old idea of specific centers in the brain which control definite functions. As such, they were of vital importance to the theory that dated from Gall and Flourens.

Lashley became interested in this type of work, and on

more than one occasion worked with Franz in attempts to restore functions in human beings that had been lost through accident or injury. One patient in the Government Hospital, male, fifty-seven, a paralytic, had lost the power of intelligible speech. In three months of long, laborious, and sympathetic instruction the patient became able to recite the Lord's Prayer and short stanzas of verse, to name ten familiar colors, and to count numbers. He died of pneumonia soon after the experiments ended. Post-morten examination disclosed destruction of a considerable portion of the temporal lobes, which lie in the lower part of the brain behind the ear. To Franz, Lashley, and others, this indicated the possibility of re-establishing old brain connections or bringing into play new ones. Here was the link between white rats and human patients.

The papers published by Lashley and Franz attracted wide attention. Lashley pushed on with a series of epochal experiments, concentrating upon the white rat. He has come to know this type of rat as you and I know the color of our hair and the brand of our favorite cigarette. His experiments were models of exactitude and caution, refreshing in their understatement. For example, in one paper he remarks, "These results seem to prove too much!"

The cerebral cortex (gray matter) of the rat, though simpler in structure, is markedly similar to that of man. Man and the higher mammals are supposed to be able to govern their behavior through individually learned experience, whereas the rat supposedly operates by what is termed "reflex" and "instinct." Lashley set out to discover by systematic exploration "the part played by the cortex of the rat in the acquisition of various habits." First, he trained a

group of his little friends in a very simple sensory habit of what psychologists call brightness discrimination." He used a problem box containing two alleyways which could be thrown into light or darkness by means of a transparent screen placed at the far end of the box. Light led to food, darkness to an unpleasant electric shock from a grill on the floor of the alley.

Lashley found that after approximately ioo trials the rat realized that the lighted ^lley meant food. The "patients" were subjected to ten trials each day until twenty consecutive errorless performances were forthcoming. It was assumed that the rat still loved his tidbit of cheese. Then Lashley placed his star performers on a tiny operating table, anesthetized them, and removed various amounts of the posterior portion of both cerebral hemispheres where vision centers are supposed to be located. After recovery, each rat was tested to discover whether it retained its ability to skip down the lighted alley towards its reward of food.

Meanwhile, another group of rats that had never been placed in the problem box were subjected to brain operations which removed different thirds of the occipital or visual lobes. This group was then tested to see if they could acquire the lighted alley-food habit, and how long a period would be required. The result was surprising. The rats which had learned the brightness-discrimination trick were found *after* the operation to have lost the knack completely. With practice, though, all could reacquire the habit, the number of trials required being roughly proportional to the *extent,* but entirely independent of the place, of brain destruction. Also, the rats whose visual lobes had been partly removed,

when placed in the box acquired the habit just as quickly as did uninjured animals.

This experiment seemed to establish clearly:

i. That although the occipital lobes are ordinarily active in brightness discrimination, these regions are not necessary for it, since other parts apparently take over the function of light perception.

2. That the brightness discrimination habit must depend upon the activity of the whole posterior region of the cerebrum rather than upon a specific area, since the habit is weakened by the extent of the injury, no matter at which point it occurs.

But criticism followed these results. Neurologists pointed out that the statement that the lighted alley-food habit can be acquired de novo in the complete absence of visual cortex "raises more questions than it answers." The part actually played by the cortex in habit formation was not demonstrated.

Lashley kept doggedly on. The next job he set for himself was destruction of the parietal brain areas in a group of trained rats. These little fellows, while slower than before to learn, in no single instance showed complete loss of the brightness-discrimination habit. Lashley burned the midnight oil, pondered and thought, and then proposed the following query: Is there any particular area of the brain that takes over the functions of the injured occipital parts?

To answer this he called upon a dozen volunteers—rats. His kindly knife removed various parts of the occipital lobes. He nursed and fed them back to health, then trained them until all had acquired the brightness-discrimination habit up to his standard. Then they were asked to submit

to a second operation which destroyed various regions of the remaining parts of the cortex. The destruction, in toto, encompassed the entire two hemispheres. And then, eureka! The problem had been solved and checked. Lashley discovered that none of the twice-operated animals had lost the brightness-discrimination habit! From this,' science has concluded that any part of the cortex is able to take over the brightness-discrimination habit in the absence of those occipital areas whose function it normally is.

Lashley didn't grow pontifical, made no claims that he was the Livingstone of the mind. He just went ahead with another series of experiments that absorbed him for several years. This was an inquiry into the effect of brain injury upon learning and retention of a motor habit. Lashley trained a group of his white-skinned, pink-eyed albino rats to go through a vaudeville gesture in order to obtain food. He put them in a problem box (the double-platform box) and let them know by the sad experience of starvation that it would be necessary for their little feet (or noses) to depress platforms *a* and *b* in fixed order *a* plus *b* in order to open a door, *c,* which led to food. These platforms, 4 by 2 inches, were raised 1 inch from the floor. The slightest pressure was sufficient to depress either. This task, according to the scientists, requires a rather complex motor response. Nineteen rats were trained in the double-platform box after about one-third of the cerebral cortex had been destroyed by operation. Surprisingly, these operated animals learned the habit as readily as the normal (control) rats did, actually requiring only about three-fifths as much practice. Lashley was much puzzled to discover that partially paralyzed, "operated" rats, with brain injuries and proved motor dis-

turbances, required (sometimes) 30 per cent fewer trials than normal rats to solve the problem and to open the door leading into the food compartment. He concluded that the normal and operated groups are most probably equal in learning ability. Habits previously acquired were not destroyed by injury of brain tissue.

What Lashley contributed was chiefly of a technical nature, but it is so general in significance that the educated man should know of it. As summed up by Dr. Garrett:

"Perhaps the most far-reaching result for human psychology of such experimental studies as those of Franz and Lashley is the very definite finding that learning and retention of sensory and motor habits cannot be explained in terms of fixed nervous pathways, definite brain structures, or specific (neuron) connections. Complex learned activities must depend upon much more extensive brain patterns than was formerly thought possible. . . . It appears as though we are returning to an older and less analytic view by saying that the brain functions as a whole in learning, but . . . the clinical evidence, as well as the experimental evidence, indicates that this widespread substitution of brain function in the case of rats, cats and monkeys holds also to a high degree for man."

Gall arguing from his skull casts, placed different functions of the human mind in different sections of the brain. The careful check of controlled experiments, which in the last analysis is science, confirmed his speculations only in a general way. The mental life of mice and men is indeed complicated, and shows with what tenacity every bit of living tissue hangs on to its inalienable right to be heard.

So Lashley, the cold scientist, works on, probing the

mental life of mice so that one day he will know that of men also. Of himself as a man there is little to say. To the person in search of poetic meaning, human values, or romantic sidelights nothing will be revealed. Only the estimate of an objective scientist of himself is available: "The life of a laboratory worker is uneventful. When you say he was born, worked in a laboratory, and eventually died, you have reported everything which is historically significant."

XIV: Watson The Iconoclast

AMERICAN psychologists of the last generation were a crisp lot. They carved out their theories boldly and fought their scientific battles with dash. Some of them carried the verve with which they worked into their daily lives. John Broadus Watson, the founder of Behaviorism, was such a one. Watson lived and thought, married and divorced, won fame and lost prestige, with the same undimmed spirit that he charged at his academic opponents. Perhaps his life pattern was go fashioned because he was born in the tiny hamlet of Red River in the picturesque hill section of the South where the two Carolinas meet. Poverty and despair still gripped the region in the i87o's, but the hillfolk clung tenaciously to their eagerness for book learning. So John at seven trudged to the one-room district schoolhouse between his chores and his odd jobs, such as half-soling shoes and milking cows. The industrial expansion and the steel age had not yet reached Red River, and the Watsons, like their neighbors, had to know how to use their hands in carpentry and a

dozen other household tasks. Or maybe John Watson became an iconoclast because he was, as his teachers remembered him, an indolent, argumentative boy, impatient of discipline and content if he barely passed his studies. Like Peck's bad boy, John and his comrade in knavery, Joe Leech would seize the occasion when teacher left the room for horseplay, and box until one or the other drew blood. "Nigger"-fighting was one of the favorite activities of the youngsters, indulged in daily on their way home. Twice young Watson was arrested, once for "nigger"-fighting, the second time for shooting off firearms within the town limits of Greenville.

Watson's psychology, Behaviorism, contains the general characteristics that we can recognize in Watson himself, the fun-loving hillbilly who came to a cultural awakening in the breezy Midwest. Just so William James's psychology was characteristic of the continental culture in which he grew up in an overcivilized New England. Watson was an American with much of the pioneer sticking out in him as a man and as a psychologist. James was an American also, but one with a hundred-year start which an established urban culture had contributed. The flowering of New England culture occurred before the War between the States, in a period when cities were well established and an assured wealth gave many leisure and the opportunity for higher education.

But New England was a special situation. Throughout the entire country a genuine urban culture, a recognizably specific American civilization, developed much later. In spite of our great national figures who rose to eminence from obscurity and poverty, agriculture and the back-breaking labor of subduing the wilderness did not make for cul-

ture. As Hull says, "**The** perfect crystals of science and **the** arts do not form readily in a cultural conflict/' **The** energy absorbed in fighting, in building, and in pioneering leaves little to be expended for science or letters. So we can expect that when Watson came into contact with science and philosophy at Chicago, his work would be tinged by the vigor of his time and would be expressive of his environment as well as of the punch of his personality. The philosophical stimulus he met in Chicago was the Pragmatism that John Dewey had received from the hands of William James, and the psychology around him was the rising tide of experimental psychology. It seemed almost as if destiny had set the stage for the creation of Behaviorism. While Watson was still relatively young his future role in psychology was appreciated by his comrades, who watched his career with satisfaction. When Kliiver of the Institute for Juvenile Research in Chicago was on a field trip traveling through the hinterland of the South, he stopped for a chat with the storekeeper in the very town where Watson had lived. After his inquiries were over the curious shopkeeper asked Kliiver what trade he followed. "Why, I'm a psychologist," replied the experimentalist. The tradesman scratched his head and brightened up. "Broadus is one of them too," he said.

No longer a green country boy, John Broadus Watson entered Furman University as a subfreshman at sixteen, remaining for five years. College life interested him little. It was too far removed from life. His student days left him bitter, made him feel that college only weakens the vocational slant and makes for a prolongation of infancy. "Until college becomes a place where daily living can be taught, we must look tolerantly upon it as a place for boys and girls to

be penned up in until they reach their majority." His lack of satisfaction with college revealed the sensitive person underneath who craved for more reality in his intellectual diet. His instructors sensed this, and advised him to enter the University of Chicago, where the outstanding men were John Dewey and the psychologist James Rowland Angell, later president of Yale.

Watson arrived in Chicago in the fall of 1899 with a working capital of $50. Poverty was unavoidable but healthful for the country boy who wished to start a scientific career. A future scientist must know how to be an assistant janitor porter in the laboratory, a waiter at a student's boardinghouse, private nurse to a cageful of white rats, and a messenger boy, as well as how to plow through tomes on speculative philosophy, neurology, and psychology. Money was always a major problem. Another of his jobs was serving as an experimental subject for a lady dabbler in introspective psychology who so revolted him by her naive confusion that he bounded back to the laboratory, away from speculation, like one possessed. His chief disappointment was his financial inability to complete his medical courses. "I never wanted to practice medicine," he explained. "I only wanted it as a means of working with medical men and to save me from a little of the insolence of the youthful of that profession."

Watson struggled on to a doctor's degree, yet he was not satisfied. "I took enough philosophy to know something about it, but it didn't take hold. Yes, I passed my examinations," he lamented, "but the spark was not there." It was the lament of an ambitious man who wanted to make a stir in the world, not of a beaten one. Actually he was a com-

petent psychologist, and an attractive young man of whom everyone was fond.

Bright young men with a Chicago sheepskin were in demand, and Watson received offers of various collegiate instructorships in neurology and psychology, finally accepting Dewey's offer to remain in Chicago as assistant to Angell. Two years later he became an instructor in experimental psychology. Watson's teaching and experimental period in Chicago, comprising the six years 1902 to 1908, was a time of intense activity. His superiors marked him as a coming man. In the laboratory he was both brilliant and tenacious. If occasionally the Scot in him led to clashes with others, these episodes were soon forgotten in the general recognition of his enthusiasm, intelligence, and passionate search for truth.

While Watson worked with animals he was developing the ideas soon to blossom out in his Behavioristic psychology. Experiments with adult human subjects made him feel uncomfortable and unnatural; working with animals kept him "close to biology, with my feet on the ground." Watson looked at any other psychology with a touch of suspicion, and his attitudes and arguments seemed sound. Since psychology has come to consider man's mind as a product of evolution, logic demands that we study the animal's mind first to learn how man's mental mechanism operates at its simplest level. But how to study an animal's mind? Animals are limited linguistically, hence animal behavior is the only key one can have to the animal mind. What Watson and other experimentalists thought of was not the cute anecdotes such as naturalists or dog-fanciers reported. Stories of the uncanny responses of a dog to its master's command had to

be checked by experiments. To be sure that rodents knew one color from another, Watson spent months putting a rat through a maze box with two exits leading to compartments with and without food, equipped with a red and a green light respectively. It took months of experiment to determine that a rat's choice of the red-light compartment was really not due to color vision, but to other factors.

Seeing animals learn by the trial-and-error method, the idea grew in Watson's mind that if reasoning was absent in animals, it could very well be that it had been overrated among human beings. Children were closest to their evolutionary cousins the animals, and Watson hoped to prove that children learn, as animals do, through the trial-and-error method and through imitation. The brilliant "reasoning" of children reported by astonished parents was either wish fulfillment on the part of the parents or at best loose observation. When these conclusions appeared in print about 1912, they shocked the psychological world. But during the time he worked at Chicago, Dr. Watson was not quite ready to publish his theories. His enemies later hinted that Watson had set out deliberately to erect a theory that would place him in the coveted position of a leader of a psychological movement. They saw only his rugged wish to be eminent, not his zeal for truth.

During his graduate days at Chicago, the air was not yet befogged by controversy. Watson, a serious worker in the laboratory, when out of it romanced like any other student. During the instructorship period, he met the lovely Mary Ickes, a fellow graduate of Chicago and sister of Harold L. Ickes, later Secretary of the Interior in President Franklin

D. Roosevelt's Cabinet. For a while the marriage was successful, as he settled down to university life.

In 1904 Watson spent the summer at the Johns Hopkins Hospital in Baltimore observing Dr. William Howell's operative technique on animals. Three years later he was offered an associate professorship at the Hopkins at $2,500 a year. While he was hesitating, the trustees raised the offer to $3,500 and a full professorship. Watson accepted. He was not yet thirty. Here, he says, the whole tenor of his life was changed. Money, apparatus, and above all, complete freedom were afforded him. He could experiment to his heart's content. Here he worked with other eager scientists, some of whom, like Robert M. Yerkes and Karl S. Lashley, were later to attain wide fame in the conditioned glandular response experiments in dogs.

At Hopkins, Watson let himself be swallowed up in the fascinating field of animal experiments. The problem was: Do "instincts" exist? Are there actually basic, unlearned reactions in animals and human beings which psychologists had always taken for granted and called "instincts?" Yerkes had shown the way in a study designed to solve the question "Do kittens instinctively kill mice?" Watson wasn't sure; he wanted to get the answer by experiment with simple behavior units, utilizing animals and if possible later on, children. So he set out to study the behavior ("homing instinct") of terns on Dry Tortages, one of the islands off Key West in the Gulf of Mexico, because there the terns lived in primitive isolation. Here, alone on the islands except for the flocks of wild gulls, or terns, Watson was able to observe what are learned or conditioned reactions and what are "instinctive" or congenital reactions. It was an experiment that satisfied

all his scientific skepticism: a simple organism, in a primitive environment, doing simple bits of behavior. The work was not as important as the method. Back at Baltimore he was eager to go on with his experiments, but the World War intervened.

At the outbreak of the war, barred from line duty because of eye weakness, Watson was given the job of organizing and running the aviation examination boards. Then he was sent to San Antonio and Lake Charles, Louisiana, to work on the release of homing pigeons in planes and balloons, since he had experience with terns and homing pigeons when studying the "homing instinct." It soon became evident that the radio had destroyed the usefulness of the pigeon in warfare, and Watson was transferred to a unit that went overseas to test out some of Thorndike's questionnaires on British aviators. The British flyers were having all they could do at the moment on the Western front, and the project was given up. Scientific frustration annoyed Watson's vigorous soul. He ran smack into bureaucratic army red tape, and was almost court-martialed because he expressed his opinion of the famous so-called Rotation Test direct to his corps leader as requested, instead of transmitting his views through regular army channels. Watson had been working with Colonel Crabtree on oxygen deprivation, and the War Department returned him to the Colonel with this curt recommendation: "that he be not allowed to serve his country in a scientific capacity but be sent to the line." Fortunately for Watson, the war ended before shrapnel and shell had a chance at him. "The whole army experience was a nightmare to me," he com-

ments. "Never have I seen such incompetence, such extravagance, or such a group of overbearing, inferior men."

The war over, Watson resumed his post in Baltimore and at once launched his series of pioneering studies into the behavior and the emotional responses of the human young. That was obviously the next step. For a generation scientists had been gathering a substantial body of facts about the young of practically every species of animal—except man. There were certainly no reliable data on the human infant.

Difficulties arose, but Watson overcame the opposition through the understanding co-operation of Dr. J. Whitridge Williams, Dean of the Johns Hopkins Medical School, and of Dr. John Howland, physician in chief of the Harriet Lane Children's Hospital. Through these gentlemen, Watson and his staff were permitted to make psychological examinations of all infants born in the Johns Hopkins Hospital and the Harriet Lane as part of the routine hospital procedure. The result was the first complete summary of the instinctual mental "birth equipment" of the human young.

Watson's aim was to examine man's supposed "instincts" and special aptitudes, the presence of which had been accepted as gospel since the day of William James. Indeed James provided man with the following modest list of native instincts: climbing, imitation, emulation and rivalry, pugnacity, anger, resentment, sympathy, hunting, fear, appropriation, acquisitiveness, kleptomania, constructiveness, play, curiosity, sociability, shyness, cleanliness, modesty, shame, love, jealousy, parental love.

Before he had gone very far, Watson became convinced that even in the human young the environment shapes be-

havior so quickly that reasoning about which types of behavior are inherited and which are learned is doomed to inaccuracy. In fact, he proposed the abolition of the word "instinct" and the substitution of certain fundamental emotional responses or patterns, which he narrowed down, along broad lines, simply to fear, anger (or rage), and love.

"Why," exclaimed Watson, "the infant is a graduate student in the subject of *learned responses* by the time behavior such as James describes—imitation rivalry, cleanliness and the other forms he lists—can be observed!" There was the first blast of the Behaviorist: " 'Instincts' do not exist as such, they are all *learned* from parents and the environment.[1]'

To test for native emotions, Watson introduced various furry objects and animals to his babies, things which children are supposed "instinctively" to fear. Some of the tests were conducted in a dark room, the walls of which were painted black. Bare of furniture, the room was so arranged that a light could be turned on behind the infant's head or the light be switched in front and above the infant.

"First a lively black cat, affectionately aggressive, was shown. The cat never ceased its purring. It climbed over and walked around the infant many times during the course of each test, rubbing its body against the infant in the usual feline way. So many false notions have grown up around the response of infants to furry animals that we were surprised ourselves to see these youngsters exhibit no fear *always* in their behavior to this proverbial black cat."

The same story was true In the case of rabbits, white rats, pigeons, dogs, birds, elephants, reptiles. The experimenters did find, however, evidence for what Watson termed "three

types of unlearned beginnings of emotional reactions." These reactions were:

To fear. Loud sounds, such as the striking of a steel bar with a hammer close to the baby's ear, or crinkling a newspaper, or making a loud, shrill, hissing sound, would result iq a jump, a start, a respiratory pause, followed by more rapid breathing, sudden closure of the eyes, clutching of hands, and puckering of lips.

To rage. This appears when the infant's bodily movements are hampered; when the head is held lightly between the hands, or when the arms are pressed to the sides. Then the baby's body stiffens, he struggles to escape, and holds his breath or screams.

To love. Stroking of the skin, tickling, gentle rocking, patting, elicit love responses, as does manipulation of the erogenous zones. The baby gurgles and coos and, even at six to eight months, laughs with joyously violent movements of arms and trunk.

These were basic reactions that no one had taught the child. Watson's results seemed incredible. If the average infant had practically no fears or complexes, how di$ it happen that a few years later practically all children were fetish- or fear-ridden? Watson's reply was that these hampering fears were *learned* or built in by environment or various forms of social "slanting." To prove it, he decided upon a daring experiment. He would build up fears in an infant, then later study practical methods for removing them. It was the familiar conditioned response which the grand old Russian physiologist Ivan Pavlov was using with such astonishing results with dogs. For the pioneer human experiment (and with confessed misgivings) Watson chose

Albert B, a happy, chubby infant weighing twenty-one pounds at eleven months. His mother was one of the wet nurses in the Harriet Lane Hospital, where Albert had lived from birth. Although his reaction (fear) to a loud sound was characteristic of what occurs with most children, Albert had never been known to cry for any other reason. The first objective, then, was to produce a fear response in Albert to a white rat through a conditioning process.

The white rat which he played with for weeks was suddenly taken from the basket (the usual routine) and presented to Albert. He began to reach for the rat with his left hand. Just as his hand touched the animal, a metal bar was struck immediately behind his head. The infant jumped violently and fell forward, burying his face in the mattress. He did not cry, however. After a time he reached for the white rat again, this time with his right hand. Just as his hand touched the rat, the bar was again struck. Again the infant jumped violently, fell forward, and this time began to whimper.

A week was allowed to pass before the experiment was resumed, because of Albert's disturbed condition. Then the rat was presented suddenly, without sound. There was no tendency at first to reach for it. The rat was then placed nearer, whereupon tentative reaching movements began with the right hand. When the rat nosed the infant's left hand, the hand was immediately withdrawn. Albert started to reach for the head of the animal with the forefinger of his left hand, but withdrew it suddenly before contact. Obviously the two stimulations given last week were not without effect. He was tested with his blocks immediately afterwards to see if they shared in the process of conditioning.

These he played with in unconcern, picking them up, dropping them, pounding them,' and so on. In the remainder of the tests the blocks were given frequently to quiet him and to test his general emotional state, but they were always removed from sight when the process of conditioning was under way. In order to condition the child, the white rat was presented at the same time that the frightening stimulus, the noise-making, was applied. This combination of events was continued for some time. When finally the rat was presented alone, Albert cried and crawled away rapidly.

The tests were suspended for a few days and then resumed, to determine whether the infant's induced fear of the rat was still present. The researchers wished also to know if the induced fear had also spread to other animals and objects with which he had previously played happily. These were rabbits, pigeons, fur muffs, the hair of the attendants, false faces, and so on. Twelve days after the first experiment Albert was tested with blocks. He reached readily for them, playing with them as usual. This showed that there had been no general transfer of conditioning to the room, table, blocks, and so on. Then the white rat was presented alone. Whimpering followed immediately, and he withdrew his right hand and turned his head away. The blocks again were offered; immediately Albert was smiling, gurgling, and happy. Now the other subjects (rabbit, human hair, and so on) were presented. The results showed how an infant can build up fears by transferring a conditioned emotional reaction acquired in connection with the rat to other similar objects. The experiments are fascinating enough to report Watson's protocol in detail:

A rabbit was suddenly placed in front of Albert. The reaction was pronounced. He leaned as far away from the animal as possible, whimpered, then burst into tears. When the rabbit was placed *in* contact with him he buried his face in the mattress, then got up on all fours and crawled away, crying as he went. This was a most convincing test.

The blocks were next given to him, after an interval. He played with them as before. It was observed by four people that he played with them far more energetically than ever before. The blocks were raised high over his head and slammed down with a great deal of force.

Dog presented alone. The dog did not produce as violent a reaction as the rabbit. As the animal came nearer, Albert attempted to get on all fours but did not cry at first. As soon as the dog passed out of his range of vision he became quiet. The dog was then made to approach the infant's head (he was lying down at the moment). Albert straightened up immediately, fell over to the opposite side and turned his head away, beginning to cry.

Blocks were again presented. He began immediately to play with them.

Fur coat (seal) offered. Albert withdrew immediately to the left side and began to fret. Coat put close to him on the left side, he turned immediately, began to cry and tried to crawl away on all fours.

Cotton wool was presented in a paper package. At the ends the cotton was not covered by the paper. It was placed first on his feet. He kicked it away but did not touch it with his hands. When his hand was laid on the wool he immediately withdrew it but. did not show the shock that the animals or the fur coat produced in him. He then began to play with the paper, avoiding contact with the wool itself. Before the hour was up, however, he lost some of his negativism to the wool.

Just in play, experimenter Watson put his head down to see if Albert would play with his hair. Albert was completely negative. The other two observers did the same thing. He began immediately to play with their hair. A Santa Claus mask was then brought and presented to Albert. He was again pronouncedly negative, although on all previous occasions he had played with it.

Here was a series of impeccable observations which

proved how a child can build up what we like to call "instinctive" fears. Why look for a mysterious instinct when all a child's reactions can be shown to be learned or acquired? This was a brand-new psychology, one that depended on observing the *behavior* of infants.

Watson's pioneering experiments soon were attracting attention far beyond the halls of Johns Hopkins. The profession of child psychologist was then practically unknown, but educators everywhere realized the enormous implications in the questions Watson was raising. If emotional responses, fears, and habits could be so easily built in, why, then, could not educators and psychologists aid parents in eliminating the fears and other handicaps hampering the development of so many children?

With energy and enthusiasm at full flush, Watson outlined a series of broad experiments along these lines and began writing his book *Psychology from the Standpoint of the Behaviorist.* Dr. Adolf Meyer, veteran director of the Phipps Psychiatric Clinic at Johns Hopkins, became interested in the new theories from the standpoint of psychiatry, and once a week had his whole staff meet in Watson's laboratory to hear Watson read and discuss the manuscript as it progressed. Fame and an amazing future seemed assured for the young psychologist. Holt, in 1915, said that Behaviorism "is the one great luminary on the psychologic sky."

Then suddenly, in the closing weeks of the 1920 semester, something happened that halted Watson's work, drove him from Baltimore under a cloud, and left him not only without a laboratory but without a job. That something was what the world calls "scandal." While Dr. Watson was busy

making science, Mrs. Watson was indulging her own enthusiasms. Dr. Watson had more interest in the rabbits, dogs and mice that he played with in the laboratory than in the social gaieties and other diversions that occupied the attention of their Baltimore friends. From this division of interests between the Watsons developed a quarrel that unfortunately ended in divorce and attained the importance of a front-page story in the metropolitan newspapers. Watson, the man who knew what it meant to meet realities in the world as well as in the laboratory, promptly married Rosalie Rayner, the daughter of a Baltimore family.

The trustees of Johns Hopkins University were shocked, and demanded Watson's resignation forthwith. His divorce, his marriage to Miss Rayner, the financial settlement with his first wife, and his resignation following one another with a sickening rush, left him emotionally shaken. He came to New York in the summer of 1920 to see an old Chicago friend, William I. Thomas, a scholar who at the age of fifty-two had cut loose from academic halls. For three days he paced about the Thomas apartment unwilling to do anything, on the verge of collapse, wrecked by his experiences in Baltimore. He was lost: a psychologist, a research professor, a leader of Behavioristic psychology without a post.

What could he do? He began looking for a job, any job. Mr. Thomas introduced him to Stanley Resor, president of the J. Walter Thompson Advertising Company. Mr. Resor offered him a try-out and sent him to^ investigate the market for rubber boots on each side of the Mississippi River from Cairo to New Orleans.

"I was green and shy," recollects Watson, "but soon learned to pull doorbells and stop wagons in order to ask what brand of rubber boots was worn by the family." This took place in the fall of 1920, the trying time when his divorce was front-page news in Baltimore. In January, 1921, he was taken over permanently by the Thompson company and sent out immediately to sell Yuban coffee to retailers and wholesalers in Pittsburgh, Cleveland, and Erie. He carried his pack for two months. It was just the job he needed to rub off the academic veneer. His success in the business world was phenomenal. It proved that psychology was *vital* to industry. "When I returned to the agency, I went through every department—media, research and copy. I felt one distinct need. I knew little about the great advertising god, the consurqer. Accordingly, I made private arrangements to clerk in Macy's department store for two months during the summer of 1921." He pushed groceries over Macy's counters like any clerk but, unlike other clerks, he studied the consumer and his psychology. "It took me a little more than a year," he relates, "to find myself in the advertising agency. I began to learn that it can be just as thrilling to watch the growth of the sales curve of a new product as to watch the learning curve of animals or *men.*[11] Within a few years, he became vice-president of the J. Walter Thompson Company and a power in the advertising profession.

But there was *not* quite the same thrill in watching the curve of the coffee sales. Watson soon returned to his studies of the emotional life of children, on a part-time basis. Interest in Behaviorism was spreading. Behaviorism cut across the intricate theories of psychology, showing how

each of our complicated reactions develops on the basis of a simpler response to a stimulus. The startling thing was that for proof Watson selected as his subjects not animals, but human infants, observing and cataloguing them from birth through the kindergarten age. A child starts its life with a few unlearned reactions: fear, anger (rage), and love. The rest of the complicated mental equipment it learns from its parents, brothers and sisters, teachers. Add to these unlearned reactions responses that are conditioned through education by the mQther or the nurse, and you have the whole panorama of mental life. A child's reaction to any stimulus is condoned or condemned by the parent; hence the reactions are "emotionally conditioned." It is all very simple and logical. There is no need for metaphysical speculation.

As the child grows, simple stimulus-response systems become more complicated, and the child learns to increase the range of his responses. Everything he learns to do—walking, eating, caring for his bodily wants, playing, even talking—grows out of these emotionally conditioned responses. All these responses, tortuously slow and uncertain at first, as observation of any prattling baby will show, become lightning-fast and automatic later on, and are likely to be taken for granted as some kind of heaven-sent gift. Even *thought,* Watson asserts, is a condftioned response. Essentially, all we know about a person's thought are the words we hear him speak and the gestures we see him make. Hence thought is basically a piece of behavior, the movements of the tongue and lips and larynx which are conditioned to sound out the words which we use for thought. Thought, said

Watson, which psychologists glorify with mystical words like "consciousness/' is simply "subvocal speech."

Watson's discoveries announced as the psychology of Behaviorism scattered like shrapnel among introspective psychologists. His rejection of everything they had cherished was more than the academic psychologists could bear. Watson was attacked from many angles with a fury that was not lessened by his own counterblasts. William McDougall, the dean of American psychologists at the time and professor at Harvard, got into violent controversy with Dr. Watson. Their criminations and recriminations were published in scientific journals such as *Mind* and then thrown open to the reading public in the pages of the *New Republic.* During the early 1920's the entire psychological world was taking one side or the other.

In a classic debate between the two protagonists of "commonsense" psychology and Behaviorism, McDougall went at Watson with ill-concealed ferocity. Behaviorism was too simple an explanation of complex mental life, it was "lopsided, extreme," said McDougall. Watson had been a "good man—a good man gone wrong." Persons of common sense must of necessity be on McDougall's side. Behaviorism was an audacious American movement which blandly assumed that no European (McDougall was originally a Britisher) could think straight about things because all of them were fettered by centuries of tradition.

The denial of consciousness by Watson infuriated the school psychologists. Watson had found no use for the concept—all he saw in the human being was his behavior, and what was assumed to be consciousness was a by-product of behavior, which in the last analysis was physiology.

When humans talked they thought, and when they thought they were conscious—the whole act having a physiological basis. Watson had by intuition brought out his idea at a psychological moment in the history of science. Already in the prewar period the nQtion of consciousness as the center of mental experience was disintegrating in scientific minds. Freud, in insisting on the unconscious motivation of human acts, had already mo^ed away from the position that consciousness holds the clue to understanding human nature. The two heretical schools, Behaviorism and psychoanalysis, had this in common: They scoffed at the importance of consciousness as the be-all and end-all of human mentality. This unconventional attitude of Behaviorists created a serious situation. What could psychologists do without consciousness? For two centuries, as our earlier chapters have detailed, philosophers and psychologists prodded the consciousness of themselves and that of their subjects for every jot of experience they would yield. And now came Watson, who declared that consciousness was only that part of mental experience about which *one could talk.* If you have words for an event, then it is conscious to you; if words are not available, then the experience is unconscious. Consider, the Behaviorists argued, all the habits, social reactions, and attitudes that a child becomes conditioned to before (at the age of, say, five) it attains enough verbal ability to describe its feelings or thoughts. These early conditionings are unconscious to the child, and of vastly more importance in determining an individuaPs psychology than anything acquired later.

McDougall was far from denying the importance of animal or human experimentation using observable behavior

as the unit for study, but he could not and would not throw out the experience of a century of introspectionists who learned so much from what their subjects reported they *felt* in words. The pure Behaviorism of Watson did not gibe with psychologic history. It was Attractive to those born Bolshevists" who are always looking for the easy way out, even in science.

Watson's rejoinder was to state his case quietly. It was the old story—it was like implying evil to Darwin because he dared to impugn the special-creation theory of life, and it was like the persecution of psychoanalysts because they dared look into the hidden sexual forces of men. Watson pointed out that McDougall was "a priest in disguise" and scoffed at the turn toward religion that psychologists were taking in trying to dislodge Behaviorism from their horizon. McDougall sniffed and pointed out contradictions. If the psychologists stress dreams and the analysis of dreams, they must deal with purely mental, or, as it is technically known, mentalistic phenomena; and this the Behaviorists if they have the wish to be consistent, cannot do.

Behaviorism was spreading: it was represented by a wave of revolutionary influence in education. Those on the fringe of radical movements seized on it in their dealings with children in progressive schools, which were sprouting up through the East. The old three "R's" dropped away; teaching by lecturing, by exhortation, by "telling" pupils what they should know, became anathema. A modern teacher conditioned her pupil because "emotional training" was a vital part of education, far outranking the acquisition of information most of which was destined to be lost in the fog of oblivion that gathers after examination day. There was

some burlesquing of the conditioning principles, but in the main the influence of Behaviorism in education has been a healthful one to the parent as well as the child.

Meanwhile Dr. Watson was proving one thing that no amount of debate could refute—Behaviorism could make money. His financial success was startling and started a trek by psychologists into the industrial world. Success carried seeds of its own destruction: As a practicing psychologist in the advertising world who was amassing money, his academic contacts were lessening. But Dr. Watson was not through. In 1923 he returned to the study of the emotional life of children when the Laura Spellman Rockefeller Memorial Fund financed a widespread study of infant behavior.

The work was done at the Heckscher Foundation by Mrs. Mary Cover Jones, with Dr. Watson as consultant and adviser. The results have been recorded by Mrs. Jones in a paper called "The Elimination of Children's Fears." With infinite care, Mrs. Jones studied some seventy children with pronounced fear of frogs, rabbits, snakes, and so on, and under Watson's direction experimented with seven methods of removing these fears.

It was a practical problem. Parents were always fussing about the fears of their children. No one knew whether a child would forget an unreasoning fear about the neighbor's great Dane in time, or whether ridiculing the child or giving up to parental impatience was the proper course to follow. Some recommended the old barge captain's advice of throwing the child in the river if he were afraid of the water, and others pointed with horror to the results of such treatment. Mrs. Jones, being an experimentalist, got down to the business. She put her children in a special environment, pre-

seated them with the fearsome object—the frog or the snake—and tested over many tedious hours one way of treatment after the other. It was remarkable work, because it dealt with the simplest, yet one of the most distressing, bits of behavior in childhood. The Jones-Watson project had been asked a question, and at the termination of their work they were able to answer it. Their results could be set down as follows :

Elimination of fear responses through disuse. This technique was based on the common theory that if the fear object is removed the child "will forget all about it," but this they proved to be of no value.

Verbal appeal. This method, based on the idea that the child may be persuaded or talked out of its fears, likewise gave poor results.

Negative adaptation. This method, based on the idea of the old familiarity-breeding-contempt saw—that the child will soon become accustomed to dreaded bugs and snakes if he sees enough of them in situations where the snake or the bug cannot harm him—was moderately successful.

Repression. This method, in which the adult or other children ridicule the fear-stricken or tabooed child, was tried. This technique works sometimes, but is dangerous for the child, because in an effort not to seem inferior he may develop some more serious neurotic symptoms.

Distraction. Eliminating fear in this way was experimented with. Here grown-ups pat the bunny or the dog familiarly to show the child that the animal is harmless. This was found to be successful when the child feels the protection of the adult, but the fear may return as strongly as ever when the child is alone.

Direct conditioning. This experimental method was effective when used with care. The technique was to associate the mouse with something pleasant, such as food. Then the mouse was placed on the table when the child was eating, but not close enough to interfere either with the child or with its food. Gradually the animal was moved closer. After many days and many trials some children overcame their fears and fed and streaked the mouse. Others, even after trials, screamed and became ill the moment the mouse came within hand range.

Social stimulation. This was the most successful method of all. The child on seeing its trusted and loved playmates fondle the mouse or frog without the slightest evidence of fear begins to lose his mistrust.

In spite of this careful work, which proved how appropriate the conditioning idea was, there were some children who persisted in showing fear after conditioning. How does this happen? Should not one look deeper into what conditioning factors have been operating in the environment, perhaps unknown to parent or child? Was it not important to go back even further than three or five years to trace how a child develops its emotional attitudes? A thousand questions were opened up by Behaviorism, and there have been no lack of champions appearing for their solution.

At the same time that Behaviorism was pushing forward, the child-guidance and mental-hygiene movements were coming into vogue. Out of these several drives a new field was developing, the field of the direct examination of the behavior of infants. At the Institute for Human Relations at Yale University, Arnold Gesell was placing newborn infants in a cell where they could be observed unseen by scientists.

These successors to Watsonian Behaviorism, striving to obtain a clear picture of rudimentary behavior units in the child, put the whole child, not just his blood chemistry or his growth curve, under the microscope for scrutiny. They examined the whole child as he moves and grunts, squeals, waves his arms and legs, in a pristine environment untouched by adult hands, and they returned with a mass of information of the most intriguing kind. GeselPs motion picture of the spontaneous behavior of infants has become a classic in medical teaching. Under the stimulation of this new kind of child study, foundations in other parts of the country have pushed the work. At Columbia University, Dr. Myrtle McGraw placed a pair of identical twins at birth in totally different environments in order to test the course of conditioning and teaching on each one. One was kept without interference, without encouragement in his spbntaneous activities. The other was encouraged to be active at play, to read, to seek for new experiences. The plan was to see how much or how little environmental stimulation would influence the growing child. These experiments are still in process, but Watson did his part in giving psychology its Behaviorist direction.

Behaviorism has been carried even farther at the Yale Institute for Human Relations. Professor Clark Hull and his workers inrluding the experimenter Yerkes tried to put together all the information of comparative psychology into a comprehensive understanding of the interaction of the human body-mind forces. Out of this it is hoped will come an American psychology, vigorous and unafraid, more mechanistic than mentalistic, explaining behavior in the

whole organism, but not yielding to metaphysical speculation unless it can be proved by the rigid tests of science.

In the midst of this activity, Dr. Watson himself has never lost active touch with psychology, though his lectures and popular books and articles of the 1930's have practically ceased. Mellowed by age and opulence, he is saddened only by the fact that some of his former colleagues seem to consider that he sold himself to the public. For the rest, he is as firmly'convinced as ever that there are no human "instincts" in the old meaning of the term—only "learned and unlearned emotional responses"—and no inherited capacities of any sort. "Sometimes," he muses in his luxurious office, "I regret that I could not have a group of infant farms where I could have brought up thirty pure-blooded Negroes on one, thirty 'pure'-blpoded Anglo-Saxons on another, and thirty Chinese on a third,' all under similar conditions. Some day it will be done, but by a younger man."

When and if that younger man comes along, let us hope he will invite John B. Watson to visit those infant farms. For the Father of Behaviorism has a great way with children, whether black, white, or yellow.

XV: Freud, Late of Vienna

FOR many pages the reader has watched the tribulations of psychologists as they labored *to* establish the laws of mental activity. In following these crusaders of science, he has lost sight for a time of the clinician who deals with human problems. While psychological theories which a college student nowadays runs off so glibly in his class recitations were being teased out after thousands of trial-and-success experiments, the nerve doctors struggled on in despair with their neurotic patients. It was true that Charcot had cleared up the place of hysteria among ills, that Kraepelin had read order into the insanities and that Weir Mitchell had developed his helpful "rest cure" for the neurasthenic. Still the "why" of nervous disturbances was of necessity unanswered, and until doctors know why things happen, their treatment must be compounded with a prayer. The nerve doctors, or neurologists as they were called in the 19th century, could not experiment on the mentally distraught as scientists did, under ideal laboratory conditions. They were

forced to take patients as they came, with their crying spells, twitches and tremors, wild dreams, sudden weaknesses and inexplicable paralyses. The symptoms of hysteria were so varied that they called for the vocabulary of a novelist merely to describe them. Take the case of Anna O., one of the early patients that Joseph Breuer and his coworker Freud described when they first brought light to the problems of hysteria and changed the face of psychopathology thereby.

Anna O. was a young woman of twenty-one, sensitive, poetical, and keen of intellect, who cared for her father to whom she was devoted, through a severe illness whicfy terminated in his death. Toward the end of the nursing period she developed a nervous cough, marked weakness, and peculiar trancelike states occurring only in the afternoons. Later she developed a startling series of complaints: double vision, paralysis of the eye muscles, a sensation that the wall was falling over her, headache, anesthesia of the right arm which traveled to the right lower extremity, then to the left extremities, numerous contractures of the head and back which rendered her unable to lift her head, and a peculiar state of double consciousness. In one state she was quiet and depressed but clear in her mind: in the other of the double personality states, she complained that time stopped for her, became excited and threw the pillows about, had the hallucination of black snakes, for which she mistook her shoelaces. Then she started to confuse her words, gradually dropping out the articles, using peculiar forms of verbs, finally speaking only in English or Italian, understanding nothing of her native tongue, German. She complained of the oddest hallucinations, of skulls and skeletons; she repeated

phrases like "to torment, to torment" over and over, and in her "cloudy state" gave utterance to the most peculiar fantasies. For one year she was bedridden, baffling her physicians with her changeable, mysterious symptoms.

The good doctor was fascinated by the case history spread out before him. He recognized the trouble as hysteria and determined to treat Anna by a method differing slightly from the usual hypnotic technique. Daily Dr. Breuer, who had listened to her troubles earlier in the day, asked Anna after putting her under hypnosis to "talk out" everything that came to mind in connection with the symptoms that had troubled her that morning. The experiment was successful; for a few hours after Anna had given a lot of relevant and irrelevant details to the doctor, she felt better. In the most painstaking way Dr. Breuer traced all of her ordinarily inexplicable symptoms, and he found that each of them tied up to an episode with her father, which had acted as a "traumatic" or injurious scene for the patient. For example, the peculiar symptom of "not hearing when someone entered the room while in one of her states of distraction" which Breuer observed occurring 108 times in her illness was related to this: The first person she did not hear enter her room was her father. In another symptom, that of "becoming deaf from fright of a noise," noted 37 times, the memory that came to light was a choking attack her father had suffered from swallowing the wrong way.

Dr. Breuer was delighted, and also a little mystified, by the success of his new treatment. Because he had "cleaned out" harmful memories from the patient's subconscious mind, Breuer called his new technique the "cathartic" method. He discussed his findings with a young Viennese

neurologist named Sigmund Freud with whom he was friendly and whom he knew to be interested in nervous cases. Freud was fascinated by the discovery and urged Breuer to publish his findings. Dr. Breuer demurred, explaining that he had a busy practice in town; besides, there were quite a few aspects of the business that made him slightly uneasy, and more than willing to turn his ideas over to young Freud. The history of the extension of Breuer's simple yet ingenious "cathartic" method of treatment for hysterical girls to the intricate method of psychoanalysis is one of psychology's most remarkable sagas.

Freud boldly extended the scope of psychology tq a new province; he had not been afraid to search among the deepest emotions of man for the key to the understanding of human problems. Love, the province of poets for generations, was opened to the study of psychologists. More than that, Freud glimpsed the large reservoirs of mental activity, invisible in man's everyday life, in the "unconscious mind" of his patients. "A hair divides the false and true," sang Omar Khayyam, and Sigmund Freud echoed: "A thin line of repression divides the conscious from the unconscious."

His exploration of the depths of the human mind resulted in a revolution in psychiatric methods and thought. Nor was it a bloodless revolution. For thirty years the battle raged while professors of psychology, clergymen, journalists, physicians,' free-lance writers, and tabloid columnists took a hand in the fray. For a while it seemed as though the whole Christian world, the world of propriety and morality, would rise up to drive out the irreligious cancer which the Freudian theories were reputed to be. But in the end unprejudiced observers, in both the practical and the theoretical fields,

had to give the devil his due, and nowadays Freudian psychology is accepted as an integral part of psychiatric and mental-hygiene practice. Few of the mind explorers had to battle as Freud did with the smugness of scientific men. As Dr. Walter Bromberg writes in *The Mind of Man:* "Freud had to battle with the demonomania of Victorianism as Johann Weyer battled with the demonology of medieval days. . . . For four decades it [psychoanalysis] has been his passion and his life. The story of psychoanalysis is the story of Freud."

Sigmund Freud was born in Freiburg, Moravia, the oldest child of his father's second marriage. When he was four, the family moved to Vienna, where he lived in the shadow of St. Stephen's Cathedral for seventy-eight years of his life. Early in his school days he showed a capacity for scholarship. From primary school through gymnasium and the university, he was always the serious, proficient student, devoted to the study of natural science, the lodestar of his life. It was quite natural, then, that he turned to Brucke at the university, where for six years young Freud investigated the nervous organisms of certain types of the lower animals. He was pointing toward the next university appointment in physiology of the nerves when his father stepped in and persuaded him to be more practical. In time he received his medical degree; then followed the usual interne days; but he never abandoned his first interest in the natural science. A duly qualified doctor, Freud turned back to the Institute of Cerebral Anatomy under the world-famous Meynert, and to the investigation of the tracts in the medulla oblongata. Freud was in danger of once again immersing himself in a fascinating but unremunerative field. In need of looking to

his material welfare, he began to study mental and nervous disorders. As a nerve specialist he could combine an interesting practice and the opportunity for scientific work. There were no teachers of his subject in Vienna worthy of the name, but "in the distance glimmered the great name of Charcot." Soon Freud's diligence as lecturer on Neuropathology at the Institute was rewarded with a fellowship allowing him to travel to France.

Salpetriere, the Mecca for French and foreign students alike, was inevitably Freud's destination. Until he offered to translate Charcot's lectures into German, Freud was but an undistinguished visiting student; after it, he was ,one of Charcot's inner circle. With this standing, he was enabled to look behind the magic of the Master's Tuesday-morning demonstrations. Charcot was engaged at that time in proving that hypnosis is no fake, that he could produce or cure hysteria with a few passes and soft words. The most important lesson that Freud learned from his Parisian sojourn was that hysteria was a real disease, worthy of medical attention, not to be classed with the gossip of housewives or the veranda complaints of rich burghers' wives at fashionable spas. Also he saw what at first astounded and later angered older and respected neurologists—that Charcot could bring out symptoms of hysteria in *men* as well as in women. Charcot could never entirely explain the remarkable things he did; they fitted none of the theories of his time. He dealt with facts as he faced them In the clinic. When Freud, skeptical and unable to balance his results against prevailing theories asked: "How can men have hysteria when 'hysteron' means womb in Greek and hysteria has been a woman's disease from time immemorial?" Charcot calmly

replied: *"Ca n'empeche pas d'exister* (That does not prevent it from existing)." Without expressing his conviction, Freud carried away from Charcot a feeling, as yet far from maturity, that he was at the gates of new, unrevealed facts of human nature.

Back in Vienna, married and a creditable neurologist, he settled down to practice. The problem he vaguely perceived in Paris lay dormant in his brain. As the terms of his scholarship demanded, he reported to the medical society the results of his sojourn at the Salpetriere. He must have spoken with enthusiasm, because the chairman rose and said the idea of man suffering from hysteria was incredible. Meynert, with a little more leniency, urged Freud to find a case to demonstrate. Freud took the advice and after several setbacks finally found a suitable male patient on whom he demonstrated hysterical paralysis before the medical society. The doctors listened politely, applauded emptily, but said nothing; the incident passed off. But he soon learned what this icy applause meant! Rejection from the society and the laboratory, and the fate of one who opposes his conservative medical confreres. For his pains to learn the truth, Freud found himself outside academic circles.

Still striving to be regular, Freud applied the methods of electrical sparks and hypnotism, which at the time were the only two respectable forms of treatment of nervous patients. He bought the famous textbook of Erb, *Electrotherapy,* followed the instructions implicitly, but there were no remarkable results in his patients. The greatest name in German medical science may have impressed doctors, but left little imprint on patients. Freud's faith in the Olympian gods of German medicine was slowly weakening. Next he

tried hypnosis; he had seen thousands of examples in Paris, but somehow the patients did not respond so readily in the Viennese atmosphere. Freud had been a little puzzled by the fact that hypnosis worked like a charm at the Salpetriere but with indifferent results in Vienna. While he pondered the reason for his mediocre success, he decided on a visit to Nancy, where the news had leaked out: Bernl}eim and Liebeault had come upon a, remarkable therapeutic agent in mental suggestion. These iconoclasts were even hinting that hypnosis and electrical treatment were successful only because of the implied mental suggestion on the part of the doctor. At Nancy, Freud observed Bernheim's experiments with hospital patients. He was astounded to see how easily Bernheim, without the legerdemain of Charcot, could cure patients by the simple method of repeatedly suggesting to them that they were getting well of their symptoms. Why suggestion worked and why results were better in clinic than private patients, neither Liebeault nor Bernheim nor Freud could say. The more cultured the patient, the more difficult it was to obtain results from simple hypnosis. Beyond mental suggestion were many problems calling for solution.

Back home in Vienna, Freud took up the treatment of his patients with renewed hope, using Bernheim's rather than Charcot's methods. In the meantime he had been for years a friend of Dr. Joseph Breuer, an outstanding medical man of Vienna. Breuer related the puzzling aspects of his case Anna to Freud as the treatment progressed. The more Breuer talked of his case, the more engrossed Freud becaitie. He thought he would use the talking-out method in place of the moderately successful mental suggestion. It appealed to his mind as a more meaningful way of working

with the patient, but how it operated was far from clear. The discovery that hysterical symptoms were always related to an emotional experience in the past was published in 1893 by the two authors—although Breuer was reluctant—in a tract called *On the Psychical Mechanism of Hysterical Phenomena.* This was followed in 1895 by an epoch-making contribution, *Studien uber Hysterie,* in which more cases treated by the new method were described. This book represented chiefly the culmination of Breuer's discovery, but Breuer was a physician and not essentially interested in the psychological mechanism underlying his treatment. The authors united in calling the method *mental catharsis,* and agreeing that distressing emotional experiences had somehow been *converted* into actual symptoms. The emotional shock, apparently, ran deeply, submerged in some misty part of the patient's mind to emerge as a symptom days, months, or even years later. The truth of this theory was borne out a hundred times during the World War by the experience of the Allied commands with their shell-shocked soldiers. Uninjured combatants miles from the front after the battle would be seized with severe hysterical symptoms, such as blindness or paralysis, on hearing the booming artillery far off. Often men who had been under shellfire and emerged unscathed reacted months later when home on leave with jittery nerves and tremors. The emotions wrought their havoc only after days or months of apparent freedom from illness. The theory of "mental catharsis" was sufficiently radical to meet with increasing opposition. Professor Adolf von Strumpell, the Osier of his time, rebuffed the two authors for being unscientific when their book appeared in Germany. Breuer, sensing trouble, begged off. He

was willing to treat patients in any way that helped, but to become involved in polemics with the big names of medicine, or to start a new movement—*"Ach, nein!"*

Freud nevertheless was satisfied with the way things were shaping up. By this time he was using the methods of catharsis and hypnosis in his practice. One day a patient whom he had hypnotized with spectacular results awoke and threw her arms around his necjk. This embarrassing occurrence determined him to have his patients talk out their problems without the aid of hypnosis, in conscious command of their faculties. After all, if a hidden memory comes out under hypnosis it must be *known* to the patient, no matter how deeply buried, and if one could wait until the defenses had died down, the patient would actually bring up the injurious memory sooner or later. There were several kinds of ideas that patients struggled with during the seances. One type had to do, naturally, with sexual life; another type of ideas was attached to painful emotional experiences. Whatever screen there was between the patient and the doctor in the telling of these things was regularly removed by hypnosis. That being so,.pondered Freud, the deterrent must be something in the patient's mind—something in the patient's ego which exercised the role of a censor, letting out some ideas and restraining others from expression. Freud was deep in his problem, working and thinking alone. He worked with patient after patient, probing and studying their life stories, finding therein a sharp division between what was known or "conscious" to the patient and what was unknown or "unconscious" to the patient. The latter were memories and experiences kept, by a curious mental process, out of daily consciousness. This mechanism Freud called *repression,* and

the idea **of** repression became "the foundation stone **for** understanding the neuroses."

Freud was now on the threshold of a much more complicated method of treatment than that of the simple cathartic treatment. By the turn of the century he had formulated his ideas about dream life and about the protective repressive function of the mind. His theories of the unconscious portion of the mind began to take form, and though the whole psychological world balked at the idea of our unconscious mind fashioning our waking and sleeping lives, Freud found more and more evidence of the powerful effect of unconscious factors in neurotic patients, and even in the acts of normal individuals. His method now was to have the patient lie on a couch with the psychoanalyst out of sight and talk freely without regard for coherence or for the amenities of polite conversations. This always led, after evasions and tortuous ramblings, to the patient's hidden problems. Freud was able to show his patients how their unconscious was deceiving them, and they could see after days and months of this psychological work something of the emotional drives that caused their symptoms. These drives came mostly from childhood influences and had been forgotten (that is, repressed) by the patient. Since much of the trouble commenced in childhood, where sexual play or talk is suppressed, Freud in his patients' life stories stumbled upon the totally undiscovered sexual life of the child.

A few remarks dropped guardedly by Charcot and Breuer about the disordered sexual life of hysterics focused Freud's attention *on* shedding light on this hidden aspect of the life of neurasthenics. To him it was a logical step—a neglected field needing investigation. He was deterred by

the mystery, evasion, and denial that met even a doctor's questions to his patient concerning their sexual practices. Patients were squeamish at his questioning. It cost Freud, to use his own words, "my popularity as a doctor, but it brought me convictions which . . . almost thirty years later had lost none of their force." He began to assemble data that no one short of Havelock Ellis, or perhaps Krafft-Ebing, had referred to, in obscure Latin phrases. The case histories of his neurasthenics abounded in accounts of masturbation, coitus interruptus, undischarged sexual excitement, impotence, and frigidity. So overwhelmingly frequent were these findings among nervous patients that Freud was forced to conclude that neurasthenia was nothing more nor less than the expression of suppressed sexual excitement. "My medical conscience," said Freud, "felt pleased at my having arrived at this conclusion. I hoped that I had filled up a gap in medical science." There is no place in a scientist's mind for squeamish sentiment. During the next five years Freud wrote short papers illustrating these facts, and dutifully presented them before medical societies. But in the main they were ignored, or met with incredulity, or were heatedly contradicted.

A few clear-minded physicians reading his reports recognized the validity of his sexual findings. But when he invaded the sacred precincts of innocent childhood, finding evidences of perverse sexual drives there, or hinting at these perversions among normal people, they revolted. "Freud sees sex in everything!" was the cry. "One would think," Janet complained, "that psychoanalysis was a criminal investigation which aims at the discovery of a culprit in the unearthing of a past happening."

Opposition continued to grow. People accused Freud of suggesting the most heinous ideas and memories to the patients, of foisting on them murderous, incestuous thoughts, and of bringing from the very depths the most degrading of human experiences.

Critics were numerous; everyone had something to say. Morris Fishbein, editor of the official *Journal of the American Medical Association,* scorned psychoanalysis in these words: "One ritual demands that the patient lie upon a couch in a dimly darkened office. There she—and the words fall naturally, for it is usually a feminine patient—begins her long autobiography and there the psychoanalyst sits—we hope—listening and stimulating ever more and more juicy revelations." The academic psychological world was more elegant in its deprecation. Professor Pillsbury of the University of Michigan, contemptuous of Freud's lack of university connections, wrote: "He brought a few friends in a back room. There they worked out psychoanalysis." By 1929 the good professor had softened a little, for he wrote: "It [psychoanalysis] stands as a strange episode in the history of psychology, but one that has not been without many beneficial by-products." Others accused Freud of being a sour pessimist, a devotee of Schopenhauer, the prince of misanthropy who loved to unearth the basest feelings and emotions of man. Hardly a staff conference in a psychopathic hospital or a tea party among the intelligentsia in the decade 1910 to 1920 failed to break up over the question of Frued's sexual pryings into the unconscious. To all this Freud's reply was dignified and simple: "I do not see what we shall gain by being ashamed of sexuality." What he saw

of sex in his cases came from the patients, came from the reservoirs of their memories.

In the first decade of the new century Freud, who was quietly proving his assertions through his case histories, was beginning to attract followers. In Vienna a group was formed who met at Freud's home and studied their cases together. By 1908 the friends of the young science had a convention in Switzerland and made arrangements for the publication of a psychoanalytic journal. By 1910 an International Psycho-Analytic Association was formed, and Freud's psychoanalysis was now an established technique of treatment for neurotic disorders.

About this time Freud received an invitation to come with one of his then chief lieutenants, Carl Jung of Zurich, for a series of lectures at Clark University in Worcester, Massachusetts. Americans who had been to Vienna had been impressed by Freud's methods; none of the bitterness of the German psychiatrists or the disdain of the French school for Freud's sexual theories rankled in them. Freud's lectures arranged by President G. Stanley Hall at the Twentieth Anniversary of Clark University were regarded as a respectable success among scientific men. Even the American press treated Freud with regard. An article appearing in the magazine section of a Boston paper in 1909 was captioned "Prof. Sigmund Freud, the Eminent Vienna Psychotherapeutist, The Founder of a Most Successful School Interviewed." A. Albrecht, a reporter on the *Boston Evening Transcript,* described Freud as follows: "One sees at a glance that he is a man of refinement, of intellect, and of many-sided interests. His sharp, yet kind, clear eyes suggest at once the doctor. His high forehead with the large bump

of observation and his beautiful energetic hands are very striking. He speaks clearly, weighing his words carefully, but unfortunately never of himself."

Freud was then in the full flower of physical and mental strength. The great city of New York fascinated him. He used to stand in a little grotto off the West Drive of Central Park, near Seventy-seventh Street, and drink in the view of the city sky-line and skyscrapers. Once he turned impulsively to his leading American follower and translator, Dr. A. A. Brill, and exclaimed: "Brill, never get far away from this beautiful park, never, never!"

As might be expected, there was trouble on Mt. Olympus early in the history of the movement. The first rumblings in the psychoanalytic heavens were heard about the time of Freud's triumphal trip to America. Dr. Alfred Adler, one of the Viennese group that had met in Freud's drawing-room, was the first to dissent. He had been for some time decrying the importance of sex, urging a simpler answer to the vexing problem of the cause of neurosis. What handicaps people, Adler said, was the sense of inferiority that makes patients cringe inwardly and enriches the pockets of the Dale Carnegies and the personality uplifters who promise magical powers to the nation's Caspar Milquetoasts. What is the origin of this inferiority feeling? Adler thought he knew—it is the overwhelming sense of littleness which children feel in a hostile world, filled with towering adult giants. These feelings may last a lifetime if the child retreats into fantasy and does not solve his relation to the adult world as he matures. The Adlerian ideas were easily understood, and his treatment required much less

time than did the so-called orthodox methods. But Freud would not recognize it as psychoanalysis, and Adler urged his views under the name of individual psychology. As Kathryn B. Swift observed, "Freud ruled with an iron hand. He stifled initiative, refused to compromise, played favorites. He, the revolutionary, denied to everyone else the right to rebel. Expecting absolute conformity to the rigid rules laid down for 'his' science, he constantly changed and modified them himself. Small wonder that ambitious men like Adler, Jung, and Wilhelm Stekel could not exist in so stultifying an atmosphere. One after another they left Freud."

Soon afterward Carl Jung, one of Freud's chief disciples in Switzerland, broke lances with the Master on the religious implications of psychoanalysis. Delving into the mystical depths of his patients' thoughts through study of their dreams, Jung insisted on paying more attention to the primitive background of man's mind. He found not only an individual *unconscious* in analyzing his patients' dreams, but a *racial unconscious* which hearkened back to primeval times. Though Jung's psychoanalytic studies of mythology and religion were of great value, his practical treatment took a turn that Freudians could not accept.

Others took the place of the dissidents, and Freudianism moved forward. In spite of the charge of dictatorship, Freud was not too big a man to change his theories as his patients taught him their falsity. In the main, the principles of repression of unconscious tendencies, representation of emotional conflicts in physical symptoms, reappearance of childhood sexuality in adult sex life, and the causatjon of nervous troubles due to dammed up libido (or unrelieved

love-energy) were the principles that Freudian psychoanalysts utilized.

The "heroic" period of psychoanalysis lasted up to about 1918. Practicing psychiatrists who embraced Freud's ideas applied it to all kinds of neuroses and nervous disturbances hoping it would cure them all immediately. The idea that "talking out" deeper conflicts would cure every kind of mental illness appealed to some, and physicians in outpatient clinics set to work with a will to apply to their cases what they read in Freud's books. One was reminded of the heroic era of the salvarsan treatment of syphilis which followed Ehrlich's announcement of his lifesaving drug in 1907. When word went out that one dose of the magic draft 606 (salvarsan) cured civilization's curse, every large medical center applied for some of the drug. It was a gala day at the Bellevue Hospital in New York when the potent fluid was imported from Germany. The amphitheater was filled with students and doctors to watch George Fox, professor of dermatology, inject, with a great flourish, one shot of the yellow fluid which it was hoped would wipe the germs of syphilis from the blood stream of the patient. Bitter experience taught the doctors that many, many shots of the yellow fluid were needed to blast the treacherous syphilis germs out of their patient's body. Neither Ehrlich's dyes nor Freud's exploration of the unconscious could be delivered in one dose or cure in one application. The extent of the problem and the length of time needed to explore the unconscious and liberate the neurosis-producing emotions were fully appreciated by practicing psychoanalysts, and especially by Freud. Slowly the theories of psychoanalysis were altered as cases of bald sex-connected neuroses

became less Frequent, and the purely hysterical symptoms in patients who had thronged Charcot's clinic and Freud's waiting-rooms at the end of the last century became almost extinct. Psychiatrists practicing Freud's principles extended their interest to more complicated neuroses. As the purely sexual problems faded into the background the need for understanding the place of the ego in the neurosis became evident to Freud, and he modified his theories accordingly. In connection with the renewed interest in the patient's ego, one of the younger men, Otto Rank, stressed the need of mobilizing the patient's will in psychoanalysis. Another, Wilhelm Reich, sought to treat the basic *character* of the nervous patient, as distinct from his *neurotic illness.*

While this increase in the breadth of psychoanalytic treatment was occurring, the existing group of psychoanalysts were forced to look into the cultural and social background from which their patients sprang. The insistence of Freud that the love instinct was the basic drive in all human life and motivation seemed to lose some of its strength when one considered the hordes of young and middle-aged people who are thrown against the stone wall of today's social and economic conditions. Karen Horney, a transplanted German analyst, was one of the first to point to the importance of examining the cultural demands against which the patient struggles in our present-day society, especially in America. The value placed on money and worldly success, the whole of the competitive system, including the social values placed on a freely expressed sexual life, the growing revolt of women against the soul-stultifying limitation of marriage—appeared as the important neurosis-producing causes for Horney and the "cultural" psychoanalysts.

Psychoanalysis is in transition. The basic contributions which the seer of Vienna made are still valid. The amazing insight he gained into the inner working of our emotions still stands as one of the greatest contributions since the time that psychology first held up its head. The interpretations of dreams which Freud rescued from the Egyptian dream books and the readers of tea leaves was a classic work, "done for eternity," as he himself says. There is much ground to be covered, much to learn so that psychiatrists may understand the devious paths through which the human soul wanders in its search for security and happiness. Some day, Freud hopes the findings of the physicians, busy with chemistry tube, microscope, and brain-testing apparatus, will be brought into consonance with the nuggets of information which psychoanalysts have dug up from the subterranean passages of the mind. And Freud, though he had been accused of neglecting everything that psychology taught which conflicted with his views, had in view this merger. Then there will be a science of the mind worthy of the name. For to separate the mind and the body, the emotions and thoughts, the delicate matrix of the nervous system and the mental activity it carries, is an artifact of science. But until psychology and neurology are more firmly knit, psychoanalysis still deals with untamed emotions that hang on from infancy and childhood to plague their possessors.

Thirty years have passed; Freud had become world-famous. He celebrated his eighty-second birthday on May 6, 1938. The anniversary found him quite unmoved by the swirl of world events. In many ways Freud himself remained

as complex as the "complexes" he discovered and treated in his patients. Although harsh and inflexible during work hours, demanding implicit obedience of his patients and his students, Freud was a charming holiday companion. He loved to hunt mushrooms high on the Semmering as much as he enjoyed pilgrimages to his beloved Rome. He was also a lover of art and a noted collector of Chinese jade, archaic bronzes, and scarabs. Throughout his life he had worked day and night, limiting his recreation to an evening of pinochle once a week and to art collections during holidays. His humor was keen and clean, though cutting. Once Freud wrote to the tax department protesting an income-tax levy which seemed out of proportion: "You are the only governmental department which is willing to concede my greatness." When the Nazis burned his books in the bonfire that also consumed the works of Heinrich Heine and other famous non-Aryan authors, Freud grinned and remarked: "At least I have been burned in good company."

Freud himself has been called the Old Testament Jehovah of the psychoanalytic movement, and the work of the psychoanalysts the "Jewish confessional." Even its best advocates admit that psychoanalysis is (in the wrong hands) one of the most dangerous techniques known to medicine. Other objections are that it has become a cult in the control of a small clique, and that its theories have not been properly tested on any broad statistical basis. The psychoanalyst's training is becoming as rigid and exacting as that of the priesthood, and it is well that it should. Besides the care that must be exercised in making incisions in the human soul, analysts have a world-wide moral aspect to their work.

Gradually Freud and his coworkers have been drawn into the larger problems of mankind. Freud sees life as the result of two contesting impulses: that of love or self-preservation and that of death or destruction. Discussing the pamphlet *Why War?* which he wrote in collaboration with Einstein, Freud observes: "I am an octogenarian and my long life has been devoted to the better understanding of the mentality of man. I always hoped my work would result in better understanding between the nations. But events of the last few years, not to speak of the World War, show that any effort to replace brute forces by the might of ideals and justice is doomed in our age. Maybe several centuries hence the human intellect will be strengthened to the extent that it will be able to master the inborn instincts of destruction. Maybe—if the human race will survive the horrors of wars to come."

When Hitler swarmed into Austria for his "bloodless" *Putsch* of March, 1938, Freud was living quietly and contentedly in his book-filled apartment at No. 19 Berggasse, Vienna. Despite the throat cancer which fastened upon him many years ago, the old gentleman managed to "analyze" several patients each day, collect rare glassware, compile notes and case histories, and dictate books and pamphlets. Though millions of Germans couple him with Goethe and Wagner, Hitler did not pardon the Jehovah of psychoanalysis the crime of being a Jew. As Nazi legions swept imperiously through Viennese streets in March, 1938, Sigmund Freud was hastily whisked to Paris then England with no baggage but a few books and manuscript of his daring work *Moses and Monotheism.* In London, an expatriate,

stripped of his money and possessions, but armed with the consciousness of a life well spent in pursuit of man's noblest profession, he died: an uncompromising thinker, a foe of hypocrisy, an inveterate mind explorer.

XVI: Crusaders of Mental Hygiene

AT THE close of the mauve decade, the people of the United States had not too many reasons for complaint. Admiral Dewey had just showed the world the efficiency of the American naval forces in Manila Bay and Hobson had dared all for his country at the mouth of Santiago Harbor. Teddy Roosevelt's Rough Riders swept before them the picked troops of a dying European monarchy. Mark Twain was making the characters of the hinterland beloved the world over. The muckrakers, headed by Lincoln Steffens, were ferreting out corruption in high places in our municipalities and striking out for liberalism in government affairs. Led by a fearless Chief Executive, the nation's legislators made trust-busting a national pastime, and the octopus of Big Business was thought to be well on its way to be scotched. Railroads, steel factories, oil fields, were increasing their production, and the national income was mounting. Faster ships were crossing the ocean and the keel of the first *Mauretania,* Queen of the Atlantic, was soon to be laid.

Europe's teeming thousands were turning their hopes and the sweat of their brows into gold in the New World. The Broadway of Oscar Hammerstein was preparing for the Floradora girls; Sarah Bernhardt was making her last farewell; the Gibson girl was spreading her charm into every corner of the literate world. In college, university, and laboratory, in countinghouse, mill, and drafting-room, there was relative prosperity and with it self-satisfaction.

But Dr. Adolf Meyer, pathologist and director of psychiatry at the Worcester Insane Hospital, was not content. Sitting in his chair as docent in psychiatry at Clark University in Worcester, he was pondering the problem of the tardiness with which the world recognized the problem of the mental patients. In spite of advances in neurology and the subject of "lunacy," as it was then called, the mental patient was still considered by the majority of doctors and by all laymen as a creature apart. Life stopped when the doors of the mental hospital opened and resumed only when the patient was—if at all—restored to the community and the home. Dr. Meyer, who had come to psychiatry through a thorough training in neurology, had thought long and deeply upon this problem of the life of mental patients outside asylum walls.

At that time Adolf Meyer was a comparative stranger to the American scene. Of Germanic stock, he was as indomitable, long-lived, and honest as those immutable hills that rear themselves above the village of Nieder Weningen, near Zurich, where he was born. Rudolf Meyer was his father and Anna Walder his mother. Rudolf was a comfortably situated burgher who enjoyed life to the full. Anna was artistic, high-keyed, with something of the gloom of the

mountain shadows that caused her to suffer long periods of melancholia. She had three "nervous breakdowns" during Adolf's childhood and gymnasium years in Zurich. Definitely they turned his thoughts toward the practice of medicine, and in particular, of mental medicine. He kept asking himself, while cramming to pass the Swiss *Staatsexamen* to admit him to practice: "May I not be able to do a little to find out what causes; adorable people like my dear mother to sink into uncontrollable fits of depression?"

When the Swiss Republic legally and officially licensed Adolf to practice medicine, he did not just settle down to bind up frost-bitten toes or advise old ladies as to their gastronomic excesses. He traveled all over Europe for graduate studies in pathology, neurology, and, above all, to inquire into the causes of "mental alienation." For the next few years his quest carried him to Paris, London, Edinburgh, Vienna, Berlin. Everywhere he found that the influence of neurology had forced the acceptance of the watchword "Insanity is a brain disease." The then "modern" view was that there simply could not be a mental disorder without a corresponding brain lesion. Human brains of patients who had made the melancholy passage from asylum to the morgue were subjected with eagerness to the microscope and the dissecting knife. The brain structure was minutely explored in the hope that a cause of nervous disease could be discovered. Though the laboratory attack was carried on vigorously, the admission had to be made after a time that the powerful dyes used on brain tissues did not show any distinction between the brains of diseased and normal persons.

To this inquiring young Swiss it seemed that everywhere

the living clinical approach to nervous disorders was being sacrificed to a premature science of pathology. So in 1892, at the age of twenty-six, he decided to come to America to strike out on his own. Dr. Meyer landed at the Battery in New York in September, 1892, and, with recommendations that had been sent ahead, was enrolled as fellow and docent in neurology in the Uniyersity of Chicago. His high caliber was evident. The next year, and through 1895, he was pathologist at the Illinois Eastern Hospital for the Insane at Kankakee, Illinois. Kankakee was the institution which served the city of Chicago. Under the leadership of Dr. S. V. Clevenger, the hospital administration had been wrested from the political machine of the state. Clevenger, whom Victor Robinson calls the "Don Quixote of psychiatry," appointed Meyer as pathologist to the hospital at a time when American alienists of the old school were complaining of the "modern, crazy German pagans [psychiatrists], who are trying . . . to break down all the safeguards of Christian civilization."

Here Dr. Meyer began to marshal his radical ideas. At first dimly, then as an inescapable truth, he formulated his concept: To envision man and his behavior as a whole, not motivated by a myriad of minute brain cells,' but swayed and governed by every motion and sentiment to be what he was, or hoped to be. Methodically, honestly, in Teutonic fashion, he began to assemble his ideas into a workable medical discipline. Then suddenly, early in 1894, there came a letter from Dr. Silas Weir Mitchell, America's foremost neurologist, who had been asked to deliver the address on the occasion of the Fiftieth Anniversary of the Association of Medical Superintendents of American Institutions for the

Insane, then known as the American Medico-Psychological Association. Weir Mitchell had consented with the understanding that he would be free to represent the best professional opinion in the country. He wrote to Dr. Meyer, already a recognized authority: "I am told that I shall have full freedom. To enable me to carry out this plan I have addressed duplicates of this letter to a few of the leading American neurologists, and to certain consultants not neurologists. May I ask you to answer the following question: Do you think the present asylum management of the insane is as good as it could be made? What faults do you find with it? If you had full freedom to change it what would you do?"

This inquiry from Weir Mitchell brought to a boiling climax the "border warfare," now a generation old, between neurologists and the superintendents of the insane asylums. For almost a hundred years a small group of doctors had been in control of the country's crazier citizens. By the hundreds these mentally disturbed people were segregated in institutions which, even for that day and age, were architectural eyesores. The majority of these institutions, after the old English custom, were called simply lunatic asylums. Others softened themselves into "hospitals," "retreats," "sanitariums." Each was in charge of the superintendent, a doctor, and his assistants. These doctors, for the most part, were admittedly unusual—not to say peculiar—individuals. Some were attracted to their chosen vocation by morbid impulses in their own natures, or by alcohol, or by downright incompetence for general practice. Others had found it financially advantageous to supplement the meager returns of country medical practice by boarding

harmless lunatics in their homes. Still others were appendages of local or state political machines, whose love of Bacchus exceeded that for Hippocrates.

Whatever the motive that drew them into their somber calling, these men, and there were a few conscientious physicians among them, became the first of America's psychiatrists. Behind their barred doors and high walls, they formed a cult apart. Each, in his own compound, was a monarch. They spoke a strange jargon intelligible only to their fellow Yogis. An aura of mystery and superstition enveloped them. Occasionally they stalked forth from their monasteries of the mad to testify in court for fees that grew fatter and fatter. Everyone agreed that the alienist of the 19th century walked in paths green and lush.

This, then, was the situation when Weir Mitchell sent out his "request for information and advice." It was a situation to which young Adolf Meyer, not quite thirty, had already given considerable thought.

Weir Mitchell and Adolf Meyer! Men of similarities and contrasts. Both were honest and sincere believers in humankind and in man's progressive possibilities. Mitchell was a practicing physician; Meyer was a laboratory scientist. Mitchell possessed imagination, as witness his shelf of novels; Meyer possessed a deep feeling for those nervously ill. Projected into practical medicine by chance during the War between the States, Mitchell the artist had become America's most eminent neurologist. In army hospitals he investigated postparalytic chorea; the relation of eyestrain to headache; the immunity of the pigeon to opium; the toxicology of rattlesnake poison; the fate of muscles and nerves cut by Confederate bullets; and so on. Meyer was not

studying pigeons, rattlesnakes, or turtles, but he was looking into what made Mitchell and the rest of us carry on.

So Adolf Meyer journeyed to Philadelphia and seated himself in the audience that mild May evening in 1894 when Weir Mitchell faced the newly christened American Medico-Psychological Association, now the American Psychiatric Association, and delivered himself of the most scathing indictment ever brought by one group of the medical profession against another.

Weir Mitchell's charge against the lunatic-asylumists was three-fold: that, carefully sequestering themselves out of range of critical shot, they ignored the advancing currents of the thought of other medical specialists; that they made no attempt at competent or independent research; that they spurned even primary therapeutic and curative facilities.

"What have you taught us," thundered the grizzled old warrior of neurology, "of the 91,000 insane whom you see or treat? What of the human soil in which the disorder exists? Why, the cloistered lives you men lead gives rise, we of general medicine think, to certain mental peculiarities which I have long observed in you asylum superintendents! You hold to and teach opinions which we have long learned to lose. One is the superstition (almost it is that) to the effect that an asylum is in itself curative. You hear the regret in every report that patients are not sent soon enough, as if you had ways of curing which we have not. Upon my word, I think asylum life is deadly to the insane. . . . They are placed in asylums because of the widespread belief you have so long, and as we think, so unreasonably fostered, to the effect that there is some mysterious therapeutic influence to be found behind your walls and locked doors. We hold the

reverse opinion, and think your hospitals **are never to be used** save as the last resource."

Dr. Mitchell was speaking of the widely advertised claims of mental cures made by hospital superintendents during the middle of the 19th century. When Captain Basil Hall, the British traveler, came back from Hartford with glowing reports of 90 per cent cures of mental patients, superintendents of other American institutions began claiming up to 100 per cent cures of their insane patients. Optimism and doctored figures were responsible for the hoax, which had a long life. It was not until about 1880 or later that sober and critical alienists began to question these statements. The "cult of curability," as Albert Deutsch so aptly called it, died a hard death.

Smiling quietly amid dead silence, Dr. Mitchell continued: "I have found some heads of asylums a trifle shy about the question of discussing the occasional use of mechanical restraint. We of general medicine think it is a question past argument. It should never be used. Many years ago, during the Civil War, I got a lesson never since forgotten. I tried them once on myself a half hour. Before ten minutes had gone I began to have a half frantic sense of desire to fight for freedom. . . . Try it, and you will think long before you add to insanity this temptation to be violent. We of general medicine think also of your constantly locked doors and barred windows as being but reminder relics of that dismal system which we are pleased to think is gone forever. I presume that you have, through habit, lost the sense of jail and jailer which troubles me when I walk behind one of you and he unlocks door after door. Do you think it is not felt by some of your patients?"

There was a murmur of denial among the audience, but Weir Mitchell turned again to the attack. Why, when patients were discharged as cured or "improved," was no attempt made at follow-up psychiatric treatment? At a most difficult period of his readjustment to social and economic life, no helping hand was extended to the ex-lunatic. Instead, he rejoined his frightened or ignorant family and iagain became part of a prejudiced community which firmly believed "once insane, always insane."

Yes, that was the crux of the matter, and admirably put, too. Dr. Meyer nodded with approval as Weir Mitchell rammed his points home, and he reviewed in his mind his own thoughts on this problem of extramural treatment of mental patients. Aftercare and organized research into the social aspects of insanity, it seemed to Meyer, were the crying needs of psychiatry. Not for eight years did opportunity present itself, however, to make a practical application of his plans. While he served as pathologist and later director at the Worcester Insane Hospital he thought and organized his plans for the new day. Then, in 1902, he was appointed director of the Pathological Institute of the New York State Hospitals, and Meyer was ripe for a career as a *doer*. That same year he married Mary Potter Brooks of Newburgh, New York, and she and their daughter,' Julia Lathrop Meyer, have been his "right-hand men" for many years.

Meyer already was beginning to evolve his system of *psychobiology*, the biology of man as a mental and physical whole. The central idea of Meyer's psychobiology arose from a consideration of a tactical mistake which scientists had been making up to the 20th century. It was implied in the notion that in order to be scientific one had to dissect the

person into a myriad of detachable cells and elements, mental and physical. This orientation in science dividing the individual into a body and a mind went back to the 17th-century mathematician-philosopher Rene Descartes, who influenced psychology so strongly. The older religious philosophers like Thomas Aquinas were wiser, thought Meyer, since they considered bbdy and mind a unit, the product of one act of creation. Besides, that is the common-sense way forced on anyone who examines a man's life history from the cradle to the grave. Yes, man is a *unit,* a *psychobiologic* integration. When one looks at humans in this light, the meaning of behavior, both normal and abnormal, becomes so much less mysterious, less shrouded in technical terms, more understandable.

Using a psychobiological approach, mental illness could be conceived as the result of unhealthy, abnormal ways of living rather than of any specific physical or mental complaint. In other words, a maladjustment of the *whole personality* had occurred. It was obvious then, Meyer reasoned, that in his practical work with patients the physician must consider man in *all* his aspects—social, economic, hereditary, physical, mental, emotional, spiritual. As Meyer's ideas spread, his teaching became the foundation of the American school of psychiatry. It touched at one point the philosophy of John Dewey, whose faith in progress has influenced a generation of American thinkers, at another point the Behaviorism of Watson,' and at a third the growing interest in the less-than-insane mental problems which educators are forced to face. His papers and addresses appeared with regularity, were read and reread, and the influence of his psychobiology spread to almost everyone who worked with

mental cases. Meyer's importance is that very influence, his teaching of how to *think* of mental patients, how to interview them, how to gather material for a case (and therefore life) history, how to deal with them as sensitive bundles of humanity. Meyer, the Swiss emigrant, has given form, substance, and human kindness to American psychiatry.

s Dr. Meyer's career, which started with an idea, had the happy result mentioned above. When he moved to New York armed with his ideas and a reputation for erudition, the opportunity for action presented itself. When he took hold in New York,' the Pathological Institute (through his insistence its name was changed to Psychiatric Institute in 1908) occupied commodious quarters in a metropolitan skyscraper. Meyer moved it to Ward's Island, site of the Manhattan State Hospital, where the staff could have direct contact with the sick men, women, and children it was seeking to help. He organized a clinical department, instituted training courses for physicians from other state hospitals, and turned the attention of his research men away from the morbid material of the deadhouse to the living patients in the crowded wards of Manhattan State Hospital. To ohr tain the necessary facts upon which to base proper treatment, Dr. Meyer evolved the "psychiatric interview," a long interrogation of every detail of personality development that is now used in every well-run mental hospital. This "Outline of Psychiatric Examination" has been a standard for a quarter-century.

Another innovation was the training of young men and wdmen, some medical students, some laymen, to go out into the community, interview the friends, family, and employers of as many patients as possible and bring back a full report

on the patient's life history. This was the beginning of the so-called psychiatric social worker, now to be counted by the scores in every large city. It was the beginning, also, of closer ties between the social sciences and psychiatry. Weir Mitchell's criticism of the "mystery men of medicine" was bearing fruit.

"At first our staff physicians made these visits to the homes of patients and wrote up the case histories," recalls Dr. Meyer. "But soon I realized they had to have help. So, in 1904, I enlisted the services of my wife. She volunteered to visit my personal patients at Ward's Island and also their families in the city. And I must say," he added with a twinkle, "she did her work well." Thus was obtained help in a broader social understanding of problems and a reaching out to the *sources* of sickness, in the family and in the community.

Dr. Meyer early saw the need of a great psychopathic hospital in New York City (there was then nothing but the psychopathic wards in musty old Bellevue Hospital). Through his efforts and those of Dr. Frederick Peterson, president of the New York State Commission in Lunacy, and other progressive men, in 1904 the state legislature authorized the city of New York to "acquire a site and to lease the same to the State for the establishment thereon of a Reception Hospital for the Insane." The plan did not come to actual fruition, but in 1929 the state undertook to build such a hospital when the Psychiatric Institute was opened as an affiliated unit of the huge Columbia-Presbyterian Hospital Medical Center. The Institute, rising twenty stories above the Hudson River in upper Manhattan,' has

beds for two hundred patients and unexcelled facilities **for** research and psychiatric education.

Meanwhile, Adolf Meyer had been called to Baltimore to direct the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital. The Phipps Clinic was opened in 1913; and here for a quarter of a century Dr. Meyer has lived and worked. Under his guidance the Phipps Clinic has become one of the world's most famous centers of psychiatric treatment and research. At Phipps the stream of psychiatric research has been broadened and deepened. His system of psychobiology, "the psychiatric interview," and other features, has been adopted by those of his colleagues (Harvey Cushing calls them Nut Pickers) who are not theory-ridden or chained to tradition. Each year more and more psychiatrists, whether in hospital or in private practice, are endorsing Meyer's contention that in mental disorders it is not only the nerves or the brain or the glands or the emotions or the environment that must be considered, but the sum total of all these factors. "Mind," says Meyer, "is sufficiently organized living being in action and not a peculiar form of stuff. Mental activity is really best understood . . . as the adaptation and adjustment of the individual as a whole." Meyer added to psychiatric knowledge the sorely needed viewpoint "that man undissected is more real and important to us than the paradox of a divided individual. We [need to] train out methods on our facts . . . instead of trimming our facts to suit mere methods."

Meyer's life is monastic in its simplicity; he is completely absorbed in his work. His intellectual stamina is phenomenal. Few will dispute the fact that no other one of the two thousand-odd members of the American Psychiatric

Association is able to subject himself to such a long, punishing toil as this seventy-three-year old savant continues. When at work, Meyer rigidly excludes from his mind everything except the particular problem engaging him. His students at Phipps Clinic tell of an occasion when the late Queen Astrid of the Belgians visited the clinic. She waited a long time, then walked into the sanctum of the dignified gentleman with the grizzled beard. "Dr. Meyer," she said, pleasantly, "pcrmit me to introduce myself. I am the Queen of the Belgians." The Doctor looked up, a gleam of professional interest in his eye. "Ah, yes," he said. "And, madam, how long have you thought that you were Queen of the Belgians?"

At the time that Adolf Meyer was reorienting psychiatry in the direction of bringing the mental patient closer to his normal brethren, another event of mighty significance to the cause of mind-exploring occurred. A young Yale graduate was committed to a mental hospital as violently insane! It required this man's commitment, the work and counsel of Meyer, and millions of written and spoken words to dispel what Dr. Walter Bromberg has called "man's dark shadow," the shadow that has dogged man's footsteps almost from the time he stood erect on two feet. Today the dark shadow is slowly lifting. In nearly every country of the world there is a mental-hygiene organization striving to prevent and to cure dreaded mental illness.

Clifford Whittingham Beers, author of the most widely read autobiography of modern times, *The Mind That Found Itself,* was the young Yale graduate who became a crusader of mental hygiene. Until he suffered a mental

breakdown at twenty-four, Beers's life was uneventful. An elder brother had been stricken with epilepsy. Following an attempted suicide, caused by the delusional belief that he too was developing this dread malady and his preference of death to life as an epileptic, he threw himself from a fourth-story window of his home, miraculously escaping death by landing on soft earth. Following this tragic occurrence, his family first placed him in a general hospital, where his physical injuries were treated, then for eight months, in a private sanitarium finally under the care of an attendant. Since he was still in an uncommunicative and depressed state of mind after many months, he was committed to the Retreat at Hartford, Connecticut.

Here for fourteen months Beers remained in the same depressed and delusional state of mind in which he had entered. His description is both fascinating and of value to medical science. "My quarters were comfortable," he says in his book, "and after a little time I adjusted myself to my new environment. . . . I soon became accustomed to the rather agreeable routine, and had I not been burdened with the delusions which held me a prisoner and kept me a stranger to my old world, I should have been able to enjoy a comparatively happy existence." Then on August 30, 1902, which Beers calls the second anniversary of his mental rebirth, his condition changed within a fraction of a second, the depression giving way to its opposite—great elation. "Medically speaking, I was as mentally disordered as before, yet I was happy I . . . No man can be born again, but I believe I came as near to it as ever a man did. To leave behind what was in reality a hell, and immediately have this good green earth revealed in more glory than most men ever

sec it, was one of the compensating privileges which make me feel that my suffering was worth while. . . . At first I seemed to live a second childhood. I did with delight many things which I had first learned to do as a child. . . . I had much lost time to make up; and for a while my sole ambition seemed to be to utter as many thousand words a day as possible."

The day after this transition Beers attended service in the Retreat's small chapel. The minister that day read the Forty-fifth Psalm. It kindled a spark in Clifford Beers that *never* died out. "Gird thy sword upon thy thigh, O most mighty. . . . And in thy majesty ride prosperously because of truth. . . . Thine arrows are sharp in the heart of the King's enemies, whereby the people fall under thee. . . . Thou lovest righteousness and hatest wickedness. Therefore God, thy God, hath anointed thee with the oil of gladness above thy fellows." Earlier there had been the phrase "My tongue is the pen of a ready writer," and Beers's elated mind was already seething with the idea of reform. Suddenly it was clear to him—the pen was *his* weapon. As the good minister read the last prophetic verse,* "I will make thy name to be remembered in all generations," his mind was made up. It is to be doubted if the majestic words of the Forty-fifth Psalm ever fell upon more fertile soil than they did on that memorable Sabbath. The immediate effect, though, was painful for Beers. During his years of suffering and confinement he had witnessed many acts of abuse and cruelty. Patients were kept under lock and key, beaten, confined in strait jackets, thrown into dank, dark "strong" rooms; and there was seldom any effort to aid in their recovery. Dorothea Dix's 19th-century crusade against complacent

asylum superintendents had been forgotten. Mental hospitals were run by men who, if not vicious, in many instances were narrow, ignorant, bigoted, and untrained.

Highly exalted and with energy once more coursing through his brain and body, Beers resolved to reform the system. Many patients with firsthand knowledge of asylum conditions had made that same vow. The remarkable thing about this particular patient was that he kept his oath and that he succeeded. He started his great crusade with the Retreat itself as his realm of exploration. This resolve had as its first result a heart-rending struggle, marked by much turbulence. On one occasion Beers was confined for twenty-one consecutive nights in a strait jacket in a padded cell. A feud soon developed between himself and the assistant physician in charge of his case, and vituperative encounters were frequent. Apparently Beers was least troublesome when he had plenty of paper and writing materials; he speaks of using large strips of manila wrapping paper as stationery,' and his hourly output was something like twelve feet long. He talked to every patient within reach and made mental notes of what they said. The assistant physician retaliated by cutting off his precious writing material. Beers promptly staged a one-man rebellion. He quieted somewhat only upon the infrequent appearances of the aging superintendent. During the periods when Beers was able to handle the case himself, peace was somewhat restored.

There is a record of the superintendent's having put in at least one timely appearance. A very docile, refined, well-educated, and traveled gentleman in his middle fifties became one of Beers's ward mates. They soon developed a warm friendship, with Beers taking the newcomer under his

all-protecting wing. This patient was very sensitive about taking his daily walk in prisonlike file with the other patients, and since earlier new arrivals had never been required to exercise in this manner, Beers assured his bewildered and timid friend that he would settle the matter for him. A few words with a big strapping attendant resulted in a scuffle in which another patient joined. When the superintendent appeared at the door, he beheld (using Beers's own description) "an insane man being choked by a supposedly sane one, and he in turn being choked by a temporarily sane insane friend." A graduate of Yale himself, the superintendent is reported to have said: "You don't know how it grieves me to see you, a Yale man, act so like a rowdy." To which Beers said that if protecting the rights of others was being a "rowdy," he was content to be one.

Life quieted down for a while after that. But when the superintendent again took to his bed, Beers found himself in seclusion under the orders of "Jekyll-Hyde," as he called the assistant physician. Seclusion then meant the padded cell, which at the time was deemed the last word in modern restraint, and the camisole, a modified form of strait jacket. Most of these measures were taken as a direct aftermath of a faked-up suicide attempt (to gain attention) and other energetic experimental forays which Beers ventured in the cause of reform. In November, Beers's eldest brother, who acted as his conservator, had him transferred to the Connecticut State Hospital at Middletown, feeling he would not be any worse off there. Here after a couple of weeks he again became inquisitively experimental, with the result that he fared as badly as he had at the Retreat. Happily, during the following summer his period of elation waned and he

was able to leave the hospital to return to the world he had known before his breakdown.

"I left the state hospital in September, 1903," Beers has said, "firmly determined to write a book about my experiences and to organize a movement that would help do away with existing evils In the care of the mentally ill and, wherever possible, to prevent mental illness itself. Most of my friends and acquaintances looked askance at these aspirations. They thought that my plans were grandiose, and under the conditions, I suppose that their skepticism was justifiable. Not all of my acquaintances, however, were unconvinced of the feasibility of my projects. One was my boyhood friend, Victor Morris Tyler, who gave me not only moral support, but timely loans which, fortunately, I was later able to repay. The other was also a friend of my early days, Clara Louise Jepson, who later became my wife. She it was who consigned to oblivion many cherished but superfluous passages that otherwise might have remained in the manuscript of my autobiography and crept into print to plague readers later." Those who know Mrs. Beers say that her influence upon his career cannot be overestimated.

Beers realized sagely enough that he must first prove to himself, his employers, and to the world at large that he was again sane. When traveling in connection with his business duties, he visited mental institutions in various cities, adding to his ammunition. Toward the end of 1905, however, he became so eager to put his project to actual test that his brother, fearing another period of elation was at hand, persuaded him to return to the Hartford Retreat. This he did for a month as a voluntary patient. This admission was uneventful. There was a new, younger, and more responsive

superintendent and "Jekyll-Hyde" was gone. Beers described this second and last stay in an institution as follow*: "The doctors and attendants treated me as a gentleman. Therefore it was not difficult to prove myself one. My every whim was at least considered with a politeness which enabled me to accept a denial with a highly sane equanimity. Aside from mild tonics I took no other medicine than that most beneficial sort which adheres in kindness. The feeling that, though a prisoner, I could still command obligations from others led me to recognize my own reciprocal obligations, and was a constant source of delight. The doctors . . . all evinced a consistent desire to trust me. In return I trusted them."

Beers also describes, amusingly, a business interview that took place at this time: "As business interviews go, this was in a class by itself. While my attendant stood guard at the door* I, an enrolled inmate of a hospital for the insane, entered the banking room and talked with a level-headed banker, who, of course, was unaware of my being a mental patient at the time. And that interview was not without effect in subsequent negotiations which led to the closing of a contract amounting to one hundred and fifty thousand dollars."

When he left the Retreat he resumed his business position, and it was not until 1906 that he again found time to work upon his manuscript. Then the words poured out. Taking a leave of absence, Beers called upon two stenographers "to help in the sharing of my thoughts." With a rough draft of the manuscript as an introduction, he called upon William James at the latter's home in Cambridge, Massachusetts. The famous psychologist-philosopher was

cordial, but wary. He told Beers that he was a target for all sorts of dreamers and cranks, pointed to a pile of unread manuscripts on his desk, and said it might be months before he could make time to read his story. "Nevertheless," Beers relates, "Professor James soon dipped into my manuscript, read it through promptly, and then sent me an approving letter that was to serve as part of the Introduction to the first edition of my autobiography, which appeared in 1908. Though Professor James's approval was not that of a psychiatrist, it marked the turning point in my struggle for support. With this great American on record as to the psychological and literary value of my story, other important leaders, including psychiatrists, soon came to my aid." James wrote of Beer's story: "It sounds like fiction but it is not fiction."

Next he set out to obtain the approval of the country's recognized leading psychiatrist, Dr. Adolf Meyer, then director of the New York State Psychiatric Institute. It was Adolf Meyer who suggested the name "mental hygiene" for the movement Beers was promoting, and it was he who, because of his vast experience and profound knowledge, was able to formulate a basic plan for the work. Though the term "mental hygiene" was not new—it had been used occasionally by psychiatric writers of the nineteenth century, both here and abroad—it did not come into general usage until the movement got under way. Adolf Meyer approached Beers's book soberly and intently. He recognized its intrinsic worth. "Since about a month ago, when Mr. Clifford W. Beers was introduced to me," wrote Meyer, "I have had an unusual experience in finding in him a man not only without a chip on his shoulder, but one with a sound and worthy

conviction that something must be done to meet one of the most difficult, but also lamentably neglected problems of sociological improvement. . . . It looks as if we had at last what we need: a man for a cause. . . . Information must be put into practical form for communication and teaching, and brought home where it will tell. . . . A Society for Mental Hygiene, with a capable and devoted and judicious agent of organization, will put an end to the work of makeshift and shortsighted opportunism, and initiate work of prevention and of helping the existing hospitals to attain what they should attain. . . . What officialism will never do alone must be helped along by an organized body of persons who have set their hearts on serious devotion to the cause. . . . Here is a man who is not afraid of the task. May he get the help to enable him to surround himself with the best wisdom of our Nation!"

Beers was so encouraged that he resigned his job early in 1907 and devoted his entire time to completing his book; it was published in March, 1908. In May he founded in Connecticut the first society for mental hygiene ever established. From then on the movement rapidly gained momentum. Adolf Meyer's championship had already attracted medical men throughout the country. Among these was Dr. William H. Welch of the Johns Hopkins University, who contributed more to the advancement of scientific medicine in America than any physician of his day. The time was ripe for the initiation of Beers's crusade. In the field of social welfare and public health the cry was prevention, rather than merely court-plastering the triple menaces of evil—poverty, delinquency, disease. "The cyclic interaction of these major social ills," points out Albert Deutsch, "was

discerned with increasing clarity. Poverty was a prolific mother of both delinquency and disease; disease, in its turn, bred more poverty, and so ran the vicious cycle." It was the dawn of community health service. Federal, state, and local agencies were pushing control and improvement into the dark corners of tuberculosis, pellagra, hookworm, and anemia. The time for prevention had come to stay. Meyer the mind explorer joined with Beers the mind colonizer in a vigorous application of prevention to mental problems. Andrew Carnegie and John D. Rockefeller, Sr., ruthless business geniuses of their day, were, strangely, the first to grasp the new ideal. Both began distributing large amounts of their vast fortunes for research and human betterment. On every board, on every committee, Dr. Welch had his place. This great benefactor of mankind wrote Beers that his book had greatly influenced Henry Phipps in his endowment of the new Psychiatric Clinic at Johns Hopkins. Later, Mr. Phipps forwarded to Dr. Welch a gift of $50,000 for use in Ameliorating the condition of the insane." That contribution put the movement on its feet.

Progress up to then had been slow. Beers was deeply in debt on account of the work, but his faith remained unshaken. The atmosphere of suspicion in which he had begun his work may be illustrated by an incident occurring at the founding of the pioneer Connecticut Society for Mental Hygiene. Among the fourteen persons present was Dr. Diefendorf, a psychiatrist who had known Beers six years earlier at the Connecticut State Hospital. When Beers was nominated as secretary of the society, Dr. Diefendorf stated bluntly: "I wish to state that Mr. Beers is now sane." On February 19, 1909, the National Committee for Mental

Hygiene was founded at a meeting held at the old Manhattan Hotel in New York Gfy. Its treasury was empty. Two years later the Phipps manna fell from the skies, and subsequently grants were received from funds and foundations, conspicuous among them being the Rockefeller Fpundation$_f$ the Commonwealth Fund, the Milbank Memorial Fund, the General Education Board, the New York Foundation, and the Carnegie Corporation of New York. Substantial gifts and bequests were also received from individuals of vision and public spirit.

Altogether Beers and his associates have raised and expended in the work of the National Committee during the past thirty years more than $3,500,000. This sum seems impressive, but it is only a drop in the ocean compared to the yearly economic loss through mental disease. This economic loss, the cost of maintenance and the stoppage of earnings for the nearly half million patients in our mental institutions, is authoritatively estimated at the staggering total of $750,000,000 a year.

In March, 1912, the late Dr. Thomas W. Salmon, a man of astonishing force and ability, with wide experience in psychiatry and public-health work, became medical director of the National Committee and served for ten years. "Dr. Salmon," Beers says, "placed the active work of the National Committee, indeed the whole movement, on a sound and scientific basis." Dr. Salmon was a rare combination of idealist and executive. He, calm, constructive, and convincing, and Beers, dynamic, persuasive, and persistent, made a perfect team. Later, as a Lieutenant-Colonel in the A.E.F., Dr. Salmon organized the army's neuro-psychiatric service in France; and after the war he was chiefly instru-

mental in forcing indifferent or laggard politicians to establish a chain of veterans' hospitals for former soldiers suffering from shell shock and other nervous diseases.

The National Committee for Mental Hygiene, under Dr. Salmon's direction, put workers in the field and, state by state, made the first actual and accurate survey of the extent of mental illness in the United States. It assembled masses of firsthand data on actual conditions prevailing in public, private, and semiprivate institutions, including almshouses and poorhouses in every section of the country. On the basis of this information, it organized a systematic, unsensational campaign of education. It used the press, the lecture platform, the radio, scientific and nontechnical journals; it backed research men, and helped organize local self-supporting mental-hygiene societies in many states.

From the beginning Beers had visioned a world-wide organization. In 1917 Dr. Clarence M. Hincks of Toronto dropped in to see him. The result was the founding of the National Committee for Mental Hygiene of Canada. "That was a long step forward—but no seas had yet been crossed," noted Beers. "I saw the need for an International Congress and in 1919 appointed an organizing committee. It took eleven years to bring that Congress to fruition." Slowly the movement spread. In various parts of the world national organizations were established. In May, 1930, Clifford Beers, who thirty years before was a mental patient under confinement in institutions, was the leading figure at the first International Congress on Mental Hygiene, held in Washington, D. C, with delegates from fifty-three nations and from all the six continents in attendance. At this congress, under Beers's inspiration, the International Committee for

Mental Hygiene was founded. Two years earlier Beers had founded the American Foundation for Mental Hygiene, which seeks a large endowment for use in financing the work in this country on a liberal scale, especially that of the National Committee for Mental Hygiene, the. pioneer and leading national agency.

Today in the United States alone there are more than six hundred mental-hygiene clinics, many of which carry on child-guidance work, whereas virtually none existed when the movement began. Although ia most states laws are still archaic, new and more liberal social attitudes are being reflected in legislation. There is a new understanding of delinquents and criminals. The movement has spread into a wide educational field—the home and the schools. Better still, we have learned that at best "sanity" and "insanity" are purely relative terms; that "insanity" is not a disgrace; that most of us, in our nervous and emotional structure, are "in-betweens," victims "not of sins but of symptoms." The chances for prevention and cure of faulty mental adjustment are becoming better every day.

For this changed outlook, the bulldog courage and luminous idealism of one man, Clifford Beers, and his epoch-making autobiography, are largely responsible. Honors have, of course, been conferred on Clifford Beers in recognition of his unique and heroic services to mankind, among them an honorary degree of Master of Arts from Yale University; the Cross of Chevalier of the Legion of Honor from the French Government; and the Gold Medal of the National Institute of Social Sciences. The most unusual honor, however, was the collection of Twenty-fifth Anniversary tributes from leaders in all parts of the world,

gathered by **the** late **Dr.** William H. Welch, and later published in a book entitled *Twenty-Five Years After: Sidelights on the Mental Hygiene Movement and Its Founder.* The most vividly descriptive tribute of all was written by Dr. G. Alder Blumer, superintendent emeritus of Butler Hospital in Providence, Rhode Island, a pioneer himself during the first of his fifty years in psychiatry. Dr. Blumer said of Beers in part: "His eagerness, intensity, pertinacity, untiring energy, geniality, approachableness and ease of approach, fluency of speech—these, as well as other contributory elements in a Pauline make-up have stood him and his evangel in good stead as an indomitable apostle. Without them his mission would not have been crowned with so quick success or endured to flourish and grow wherever the good seed had been planted. . . . No 'push' for Clifford Beers, save that of his own ardent spirit and high courage; no 'pulP save that of might and main to fulfill his humane vision. For he is in the Temple of Fame by inherent right of entry; and in that part of it dedicated to the daughter of Aesculapius his name will stand out in bold relief with those of Philippe Pinel, William Tuke and Dorothea Dix . . • who wrought with like zeal and effectiveness to save and succour the wretched in whose cause Clifford Beers, went forth valiantly to battle twenty-five years ago."

Clifford Beers the crusader has achieved his objective. What spurred him on was the never-to-be-forgotten words of an eminent psychiatrist and hospital superintendent: "After all, what the insane most need is a friend**I**"

XVII: Mental Science and the Future

WITH the story of the mental hygienists, we have reached the last of our mind explorers. Many stalwart investigators have been slighted, much that is fascinating in this search for illumination on the mind's action has been left untouched, important ideas that tomorrow may lead to the solution of problems which *ndw* loom impregnable have been scarcely mentioned. A few stars in a scientific Milky Way were all we could glimpse through our roving tclescope, but these glimpses at mind explorers give us an appreciation of those who are to follow.

Psychology has unlimited possibilities once its relation to our daily attitudes and decisions is realized. The work of the future will be to bring the results of psychological study to bear *on* interpersonal relationships in the home, on the job, during the social hour, and in the trading mart. The psychology that will do this will be of no one school or theory, but a combination of everything that is usable, from the dog experiments to psychopathology. For the

final value of the mental sciences is in its use in aiding anxious, distressed humanity and in improving and lubricating the activity of "adjusted" people. Here is a formidable task for the future psychologist. For progress is slow at best, even after the scientist has reproduced nature in the laboratory and proved his assertions beyond doubt. One of the reasons for this is the cultural lag, the time required for dissemination of new ideas and new ideologies into the various institutions of the prevailing culture. New concepts, after they are translated out of the language of science and forged into a practical reality, must get into the press and literature, onto the radio, and into the speech and thought of the common man. Woodrow Wilson once said that the trouble with a new idea was that it took twenty years for it to be absorbed by the public. Ideas touching on our mental functions, where educational and healing aspects of them are concerned, require much time for absorption. Old traditions must die off and obstructions to clear thinking must be removed. Darwinism was the center of a raging intellectual battle for a half-century after its enunciation, and even within a decade of the present time schoolteachers were hailed into court for teaching evolutionary theories to their pupils in our free and democratic country. Yet the theory of evolution has revolutionized biological and philosophical thought.

Beyond the influence of this cultural lag, there is the handicap that psychology as such is still remote from people's thoughts. Although psychological principles guide the man in the street in his choice of newspaper, the clothes he wears, and the politics he argues, he will have none of them in their scientific garb. The wonderful thing about

psychology is that, like a much-publicized cathartic, it works while you sleep. The boy who yearns to be in the uniform of a cadet corps is moved by psychological principles he would hardly recognize if he *met* them in a textbook. People buy clothes, read advertisements, and pound the bar in political debate under the invisible control of well-studied principles, such as mass suggestion, visual perceptive configurations (Gestalten), and the unconscious love or hatred of their fathers I But this few men would concede, for psychology came to life through an esoteric source, philosophy. Because of this heritage, it will reach the stage of popular appreciation only slowly. Some of this philosophical aura still clings to psychology. We have seen in Chapter X how the divorce of psychology from philosophy (and recent thinkers are working anew for a reconcilation between the two) had to wait until the European culture of medievalism was superseded by a wave of objectivity. The 18th century, we remember, brought psychology close *to* measurable science, permitting men to look at the mind and its function with a new objective freedom. One of the reasons for this was the success of the physical sciences—chemistry, physics, and electricity—which gave humans the means to control their environment so marvelously. If man-made science could tame nature the untamable, how miraculous must be the tool—-the human mind—that itself fashioned science. Thus this ancient curiosity about man's mind was stimulated ajiew, giving impetus to growth of a new field of inquiry, Darwinism and the development of medical science, notably bacteriology, completed the emancipation of psychology from the grip of religion and philosophy. It was through the demonstration that invisible bacteria, not

evil spirits, cause infection of human tissues or dead bits of animal matter that the last shred of evidence for the spontaneous generation of life, a notion defended to the death by Pasteur's enemies, was destroyed. And so psychologists, unfettered, could and will go on searching into the mind and the soul and their creations, and into the mind's view of the mind's creations.

Psychology, free from impediments of a moral type, bounded forward into the study of behavior, first of animals, then of children, and finally of adults. While this was occurring in the realm of psychology proper, psychiatry was making advances in therapy. With psychopathology, the study of mental abnormalities, well understood, every type of clinical case was at last treated intelligently. But after years of sincere and well-directed effort psychiatrists were forced to admit that they were blocked in their ability to modify successfully mental disorders like the dread dementia praecox. When all looked hopeless, fresh hints came from medical brethren in the i93o's as to the use of substances effecting the chemistry of the body. A whole new field of research opened up and psychiatrists were still busy trying to fix the actual value of insulin and the drug metrazol in the treatment of serious mental disorders. From here they were led into prying into the mysteries of the sympathetic nervous system and the hormones secreted by the internal glands, which so powerfully affect human behavior. The future will place much reliance on the delicate chemistry of the brain and nervous tissue, and on the measurement of electrical activity in the brain tissue by the electroencephalograph, an astounding instrument that transcribes electrical potential of brain waves into the lines of

t graph on a strip of paper. The actual "currents of thought" measured by this ingenious machine will shed light on what happens, and why, in the "master tissue" of the body.

With research steadily advancing along every front, mind explorers may well be exuberant today. They prophesy that the present century will be to the science of mind what the last one was to physical medicine. They are highly individualistic men and women—and their lives are as challenging as their quest.

The scene, too, has shifted somewhat from Europe to the New World. The great pioneer energy which had formed a new country, built a vast industrial empire, is invested in psychology in America. The United States had certain advantages to offer new and old scientists. Here religion from the outset has had freer expression than in the older countries; and our history is too brief for tradition to have settled inflexibly over our lives. In America science meets with little opposition; on the contrary, it is literally enthroned. The big industrial magnates, amazed and some perhaps a bit awed at the huge fortunes they had amassed during their lifetimes, developed a benevolent turn which in the changing order of today is too often overlooked. Unlike the European magnate, who would establish his heirs for generations to come, the American millionaire endowed universities, libraries, hospitals, and laboratories for scientific research. Due chiefly to these princely outpourings, no other country in the world at the present time enjoys such magnificent scientific equipment and facilities as does the United States.

In America, also, mind explorers have had opportunity

for the immediate trial and practical application of their findings. In advertising, industry, education, art; in homes, hospitals, institutions for the mentally afflicted, penitentiaries, juvenile courts—indeed in every phase of modern life—there are evidences of their recent discoveries. They have revolutionized our care of children, for we know now that what goes into those little heads will come out some day—and the selection of mental diet is becoming just as important as that of food. In choosing vocations and adjusting lives, the mind explorers are erecting new guideposts, not too distinct as yet, but still pointing the way. The New World stands out as a future home of mind explorers. For here, intellectual vigor, untrammeled curiosity, and self-criticism exist side by side and nourish the life-blood of science.

Reading Suggestions

THERE is no attempt here to give the original or secondary sources of material utilized in this book. This list constitutes merely a few suggestions for the general reader who wishes to pursue any one stage in the development of the mental sciences from the days of Mesmer up to the present. Each of the special fields of psychiatry and psychology have a tremendous literature which is available in medical and scientific libraries.

I. ***Craniology and phrenology*** **(see also original works by Gall, Spurzheim and Combe):**

Encyclopedia Britannica**—nth Edition. Articles on Franz Gall and Phrenology, Vol. 4, p. 406; Vol. 11, p. 411; Vol. 21, p. 535.**

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Index

Abreu, Rosalia, 257
Absolute truth, 159, 169, 173
Academy of Medicine, 105, 108
of Sciences, 47, 49, 104
Adler, Alfred, 208, 325, 326
Adolescence, 187, 198, 205, 214
Africa, 125, 126, 127, 129, 131
Agassiz, Louis, 152, 154, 172, 196, 264
Albany, 32, 147, 186
Alienist, 24, 73
Amativeness, 9, 18, 26, 27, 30
American: Ass'n. Advancement of Science, 235
Ass'n. of University Professors, 209, 234
Institute of Phrenology, 33
Journal of Phrenology, -25, 34
Journal of Psychology, 201
Medico-Psychological Ass'n., 337, 339
Men of Science, 232
Phrenological Society, 8, 31
Psychiatric Ass'n., 92
Psychological Ass'n., 203, 209, 255, 339
Anatomy, 9, 15, 16, 17, 18, 22, 23, 25, 28, 42, 43, 65, 122, 152, 192
Angel, James R., 257. 258, 288, 289
Animals, 16, 22, 35, 68, 105, 133, 136, 220, 252, 265-6-7-8-9, 270-1, 275-6-7-8-9, 280-1-2-3, 289, 290-1-2-3-4, 296-7-8, 307-8
Anthropological Society, 130, 139
Anthropology, 127-8-9, 135, 144, 196, 201, 232, 257-8-9, 260-1-2
Anthropometric, 115, 118, 134-5, '38, 141, 239
Aristotle, 1, 196, 249
Army Alpha and Beta Intelligence Exam., 255-6-7
Associationists, 216-7-8-9, 220, 232
Atwood, Wallace W., 209
Audubon, 150
Austria, 4, 6, 9, 15, 16, 21, 22, 73. *43» 213

Bain, 217
Baquet, 50, 51, 67
Barbey, 109
Barclay, 18
Barnes, Harry Elmer, 204
Barthez, Paul Joseph, 65
Bartlett, Dr., 32
Beauchamp ("Sally"), 113
Bedlam, 59, 80
Beecher, Henry Ward, 190, 191

Beers, Clifford W., 156, 346-7-8-9. 250-1-2-3-4-5-6-7. 359
Behaviorism, 2, 170-213, 214, 218, 219, 251, 253, 285-6-7-8, 294-5-6-7-8-9, 300-1-2-3-4-5-6-7-8-9, 310, 34*
Bell, Sir Charles, 216
Betlevue Hospital, 327, 344
Bergson, Henri, 174
Berlin, 16, 17, 192, 193
Bernheim, Dr., 109, no, 193, 318
Bertillon, M., 135
Bicetre, 57-8-9, 61, 63, 69, 70, 72, 73, 75, 76, 85
Binet, Dr. Alfred, 109, 238, 239, 241, 244* 275
Binet-Simon, 109, 239, 247
Bingham, Harold C, 259
Birmingham, 20, 117, 119, 120, 122-3-4, »33
Bloodletting, 5, 41, 59, 81, 87, no
Bloomingdaie Asylum, 90
Bhuner, G. Alder, 359
Bordeu, Theophile, 66
Boring, Edwin G., 184, 247
Boston: 8, 30-1-2, 113, 198, 200, 232, 254. 324
Botany, 42, 43, 47, 65
Braid, James, 40, 55, 107
Brain, 7, 8, 9, 11-2-3-4-5-6-7-8-9, 12-3-4-5-6-7, 34-5r 4*-2, 87, 99, 102, 164, 215
Brazil, 152-3-4, 171
Breuer, Joseph, 312-3-4, 318-9, 321
Bridgman, Laura, 75
Brill, A, A., 325
British Institute of Psychology, 231
Bromberg, Walter, 315, 346
Brown, Thomas, 216
Brown-Sequard, 152
Bumps, 7, 12, 13, 18, 23, 25-6-7, 30, 91, 189, 325
Butler, Nicholas Murray, 233, *J4» 235

Cabanis, Dr., 60, 61
Call, Annie Payson, 180
Cambridge, 122, 124, 152, 160, 168, 170-i, *95, 224
Capen, Dr., 30, 31
Carlylc, Thomas, 51, 54, 150
Carnegie, 233-4, 257-8, 325, 355-6
Catalepsy, 96-7-8
Catholic, 131, 207
Cattell, James McKeen, 183, 201, 214, 222-3-4-5-6-7-8, 230-1-2-3-4-5-6-7-8, 241, 264-5-6
Central Normal College, 240, 241
Cerebral, 15, 31, 35, 55
Charcot, Jean Martin, i, 40, 56, 94-5-6-7-8-9, 100-1-2-3-4-5-6-7-8-9, no, 112, 113, 158, 195, 221, 316
Chautauqua, 37, 168
Chemistry, 2, 22, 43, 68, 122, 124, 213
Chicago, 170-171
Chorea, 65, 103
Church, 3, 4, 7, 9, 16, 30, 31, 43, 64, 105, 157, 215
Clark, Jonas Gilman, 201-2-3
Clark University, 160, 201, 203, 205, 208, 209, 242-3-4, 324, 334
Clergy, 5, 17, 26, 130, 131, 167
Coffeehouses, 10, 46, 74, 80
College des Doctrinaires, 63
of Medicine, 85
RoIHn, 108
Color, 19, 117, 132, 139
Columbia University, 181, 225, 226, 232-3-4-5, 262, 264, 270
Combe, George, 8, 29
Composite photograph, 135, 136
Connecticut, 83-4-5-6, 350
Convolutions, 15, 17, 18
Corvisart, Dr., 22, 23
Couthon, 61-2-3, 70
Cranial: 7, 8, 17, 18, 20-1-2-3-4, 27, 28, 34, 35, 42, 73, "3, 215
Cruveilhicr, 103
Cullen, Prof. Wm., 66
Cupping, 41, 87
Cushing, Harvey, 345
Cuvier, 21, 68

Danton, 60, 69
Darwin, Charles, 119, 124, 128, 130, 133, 143, 149, 153, 179, 188, 195, 206, 208, 218, 305, 361, 362
Davis, D. D., 72
Dearborn, W. F., 232
Death masks, 13, 23
de Condi 1 lac, Etienne B*, 13, 14
de Haen, Anton, 4
Demonomania, 5, 105, 315
lie Mureau, Abb6, 13, 14
de Puys6gur, Marquis, 5$
de Sauvage, Boissier, 65
Descartes, Ren6, 5, 215, 342
de Sevigne, Mme., 24
Deslon, Charles, 52, 53
Destructiveness, 18, 23, 27
Peutsch, Albert, 340, 354
Dewey, John, 170, 172, 201, 287-8-9, 342
Dickinson College, 27
Dix, Dorothea L., 92, 348, 359
Dubois-Reyrnond, 196
Dumontpallier, 108
Durbin, J., 27

Ebbinghaus, 182, 219
Edinburgh, 8, 24, 29, 78, 86, 182
Ehrlich, 327
Elder, James H., 259
Electricity, 41, 42, 47, 97, 213
Electrotherapy, 317
Eliot, Charles W., 158, 195, 199, 258
Ellis, Havelock, 322
Emerson, Ralph Waldo, 31, 150
Empiricism, 218
England: 5, 6, 8, 13, 18, 20, 21, 27-S-9. 55, 59» 72, 76, 77, 81, 82, 96, 116, 117, 119, 120, 127, 129, 130, 132, 133. 135. 144, 145, 182, 213, 216
Erb, 317
Eiquirol, Dr., 75, 89
Ethnological Society, 129
Eugenic, 117, 129, 132, 133, 136, 143
Europe: 2, 3, 5, 21, 22, 26, 49, 60, 76, 79, 91, 108, 123, 129, 151, 155, 182, 191, 202, 208, 215, 364
Evolution, 129, 130, 149, 153, 156, 175, 176, 210, 211, 213, 218, 223, 266

Fabre, Henri, 252
Faculties, 18, 24, 114, 138, 216
Faculty of Medicine, 7, 48, 49, €0, 64, 66
Faculty theory, 35, 216
Faith cures, 105
"Family of minds", 147
"Father of Child Psychology", 199
Fechner, 161, 217
Ferrus, Dr., 75, 81
Fevers, 5, 42, 44, 65, 68, 84, 87, 101
Finger-prints, 134, 135
Fishbein, Morris, 323
Fisher, Cornelia, 196
Fletcher, Horace, 181
Flourens, Pierre, 21, 22, 34, 35, 277, 278
Forehead, 11, 26
Forster, Dr., 28
Fourier, 149
Fowler and Wells, 31, 33, 34, 189
France: 3, 6, 8, 13, 21, 22, 24, 55, 61, 72, 73, 76, 80, 82, 94, 108, III, 215, 216
Franklin, Benjamin, 41, 53
Franz, S. I., 232, 277-8-9, 283
French, 3, 4, 5, 13, 20, 21, 25, 43, 51, 54, 57, 58, 60, 62, 68, 69, 7$, 7$, 77, 94, 104-5-6, 112, 151, 157, 215
Freud, Sigmund, 104, 112, 140, 164, 166, 198, 208, 221, 304, 312, 314-5-6-7-8, 320-1-2-3-4-5-6-7-8-9, 330, 33i
Furman University, 287

Galen, 5, 40
Gall, Franz Joseph, 1, 6, 7, 8, 9, 10, 11, 12, 13, 15-6-7-8-9, 20-1-2-3-4-5-6-7-8, 31-2-3-4-5-6, 42, 43, 55, 73, 91, 213, 215, 276, 283
Galton family: 118, 119, 123, 124-5-$
Galton, Francis, 114-5-6-7-8-9, iao-i-2.3.4.5-6-7-8-9,130-1-2-3-4-5 135-

6-7-8-9, 140-1-2-3-4-5, 164, 168, 213, 224, 239, 241, 249
Galvani, 41
Gates, Dr., 226, 228, 229
Genetic psychology, 197, 206, 208, 210, 218, 223
George I I I , 79, 80, 81
German: 5, 6, 15-6-7, 21-2-3, 55, 94, 144, 151, 155, 156, 161, 169, 170, 171, 182, 191, 192-193, 196, 216, 217, 315, 324
Gesell, Arnold, 203, 308
Gestall, 220, 251, 362
Gilrnan, Daniel Coit, 200, 204
Gladstone, 134
Glass harmonica, 43, 50
God, 16, 24, 116, 148, 153, iS9, 172, 175, 176, 185, 187, 191
Goddard, Henry, 239, 244
Goff, Judge, 240
Grattan, Hartley, 147
Greek, 2, 119, 121, 133, 272, 274
Greeley, Horace, 150
Guinea pigs, 115, 138

Hall, Capt. Basil, 89, 90, 340
Hall, Stanley G., 160, 183-4-5, 187-8-9, 193, 196-7, 199. 200-1-2-3-4-5, 206-7-8-9, 210, 214, 218, 223, 238, 241-2-3, 267, 324
Hallucinations, 44, 140
Harmonic Society, 52, 55, 56
Harriet Lane Children's Hospital, 293, 296
Harris, William T., 195
Hartford, 82, 85, 88, 90, 91, 93
Harvard, 31, 148, 152, 156-7-8, 170, 171, 174, 184, 195, 200, 209, 224, 253, 263, 275
Hebrew, 2, 194, 272
Hegel, 169, 18s
Hell, Father Maximilian, 44
Helraholtz, 196, 216
Herbart, 216
Herbs, 5, 40, 41, 67
Heredity, 117, 132, 142, 145
Hincks, Clarence M., 357
Hippocrates, 65, 338
Hitler, Adolf, 331
Hollingworth, H. L., 232
Hopkins, Mark, 188
  William, 122
Homey, Karen, 328
Hosmer, James K., 194, 197
Howell, William, 291
Howland, John, 293
Hufeland, Dr., 17
Hull, Clark, 287, 309
Human: 2, 3, 9, 10, 12, 14, 20, 30, 114, 115, 118, 158, 142, 205
Humanitarian, 60, 61, 8s, 93, 212
Huneker, James, 178
Huxley, 149, 195
Hydrocephalic, 15
Hypnosis, 39, 56, 95-6-7-8, 106-7-8-9, 112, 113, 164, 196, 221, 318, 320
Hypnotical Congress, 108
Hypnotism, 31, 37-8-9, 40, 55, 95, 99, 105, 107-8-9, 110, 213
Hysteria, 4, 5, 50, 95-6-7-8, 104-5-6-7, 109, 110-1-2-3

Ideality, 19, 29
Idiot, 74, 75, 95, 135
Imagery, 138, 139, 140, 168
Impressionists, 94
Individuality, 19, 171
Infant prodigy, 118, 120, 128
Ingerhouse, 47, 48
Insane, 2, 12, 13, 24, 25, 62, 70, 73, 77-8-9, 80-1-2, 84-5-6, 88, 90, 92, 93, 95, 103, 129, 140, 33S
Institute of France, 8, 21, 22, 24, 72, 73
Intellect, 2, 3, 4, 12, 20, 24, 29, 174
Intelligence, 15, 115, 144, 204
  Quotient, 245-6-7, 252, 275
Internatl. Magnetic Congress, 108
(9th) Congress of Psychologists, 23s
Introspectionists, 159, 162, 165, 166, 184, 213, 214, 218, 219, 220, 305
Itard, Jean Marc Gaspard, 73-4-5, 238

Jacobin, 30, 61, 69

James-Lange Theory, 180
James, Henry Jr., 147, 151, 153, 172, 176, 182
Henry Sr., 148, 1491 150, 151, 155
William ("Old Billy"), 147, 148, 150
William, 1, 35, 146, 147, 150-1-2-3-4-5-6-7-8-9,160-1-2-3-4-5-6,167-8-9, 172-3-4-5-6-7-8-9, 181, 182, 184, 196, 214, 218, 223, 224, 263, 264, 286, 287, 293, 294, 352, 353
Janet, Pierre, 112, 158, 221, 322
Jastrow, 201
Jekyll-Hyde, 113, 348, 352
Johns Hopkins University, 200, 204, 291, 293, 299, 300, 345, 254, 355
Jones, Mary Cover, 306
Jones-Watson project, 307
Journal Amer. Medical Assn., 323
de Paris, 53, 67
des debats, 73
of Speculative Philosophy, 195
Jung, Carl, 208, 324, 326

Kant, 188, 215
Keller, Helen, 75
King's College Medical School, 122, 124, 125
Kluver, 287
Koffka, 220
Kohler, 220, 251
Kraepelin, 311
Krafft-Ebing, 322
Kiilpe, 220

Lafayette College, 223
La Fontaine, 108
Lange, 191
Lashley, Karl S., 275-6-7-8-9, 280-1-2-3, 291
Latin, 5, 43, 65, 118, 119, 121, 270, 272-3
Lavoisier, 52
Lavour, 63
Lazarus, Prof., 198
Legrand, Prof., 38
Leland Stanford University, 240
Lemonnier, 66, 67
Leroux, 54
Lethargy, 96-7-8, 108
Liebeault, Dr., 109, 196, 318
Liegcois, 108
Linnaeus, 65
"Little Corporal", 22, 73, *76*
Locomotor ataxia, 101
Lodor, Dr., 16
London Royal Academy, 47
University, 114, 144
Louis XVI, 6, 52, 53, 66
Lowell Institute, 181
Ludwig, Dr., 197
Lunatic, 1, 3, 58, 61, 63, 71, 72, 77, 79, 81

Magendie, 216
Magnet, 40-1-2, 44-5-6-7, 50, no
Magnetism, 40-1-2, 44-5-6-7-8-9, 50-2-3-4-5-6, 108, 213
Manchester, 107, 133
Manhattan State Hospital, 343
Mann, Horace, 90, 91, 92
Massachusetts General Hospital, 91, 154-
Legislature, 90
Maria Theresa, 4, 43, 44, 48
Mark Twain, 146, 333
Maternal love, 24, 26
Mathematics, 2, 43, 63, 65, 66, 68, 122, 124, 203, 213
McCosh, James, 223
McDougall, William, 303, 304, 305
Medical, 4, 5, 6, 11, 27, 28, 30, 34, 41, 44, 49, 52, 55, 82, 95, 108, no
Medicine, 4, 5, 7, 9, 10, 16-7-8, 47, 54, 63, 65, 67, 68, 75, 76, 83, 100, 102, 105, 123, 124, 156, 213
Medieval, 40, 41, 76, 95, 105, 113, 121
Melancholic, 25, 84
Memory, 9, 10, 11, 26, 36, 162, 182, 201, 210, 229
"Memory Thompson", 26
Mencken, H. L., 256
Mendel, 142
Mental Hygiene, 156, 179. 353. 354
Mercier, Charles, 59

Index

Mesmer, Friedrich Anton, 7, 37, 39, 40-1-2-3-4-5-6-7-8-9, 50-1-2-3-4-$-6, 60, 67, 79, 113, 213
Mesmerism, 31, 37-8-9, 55, 56
Metaphysical, 27, 149, 156, 166
Metternich, prince, 9
Meyer, Adolf, 71, 299, 334*5-6-7-8-9, 341-2-3-4-5-6, 353, 3S5
Bona, 191
Meynert, 315, 317
Microscope, 1, 99, 152
Miles, Catherine Cox, 249
Mill, James, 216, 217
Millerites, 31, 32
Mind, 1, 2, 4, 11, 13, 14, 18, 34, 160, 161, 215, 217, 283, 303, 345
Mind explorers, 1, 2, 7, 113, 115, 141, 183, 214, 222, 251, 360, 364
Minerals, 5, 40, 119
Mirabeau, 60
Miracles, 40, 46, 105
Mitchell, S. Weir, 111, 311, 336-7-8-9, 340, 341, 344
Montesquieu, 58, 60
Montmartre, 52, 94
Monrpellier, 64, 65, 66
Moron, 239, 240
Mozart, Wolfgang, 43-4-5-6
Muller, 216
Multiple sclerosis, 102-3-4
Munsterberg, Hugo, 168, 254
Murray, Lindley, 78
Museum of Comparative Anatomy, 27
Science and Industry, 114
Mysticism, 1, 41, 42, 55, 215

Nancy, 27, 108, 109
Napoleon, 22, 23, 54, 72, 80, 81, 106
National Assembly, 60, 69
Institute for Deaf and Dumb, 74
Research Council, 234, 257
Negro, 130, 133, 134
Neryes, 26, 46, 112
Nervous illness, 1, 40, 102, 111, 112
system, 1, 8, 11, 14, 15, 56, 102, 103, 166, 177, 178, 215, 216
Neurohypnosis, 55
Neurology: 1, 7, 28, 34, 35, 95, 98, 99, 102-3-4, 106, 111, 112, 152, 158, 212, 213, 221, 281, 336, 337
Neuropathology, 254, 316
Neurosurgery, 7
Newcomb, Simon, 204
New England, 31, 82, 85, 91, 137, 192, 202, 214, 286
New Haven, 82, 83
New Republic, 303
New World, 83, 93, 364, 365
New York, 30, 57, 147, 150, 151
Herald, 240
Hospital, 90
Society of Neurology and Electricity, 104
Tribune, 193
Novelist, III, 146, 148, 160
Numbers, 138, 139

Oesterlin, Franzl, 44, 45, 47
"Old Vienna" school, 4, 43, 48
"Our Lady of Lourdes", 105
Ovampo Tribe, 127, 131
Oxford University, 182

Palsy, 102, 103
Papini, Giovanni, 170, 182
Paracelsus, 40, 41, 113
Paralysis, 45, 63, 102, 111
Paralytic, 95, 99, 102, 206
Paris, 3, 6, 20, 21, 23, 25, 27, 31, 49, 52, 53, 54, 57-8-9, 60, 61, 66, 68, 69, 74, 85, 94, 95, 100, 104, 108
Pasteur, 105, 363
Pavlov, 219, 251, 269, 295
Pearson, Karl, 143
Pedagogy, 199, 200, 201, 203, 205, 210, 211
Peirce, Charles S., 154, 156, 159, 169
Pepys, Samuel, 59
Sir Lucas, 80
Perception, 19, 34, 138, 144, 199, 216, 217, 224
Perfectionists, 31
Personality, 12, 112, 113
Peterson, Frederick, 344
Philadelphia, 30, 86, 91, 111, 204

Philophregenitiveness, 18, 26, 27, 29
Philosophers, 2, 5, 13, 21, 54, 71, *137, 149*, 170, 174, 176, 209, 215
Philosophical Congress, 182
Philosophy, 1, 13, 43, 55, 64, 144, 150, 155, 158, 163, 177, 188, 212, 215, 221
Phrenology, 6, 7, 8, 9, 18, 24-5-6-7-8-9, 30, 32-3-4-5. 39, 56, *91*, 124
Physics, 43, 47, 67
Physiognomy, 8, 10, 13, 19, 28, 33
Physiology, 65, 124, 155-6, 158, 163, 187, I96-7, 212, 215, 217
Pillsbury, Prof., 323
Pinel, Philippe, 1, 3, 24, 25, 57, 60-1-2-3-4-5-6-7-8-9, 70-1-2, 74-5-6, 81-2, 85-6, 89, 93, 213
Pitres, Dr., 97
Plants, 39, 40-1, 43-4, 50
Pluralism, 173-4
Poffenberger, A. T., 232
Potter, (Bishop) Alonzo, 153
Priests, 5, 45, 63-4, 75, 105
Prince, Morton, 113
Princeton, 139, 148, 223
Pragmatism, 159, 169, 170, 172, 174, 176-7, 287
Prayer, 3, 130, 131
Propensities, 18, 24, 25, 29
Pruette, Lorine, 204
Psychiatric Association, 92
Institute, 243, 344
Psychiatry, 2, 76, 91, 103, 140-1, 192, 221, 238, 249, 299, 327-8, 336, 341, 344, 363
Psychic medium, 164, 343
Psychoanalysis, 105, 208, 213, 218, 304, 305, 314
Psychoanalytic Association, 208, 324
Psychobiology, 71, 213, 253, 255, 341, 342
Psychogenesis, 201
Psychologic, 3, 9, 107, 113, 133, 136, 138-9, 161, 176, 178, 183-4, 201, 204-5, 212
Psychologist, 162, 165, 167, 176, 182, 187, 198, 283, 287, 289, 300, 306, 311
Psychology, 1, 2, 3, 32, 35-6, 40, 75, 107, 111, 113, 136, 139, 140, 142, 144-5-6, 156, 157-8, 160, 163, 166, 175-6, 178-9, 181, 184, 187, 195-6-7, 200-1-2-3, 204, 208, 210-11-12, 214, 216-7, 220-1-2, 224, 231, 234-5, 238, 247
Psychometric, 141, 224, 232
Psychopathology, 42, 112-3, 141, 221, 255, 312, 360, 363
Psychophysical, 161, 201, 217

Quaker, 1, 77-8-9, 81-2, 119, 129, 134, 144
Queen of France, 13
Germany, 17
Mary of Scots, 23
Victoria, 117, 121, 122, 131
Quimby, Phineas, 181

Rank, Otto, 328
Reich, Wilhelm, 328
Reil, Christian, 16
Religion, 1, 23, 31, 105, 108, 116, 130, 149, 153-4, 175-6, 188, 196, 305,
Renouvier, 157, 166
Repression, 320-321
Republicans, 105, 171
"Retreats", 77-8-9, 81, 86, 88-9, 90-1-2-3, 129
Ribot, 219, 223
Richet, Charles, 95, 97, 106-7
Robespierre, 69
Rockefeller, 203, 258, 355-6
Rome, 170, 182, 215
Rotation Test, 292
Rousseau, 3, 60, 74
Royal: 47, 53-4, 63, 72, 76, 104, 126-7, 130, 136-7
Royce, Josiah, 171

Salmon, Thomas W., 356-7
Salpetriere Hospital, 56, 75, 94-5-6, 100-1-2-3, 106-7, 109, 113, 316-7-8
Santayana, George, 170-1-2

Index

Science: 2, 3, 6, 8, **17,** 22, **28, 42,** 55-6, 70, 95, 108, 116-7, 134, 153
Scotland Yard, 135
Seligman, Jesse, 194
Skull, 7, 8, 9, 11-2-3, 15-6, 18, 21, 23, 24-5. 27, 42, 73, 213, 283
Spinal cord, 15, 17, 26, 99, 102-3, 164
Sommerling, 15
Split personality, 112-3
Spurzheim, Johann Christoph, 8, 17-8, 21, 23-4-5-6-7-8-9, 30-1-2, 34, 9t
St Virus's dance, 65, 103
"Standard Oil Institution", 203
Stanford-Binet, 228, 244-5-6-7
Steffens, Lincoln, 160, 333
Stream of consciousness, 161-2
Subconscious, 110, 112-3, 141
Subliminal self, 164, 175-6
Supernatural, 2, 3, 5, 28, 70, 174, 181
Swedenborgian, 149, 150, 176
Sydenham, 65
Syphilis, 101, 327

Terrnan, Lewis M., 203, 240-1-2-3-4, 246-7-8-9, 250, 256, 275
Thorndike, Edward Lee, 232, 263-4-5-6-7-8, 271-2-3-4, 292
Thou ret, Prof., 54, 60-1
Todd, Eli, 82-3-4-5, 88-9, 90-1-2-3
Touch, 14, 23, 165, 217
Trance, no, 164, 312-3
Tuke (William) family: 77-8-9, 81-2, 92-3, 129, 359
Twins, 309

Unconscious mind, 163-4, 17$
United **States,** 31, 82, 88-9, 90, 129-139, **234**

Van Swieten, Dr., 4, 48
Victorian, 110, 120, 198
Vienna, 4, 5, 6, 7, 9, 10-1-2, 15-6, 20-1, 43-4, 48-9
Virchow, 192, 196
Voltaire,, 3, 4, 6, 23, 27, 60, 64, 69
von Hohenhein, 40
von Strumpell, Adolf, 319

Wassermann Test, 250
Watson, John B., 170, 214, 219, 251, 285-6-7-8-9, 290-1-2-3-4, 297-8-9, 300-1-2-3-4-5-6, 309, 310, 342
Weber, 161, 217
Welch, William H., 354-5, 359
Weyer, Johann, 4, 5, 315
Wild Boy of Aveyron, 73-4-5
Williams, J. Whitridge, 293
Wilson, Woodrow, 205, 272, 361
Woodward, Samuel, 92
Woodworth, R. S., 220, 232, 271, 27
Wundt, Prof. William, 160-1, 18 195-6, 217, 224, 241

Yale, 82, 85, 148, 203, 254, 257, 28 308
Yerkes, Robert M., 247, 252-3-4 257-8, 260-1-2, 268, 291, 309
Yoakum, C. S., 257
Yogi, 174, 338
Young, Robert, 217