Man
The Unknown

BY

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Preface

THE AUTHOR of this book is not a philosopher. He is only a man of science. He spends a large part of his time in a laboratory studying living matter. And another part in the world, watching human beings and trying to understand them. He does not pretend to deal with things that lie outside the field of scientific observation.

In this book he has endeavored to describe the known, and to separate it clearly from the plausible. Also to recognize the existence of the unknown and the unknowable. He has considered man as the sum of the observations and experiences of all times and of all countries. But what he describes he has either seen with his own eyes or learned directly from those with whom he associates. It is his good fortune to be in a position to study, without making any effort or deserving any credit, the phenomena of life in their bewildering complexity. He has observed practically every form of human activity. He is acquainted with the poor and the rich, the sound and the diseased, the learned and the ignorant, the weak-minded, the insane, the shrewd, the criminal, etc. He knows farmers, proletarians, clerks, shopkeepers, financiers, manufacturers, politicians, statesmen, soldiers, professors, school-teachers, clergymen, peasants, bourgeois, and aristocrats. The circumstances of his life have led him across the path of philosophers, artists, poets, and scientists. And also of geniuses, heroes, and saints. At the same time, he has studied the hidden mechanisms which, in

the depth of the tissues and in the immensity of the brain, are the substratum of organic and mental phenomena.

He is indebted to the techniques of modern civilization for the possibility of witnessing such a gigantic spectacle. These techniques have enabled him simultaneously to give his attention to several subjects. He lives in the New World, and also in the Old. He has the privilege of spending most of his time in the Rockefeller Institute for Medical Research, as one of the scientists brought together in that Institute by Simon Flexner. There he has contemplated the phenomena of life while they were analyzed by incomparable experts such as Meltzer, Jacques Loeb, Noguchi, and many others. Owing to the genius of Flexner, the study of living things has been undertaken with a broadness of vision so far unequaled. Matter is investigated in those laboratories at every level of its organization, of its ascension toward the making of man. With the help of X-rays, physicists are unveiling the architectonic of the molecules of the simpler substances of our tissues—that is, the spatial relations of the atoms constituting those molecules. Chemists and physical chemists devote themselves to the analysis of the more complex substances encountered within the body, such as the hemoglobin of the blood, the proteins of the tissues and the humors, and the ferments responsible for the unceasing splitting and building up of those enormous aggregates of atoms. Instead of directing their attention to the molecular edifices themselves, other chemists consider the relations of those edifices with one another when they enter the fluids of the body. In short, the physicochemical equilibria that maintain constant the composition of blood serum in spite of the perpetual changes of the tissues. Thus

are brought to light the chemical aspects of physiological phenomena. Several groups of physiologists, with the aid of the most varied techniques, are studying the larger structures resulting from the aggregation and organization of molecules, the cells of the tissues and of the blood—that is, living matter itself. They examine those cells, their ways of association, and the laws governing their relations with their surroundings; the whole made up of the organs and humors; the influence of the cosmic environment on this whole; and the effects of chemical substances on tissues and consciousness. Other specialists devote themselves to the investigation of those small beings, the viruses and bacteria, whose presence in our tissues is responsible for infectious diseases; of the marvelous methods used by the organism in its fight against them; of the degenerative diseases, such as cancer, heart lesions, nephritis. Finally, the momentous problem of individuality and of its chemical basis is being successfully attacked. The writer has had the exceptional opportunity of listening to great men specialized in these researches, and of following the results of their experiments. Thus, the effort of inert matter toward organization, the properties of living beings, and the harmony of our body and our mind appeared to him in their beauty. In addition, he himself has studied the most diverse subjects, from surgery to cell physiology and to metapsychics. This was made possible by facilities which, for the first time, were put at the disposal of science for the performance of its task. It seems that the subtle inspiration of Welch and the practical idealism of Frederick T. Gates caused new conceptions of biology and new formulas for research to spring from Flexner's mind. To the pure spirit of science Flexner gave the help of new

methods designed to save the workers' time, to facilitate their free coöperation, and to create better experimental techniques. Owing to these innovations, one cannot only undertake extensive researches of one's own, but also acquire a first-hand knowledge of subjects whose mastery in former days necessitated the whole lifetime of several scientists.

We now possess such a large amount of information on human beings that its very immensity prevents us from using it properly. In order to be of service, our knowledge must be synthetic and concise. This book, therefore, was not intended to be a treatise on Man. For such a treatise would run into dozens of volumes. The author's intention was merely to build up an intelligible synthesis of the data which we possess about ourselves. He has attempted to describe a large number of fundamental facts in a very simple manner, and still not to be elementary. Not to indulge in scientific popularization or to offer to the public a weak and childish aspect of reality. He has written for the scholar as well as for the layman.

He fully understands the difficulties inherent in the temerity of his undertaking. He has tried to confine all knowledge of man within the pages of a small book. Of course, he has not succeeded. He will not satisfy the specialists, because they know far more than he does, and they will regard him as superficial. Neither will he please the general public, for this volume contains too many technical details. However, in order to acquire a synthetic knowledge of ourselves, it was indispensable to summarize the data of several sciences, and also to depict with bold and rapid strokes the physical, chemical, and physiological mechanisms hidden under the harmony of our acts and our thoughts.

We must realize that an attempt, however awkward and though partly a failure, is better than no attempt at all.

The necessity of compressing a large amount of information into a short space has important drawbacks. It gives a dogmatic appearance to propositions which are nothing but conclusions of observations and experiments. Subjects that have engrossed physiologists, hygienists, physicians, educators, economists, sociologists for years have often had to be described in a few lines or a few words. Almost every sentence of this book is the expression of the long labor of a scientist, of his patient researches, sometimes of his entire lifetime spent in the study of a single problem. For the sake of conciseness, the writer has been obliged briefly to summarize gigantic masses of observations. Thus, descriptions of facts have been given the form of assertions. To a similar cause may be attributed a seeming lack of accuracy. Most organic and mental phenomena have been treated in a diagrammatic manner. Therefore, things that markedly differ appear to be grouped together. As, at a distance, houses, rocks, and trees are not distinguishable from one another. It must not be forgotten that in this book the expression of reality is only approximately accurate. A brief description of an immense subject involves inevitable defects. But the sketch of a landscape should not be expected to contain all the details of a photograph.

Before beginning this work the author realized its difficulty, its almost impossibility. He undertook it merely because somebody had to undertake it. Because men cannot follow modern civilization along its present course, because they are degenerating. They have been fascinated by the beauty of the sciences of inert matter. They have not under-

ſtood that their body and consciousness are subjected to natural laws, more obscure than, but as inexorable as, the laws of the sidereal world. Neither have they underſtood that they cannot transgress these laws without being punished. They muſt, therefore, learn the necessary relations of the cosmic universe, of their fellow men, and of their inner selves, and also those of their tissues and their mind. Indeed, man ſtands above all things. Should he degenerate, the beauty of civilization, and even the grandeur of the physical universe, would vanish. For these reasons this book was written. It was not written in the peace of the country, but in the confusion, the noise, and the weariness of New York. The author has been urged to carry out this work by his friends, philosophers, ſcientiſts, juriſts, economiſts, with whom he has for years discussed the great problems of our time. From Frederic R. Coudert, whose penetrating vision reaches, beyond the horizons of America, those of Europe, came the impulse responsible for this book. Indeed, the majority of the nations follow the lead of North America. Those countries that have blindly adopted the spirit and the techniques of induſtrial civilization, Russia as well as England, France, and Germany, are exposed to the same dangers as the United States. Humanity's attention muſt turn from the machines and the world of inanimate matter to the body and the soul of man, to the organic and mental processes which have created the machines and the universe of Newton and Einſtein.

The only claim of this book is to put at everyone's disposal an ensemble of scientific data concerning the human beings of our time. We are beginning to realize the weakness of our civilization. Many want to shake off the dogmas

imposed upon them by modern society. This book has been written for them, and also for those who are bold enough to understand the necessity, not only of mental, political, and social changes, but of the overthrow of industrial civilization and of the advent of another conception of human progress. This book is, therefore, dedicated to all whose everyday task is the rearing of children, the formation or the guidance of the individual. To school-teachers, hygienists, physicians, clergymen, social workers, professors, judges, army officers, engineers, economists, politicians, industrial leaders, etc. Also to those who are interested in the mere knowledge of our body and our mind. In short, to every man and every woman. It is offered to all as a simple account of facts revealed about human beings by scientific observation.

MAN, THE UNKNOWN

FIRST EDITION

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Chapter I

THE NEED OF A BETTER KNOWLEDGE OF MAN

1. The sciences of life have progressed more slowly than those of inert matter. Our ignorance of ourselves. 2. This ignorance is due to our ancestors' mode of existence, to the complexity of man, and to the structure of our mind. 3. How mechanical, physical, and chemical sciences have modified our environment. 4. The results of such a change. 5. This change is harmful, having been made without due consideration of our nature. 6. Need of a more complete knowledge of ourselves.

I

THERE is a strange disparity between the sciences of inert matter and those of life. Astronomy, mechanics, and physics are based on concepts which can be expressed, tersely and elegantly, in mathematical language. They have built up a universe as harmonious as the monuments of ancient Greece. They weave about it a magnificent texture of calculations and hypotheses. They search for reality beyond the realm of common thought up to unutterable abstractions consisting only of equations of symbols. Such is not the position of biological sciences. Those who investigate the phenomena of life are as if lost in an inextricable jungle, in the midst of a magic forest, whose countless trees unceasingly change their place and their shape. They are crushed under a mass of facts, which they can describe but are incapable of defining in algebraic equations. From the

things encountered in the material world, whether atoms or stars, rocks or clouds, steel or water, certain qualities, such as weight and spatial dimensions, have been abstracted. These abstractions, and not the concrete facts, are the matter of scientific reasoning. The observation of objects constitutes only a lower form of science, the descriptive form. Descriptive science classifies phenomena. But the unchanging relations between variable quantities—that is, the natural laws, only appear when science becomes more abstract. It is because physics and chemistry are abstract and quantitative that they had such great and rapid success. Although they do not pretend to unveil the ultimate nature of things, they give us the power to predict future events, and often to determine at will their occurrence. In learning the secret of the constitution and of the properties of matter, we have gained the mastery of almost everything which exists on the surface of the earth, excepting ourselves.

The science of the living beings in general, and especially of the human individual, has not made such great progress. It still remains in the descriptive state. Man is an indivisible whole of extreme complexity. No simple representation of him can be obtained. There is no method capable of apprehending him simultaneously in his entirety, his parts, and his relations with the outer world. In order to analyze ourselves, we are obliged to seek the help of various techniques and, therefore, to utilize several sciences. Naturally, all these sciences arrive at a different conception of their common object. They abstract only from man what is attainable by their special methods. And those abstractions, after they have been added together, are still less rich than the concrete fact. They leave behind them a residue, too

important to be neglected. Anatomy, chemistry, physiology, psychology, pedagogy, history, sociology, political economy do not exhaust their subject. Man, as known to the specialists, is far from being the concrete man, the real man. He is nothing but a schema, consisting of other schemata built up by the techniques of each science. He is, at the same time, the corpse dissected by the anatomists, the consciousness observed by the psychologists and the great teachers of the spiritual life, and the personality which introspection shows to everyone as lying in the depth of himself. He is the chemical substances constituting the tissues and humors of the body. He is the amazing community of cells and nutrient fluids whose organic laws are studied by the physiologists. He is the compound of tissues and consciousness that hygienists and educators endeavor to lead to its optimum development while it extends into time. He is the *homo œconomicus* who must ceaselessly consume manufactured products in order that the machines, of which he is made a slave, may be kept at work. But he is also the poet, the hero, and the saint. He is not only the prodigiously complex being analyzed by our scientific techniques, but also the tendencies, the conjectures, the aspirations of humanity. Our conceptions of him are imbued with metaphysics. They are founded on so many and such imprecise data that the temptation is great to choose among them those which please us. Therefore, our idea of man varies according to our feelings and our beliefs. A materialist and a spiritualist accept the same definition of a crystal of sodium chloride. But they do not agree with one another upon that of the human being. A mechanistic physiologist and a vitalistic physiologist do not consider the organism

in the same light. The living being of Jacques Loeb differs profoundly from that of Hans Driesch. Indeed, mankind has made a gigantic effort to know itself. Although we possess the treasure of the observations accumulated by the scientists, the philosophers, the poets, and the great mystics of all times, we have grasped only certain aspects of ourselves. We do not apprehend man as a whole. We know him as composed of distinct parts. And even these parts are created by our methods. Each one of us is made up of a procession of phantoms, in the midst of which strides an unknowable reality.

In fact, our ignorance is profound. Most of the questions put to themselves by those who study human beings remain without answer. Immense regions of our inner world are still unknown. How do the molecules of chemical substances associate in order to form the complex and temporary organs of the cell? How do the genes contained in the nucleus of a fertilized ovum determine the characteristics of the individual deriving from that ovum? How do cells organize themselves by their own efforts into societies, such as the tissues and the organs? Like the ants and the bees, they have advance knowledge of the part they are destined to play in the life of the community. And hidden mechanisms enable them to build up an organism both complex and simple. What is the nature of our duration, of psychological time, and of physiological time? We know that we are a compound of tissues, organs, fluids, and consciousness. But the relations between consciousness and cerebrum are still a mystery. We lack almost entirely a knowledge of the physiology of nervous cells. To what extent does will power modify the organism? How is the mind influenced by the state of the organs? In what manner can

the organic and mental characteristics, which each individual inherits, be changed by the mode of life, the chemical substances contained in food, the climate, and the physiological and moral disciplines?

We are very far from knowing what relations exist between skeleton, muscles, and organs, and mental and spiritual activities. We are ignorant of the factors that bring about nervous equilibrium and resistance to fatigue and to diseases. We do not know how moral sense, judgment, and audacity could be augmented. What is the relative importance of intellectual, moral, and mystical activities? What is the significance of esthetic and religious sense? What form of energy is responsible for telepathic communications? Without any doubt, certain physiological and mental factors determine happiness or misery, success or failure. But we do not know what they are. We cannot artificially give to any individual the aptitude for happiness. As yet, we do not know what environment is the most favorable for the optimum development of civilized man. Is it possible to suppress struggle, effort, and suffering from our physiological and spiritual formation? How can we prevent the degeneracy of man in modern civilization? Many other questions could be asked on subjects which are to us of the utmost interest. They would also remain unanswered. It is quite evident that the accomplishments of all the sciences having man as an object remain insufficient, and that our knowledge of ourselves is still most rudimentary.

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Our ignorance may be attributed, at the same time, to the mode of existence of our ancestors, to the complexity

of our nature, and to the structure of our mind. Before all, man had to live. And that need demanded the conquest of the outer world. It was imperative to secure food and shelter, to fight wild animals and other men. For immense periods, our forefathers had neither the leisure nor the inclination to study themselves. They employed their intelligence in other ways, such as manufacturing weapons and tools, discovering fire, training cattle and horses, inventing the wheel, the culture of cereals, etc., etc. Long before becoming interested in the constitution of their body and their mind, they meditated on the sun, the moon, the stars, the tides, and the passing of the seasons. Astronomy was already far advanced at an epoch when physiology was totally unknown. Galileo reduced the earth, center of the world, to the rank of a humble satellite of the sun, while his contemporaries had not even the most elementary notion of the structure and the functions of brain, liver, or thyroid gland. As, under the natural conditions of life, the human organism works satisfactorily and needs no attention, science progressed in the direction in which it was led by human curiosity—that is, toward the outer world.

From time to time, among the billions of human beings who have successively inhabited the earth, a few were born endowed with rare and marvelous powers, the intuition of unknown things, the imagination that creates new worlds, and the faculty of discovering the hidden relations existing between certain phenomena. These men explored the physical universe. This universe is of a simple constitution. Therefore, it rapidly gave in to the attack of the scientists and yielded the secret of certain of its laws. And the knowledge of these laws enabled us to utilize the world of

matter for our own profit. The practical applications of scientific discoveries are lucrative for those who promote them. They facilitate the existence of all. They please the public, whose comfort they augment. Everyone became, of course, much more interested in the inventions that lessen human effort, lighten the burden of the toiler, accelerate the rapidity of communications, and soften the harshness of life, than in the discoveries that throw some light on the intricate problems relating to the constitution of our body and of our consciousness. The conquest of the material world, which has ceaselessly absorbed the attention and the will of men, caused the organic and the spiritual world to fall into almost complete oblivion. In fact, the knowledge of our surroundings was indispensable, but that of our own nature appeared to be much less immediately useful. However, disease, pain, death, and more or less obscure aspirations toward a hidden power transcending the visible universe, drew the attention of men, in some measure, to the inner world of their body and their mind. At first, medicine contented itself with the practical problem of relieving the sick by empiric recipes. It realized only in recent times that the most effective method of preventing or curing illness is to acquire a complete understanding of the normal and diseased body—that is, to construct the sciences that are called anatomy, biological chemistry, physiology, and pathology. However, the mystery of our existence, the moral sufferings, the craving for the unknown, and the metapsychical phenomena appeared to our ancestors as more important than bodily pain and diseases. The study of spiritual life and of philosophy attracted greater men than the study of medicine. The laws of mysticity became known

before those of physiology. But such laws were brought to light only when mankind had acquired sufficient leisure to turn a little of his attention to other things than the conquest of the outer world.

There is another reason for the slow progress of the knowledge of ourselves. Our mind is so constructed as to delight in contemplating simple facts. We feel a kind of repugnance in attacking such a complex problem as that of the constitution of living beings and of man. The intellect, as Bergson wrote, is characterized by a natural inability to comprehend life. On the contrary, we love to discover in the cosmos the geometrical forms that exist in the depths of our consciousness. The exactitude of the proportions of our monuments and the precision of our machines express a fundamental character of our mind. Geometry does not exist in the earthly world. It has originated in ourselves. The methods of nature are never so precise as those of man. We do not find in the universe the clearness and accuracy of our thought. We attempt, therefore, to abstract from the complexity of phenomena some simple systems whose components bear to one another certain relations susceptible of being described mathematically. This power of abstraction of the human intellect is responsible for the amazing progress of physics and chemistry. A similar success has rewarded the physicochemical study of living beings. The laws of chemistry and of physics are identical in the world of living things and in that of inanimate matter, as Claude Bernard thought long ago. This fact explains why modern physiology has discovered, for example, that the constancy of the alkalinity of the blood and of the water of the ocean is expressed by identical laws, that the energy spent by the contracting