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To CDMENU

THE SCIENCE OF MATERIALISM

By

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Liberty and the Great Libertarians
Equal Freedom and Its Friends
Freedom and Its Fundamentals
War, Its Cause and Cure
Mutual Service and Cooperation
Science Versus Dogma

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Emmett F. Fields
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Globed from the atoms falling slow or swift,
I see the suns, I see the systems lift
Their forms; and even the systems and the suns
Shall go back slowly to the eternal drift.

—LUCRETIUS.

INTRODUCTION

MATERIALISM is based on knowledge of external nature. Truth is knowledge of things as they exist.

Matter is the basis of natural science. Science without matter would be "spiritual science" or "Christian Science". Just as chemistry rests on the atom, so does science rest on matter.

Modern materialism holds to the uniformity of nature and the indestructibility of matter, just as ancient materialism did. It denies that there are any spiritual beings directing the course of events.

Matter manifests itself to a person through his five senses. The immaterial is non-existent. It produces nothing, for out of nothing, nothing comes. Matter in motion, acting through the five senses, produces knowledge.

All the manifestations of nature testify to the reality of matter. Not a movement is observed except of matter. Not a sound is heard except from a material source; not a thing is tasted that has not a material substance, not a whiff of odor from an immaterial flower.

One does not need to know all about matter to be convinced of its reality. The writer does not know much about flying machines, but he is quite sure of their existence. We know how these material things

look and how they act. They make quite an impression on our consciousness. The spiritual never casts a fleeting shadow to impress us with its existence.

Matter is permanent, while sensations are fleeting and may cease entirely, as in paralysis. Hugh Elliott says that "mind is a procession of sensations without permanence at all" and that "matter is just the hard, resistant, solid reality that it appears to be to the most abandoned upholder of 'common sense' ".

The Materialist holds that there is a materiality and denies that there is an immateriality. He stands ready to produce the material when called upon. His opponents cannot be as obliging.

Matter in motion—that is, physically and chemically active matter—accounts for all existing things and activity.

More than a century ago it was demonstrated that matter could not be destroyed, and, therefore, could not be created. Recently it has been demonstrated that there is no creation or destruction of energy within the organism. The energy is dissipated as heat and other material activity. The old vitalism has been given its death blow. A vital force imparted from without has now taken its departure along with many other ghosts.

The idea that matter is inert—that is, dead—necessitated a supernatural power to move it, but when the scientist learned that all matter is in motion, that it "lives and moves and has its being" all within itself, the supernatural, the idea of a mover, was dispensed with. Matter in motion is enough to produce the universe.

A Materialist must reject the idea of the supernat-

ural. The natural is all inclusive. It excludes the supposed unnatural or supernatural. Nature is both cause and effect, and that embraces all there is. The supernatural does not exist.

The Material scientist holds that there is in nature nothing but matter and its potentialities. Matter, with its infinite differentiations and aggregations, is cause and effect. No other cause is known; no other cause is needed. The method of materialism is the method of science. The method of metaphysics is the method of theology.

There are philosophers who have referred to Materialism as a metaphysical system. Materialism is a science, not a metaphysical or idealistic philosophy. Let us compare the teachings of the famous metaphysicians with those of the Materialists.

METAPHYSICS DEFINED AND DESCRIBED

Metaphysics has been defined as "the systematic study of the first principles of being and of knowledge; ontology." A possibly better definition is: A jungle of contradictions. At best, metaphysics is mere speculation.

Kant considered the province of metaphysical philosophy as transcendental and its method as independent of experience. Aquinas defined it as "a philosophy that is concerned with the cognition of God." Hegel labels it the "science of the absolute."

John Stuart Mill, however, described it as "the fertile field of delusion propagated by language." Metaphysics is generally recognized as beyond or above the physical; it is a system of obscurantism. Science deals with the "how" of things; metaphysics with the

"why" of things. The "why" of anything has not been discovered. The search for the metaphysical "why" of things has been likened to the search of a blind man in a dark room for a black cat which is not there.

Here are a few of the generalizations of the chief metaphysicians: "All things are nothing." And, again, "neither being or non-being, one or many, become or unbecome, have any reality or meaning."—Gorgias. "Being and not being are the same thing."—Hegel. "Knowledge consists of knowing that one knows nothing"—Socrates.

Xenophanes postulated a "God" as the essence of all, and identified God with nature. "All eyes, all ear, all thoughts"—such was God.

Zeno and others of the Eclectic school postulated two abstract elements as primal and opposing principles: God and Devil, or good and evil. Thus a philosophy of two-foldness, or dualism, arose.

Pythagoras says that "all is number"; that "the soul in essence is number"; and that "God is number".

Metaphysicians assume the existence of things as a fact without any attempt to establish this existence by observation and experimentation. In actuality, their method is to transcend experience and to accept some hypothetical basis. When they are consistent their method results in a denial of the reality of the objective world. There have been numerous systems of metaphysics, each of them contradicting the others. A new system supplants the old, and, in turn, is supplanted by another, all of them traveling in circles, returning to former bases, with nothing but a larger accumulation of words.

Few men now believe in the ancient systems. But

we still have many systems of metaphysics and there is no way of proving any one of them to be true, as scientific facts can be proven.

Aristotle is considered the greatest of the ancient metaphysicians. He is known as "the master of those who know" and as "the philosopher". He dominated the minds of the intellectual world for two thousand years. His philosophy was a mass of assumptions, one of which was that "heavy bodies fall faster than light ones." This fallacy was accepted for twenty centuries before any one thought of testing it. A simple experiment requiring only a few minutes was sufficient to disprove it. Galileo dropped two bodies—a heavy and a light one—from the top of the Leaning Tower of Pisa, and they reached the ground at the same time. In this way one of the assumptions of "the philosopher" was exploded.

The difference between metaphysics and science is a difference of method. Scientific men labor to establish a principle; metaphysicians assume a principle, and labor to defend it. When one scientist establishes a principle, other scientists can and do build upon it. In this way the great structure of science rises year by year by the concerted action of many workers. Metaphysics shows a striking contrast to this pleasing result. Each metaphysician attempts to lay his own foundation and erect his own structure. Naturally no progress is made in the field of metaphysics. There is no reason why there could not be a thousand metaphysical systems as well a a hundred. The "things" and the "no-things", used as a basis, have by no means been exhausted.

The ancient materialists took objective substance

as a basis from which to reason. This system had a concrete foundation. But the metaphyical philosophy had not a single "thing" for a foundation. Its method was and is to go beyond facts for its beginning. The end it reaches is also beyond facts.

In psychology the metaphysician depends upon introspection; he examines his own mind alone, and deals with subjective evidence. The scientific psychologist, on the other hand, uses the method of comparing the phenomena of many minds. Subjectivity is taken into account, of course, by the scientist, but it is not made the basis of his system of psychology.

The truth of science consists in the agreement of thought with things. The workability of a theory is its final test.

Metaphysicians regard matter as inconsequential, having first divested it of its powers and attributes. Let them restore to it the qualities of which it has been robbed, and they will soon see in it the beautiful elements that make the "precious opal, the amethyst and the brilliant diamond, the delicate bluebell and the violet, the lily and the rose-bud, the ruby lip and the love-lit eye, the palpitating heart and the wonderful brain." It is not a world of dead matter, as they say, for every point in space thrills with an infinity of vibrations; it is a cosmic universe everywhere energized by electrons and protons.

Metaphysics is discredited among scientific men. It is now a common thing to hear scientists say of philosophy that it is "mere verbalism" and mainly "moonshine". Critics of philosophy frequently quote the saying of Samuel Butler: "All philosophies, if you ride them home, are nonsense; but some are

greater nonsense than others." Articles appearing in journals of today with captions like "Can Philosophy Come Back?" show the present trend of critical thought.

Philosophers with a scientific training have attempted to rescue philosophy from the hands of the metaphysician. Such were the attempts of August Comte and Herbert Spencer. Comte believed he had discovered a great fundamental law that would ultimately establish philosophy on a scientific basis. In the first part of his "Positive Philosophy" he thus states the law:

"This law consists in the fact that each of our principal conceptions, each branch of our knowledge, passes in succession through three different theoretical states: The Theological or fictitious state, the Metaphysical or abstract state, and the Scientific or positive state. In other words, the human mind, by its very nature, makes use successively in each of its researches of three methods of philosophizing, whose characters are essentially different, and even radically opposed to each other. We have first the Theological method, then the Metaphysical method, and finally the Positive method. Hence there are three kinds of philosophy or general systems of conception on the aggregate of phenomena, which are mutually exclusive of each other. The first is the necessary starting point of human intelligence; the third represents its fixed and definite state; the second is only destined to serve as a transitional method."

Comte recognizes the impossibility of discovering absolute truth and gives up the search for the origin and extinction of the universe and a knowledge of the

final causes of phenomena, and pleads for the limiting of efforts to the observation of the laws of the phenomena of nature.

In the "First Principles" of his Synthetic Philosophy, Herbert Spencer contends that philosophy must have scientific principles as a basis if it is to be demonstrably true. He holds that philosophy proper is knowledge which transcends ordinary knowledge. He states it as "knowledge of the highest degree of generality". The following statement is a summing up of his position on this matter:

"A philosophy of science would be the highest generalization of scientific principles, and a correct method of inquiry. Its purpose would be to investigate the basis of all the sciences, and to define and explain scientific method."

And now we are told by a critic that Herbert Spencer's "system is now so outmoded that only an archeologist can find the debris under the sands of modern indifference".

The attempt to found philosophy on science, in which Comte and Spencer failed, was undertaken by John Dewey and Bertrand Russell in our day, and the critics say that these philosophers are already in the discard.

John Dewey demolished all of the preceding philosophies, and set up one of his own. We are told in the volume of "Essays in Honor of John Dewey" that he "brushes all the great classical philosophical systems quietly aside."

An admirer of Dewey says of this statement: "So mighty is he that he hardly has to exert himself to push all previous philosophy into limbo—he brushes

it there; he brushes it quietly. But already he has been swept contemptuously aside by an English reviewer who uses the critical duster with all the ease of the best British manner." And this writer adds: "I should guess in 1950 Dewey will seem more of a misleading mystic than Hegel now seems to Dewey."

Bertrand Russell has said: "Ever since the end of the Middle Ages philosophy has steadily declined in social and political importance. . . . All traditional philosophies have to be discarded, and we have to start afresh with as little respect as possible for the systems of the past."

We now have a new crop of philosophers, who have as "little respect" for Bertrand Russell's "Neutral Monism", as he had for all traditional philosophies, and they have discarded it, as he and other philosophers discarded those before them.

In his book "Builders of Delusion", Henshaw Ward says: "If any philosophy had ever stood the test of time, so that most philosophers could now agree that it showed a way to wisdom, we should pay homage to it and should have hope of other philosophies. But every system has been overthrown by later reasoners. The philosophy of each century has gone down before the impact of a later philosophy as if it were one of a set of dominoes that had been stood on end and that knocked each other flat in a row."

Eighty-odd years ago that distinguished scholar and scientist George Henry Lewes wrote his great masterpiece, "The Biographical History of Philosophy," and in his conclusion he admits the failure of philosophy to verify any of its premises. Here follow two short

paragraphs from his conclusions that will reveal its general nature:

"Modern philosophy staked its pretensions on the one question: Have we any ideas independent of experience? This was asking, in other words, Have we any organon of philosophy?

"The answer always ends in a negative. If any one, therefore, remain unshaken by the accumulated proofs that history affords of the impossibility of philosophy, let him distinctly bear in mind that the first problem he must solve is, Have we ideas independent of experience? Let him solve that ere he begins to speculate."

Literary critics have also pelted philosophy with every verbal missile within their reach. Henry L. Mencken's attitude towards philosophy is fairly representative of that class of critics. In a newspaper article of August 20, 1934, he says:

"One of the curious survivals of medievalism in the universities of the world is the teaching of so-called philosophy. It comes down to us from the time when there was no scientific method or experimental science, and men believed innocently that all the problems confronting mankind could be solved by simply taking thought. Thus a complicated system of formal thinking was developed, and though it led almost invariably to dubious conclusions its very difficulties made it seem profound. Its value to the world was and is next door to nothing. Not a single idea of any ponderable value to anyone has come from professional philosophers since the days of the Greeks.

"At the present time it is sometimes argued that philosophy is needed in order to keep the various sciences in harmony. Each tends to follow a path of its own, ignoring all the others, and it is a fact that this independence sometimes impedes the quest for knowledge. But philosophy is certainly not the right agency to establish a better cooperation, for many of the questions that it

still labors most assiduously were long ago dismissed by all the sciences as either insoluble or unimportant. Thus its practitioners look like quacks to scientific men, and it is seldom today that they are heard with any attention, or can have any real influence upon the progress of scientific thought.

"Moreover, their good faith is open to question, for they are generally hostile to scientific method, and let the fact slip out at every opportunity. In the long combat between science and dogmatic theology they were mainly on the side of theology, and even today they seize every chance to discredit science and whoop up their own hollow theorizing. Thus they have been at great pains of late to argue that the revolutionary discoveries of Max Planck and Albert Einstein have destroyed all the fundamental postulates of science, and revealed a universe without order. Planck and Einstein have both protested against this nonsense, and with some heat, but the philosophers continue to cite them as witnesses, and to argue idiotically that science is bankrupt at last and that their own hocus-pocus is its heir and assign.

"Nothing, of course, could be more untrue. Science was never more sure of its ground than it is today. It has found some apparent aberrations in the universe, but it is by no means ready to throw up its belief in invariable facts and to embrace instead a farrago of murky speculations, by ignorance out of impudence. Its answer to phenomena that it cannot explain is to seek diligently for their explanations. That such explanations will be forthcoming soon or late it does not doubt, though it does not engage to find them overnight. The philosophers are less patient—and a great deal less intelligent. Their explanations have been ready for two thousand years—but in all that time they have never really explained anything.

"That such organized obscurantism should still be cultivated in the universities is a monument to the hunkerousness of mankind. We have got rid of astrology, alchemy and witchcraft, but we continue to be polite to a kind of nonsense that is far worse, if only because it enlists cleverer men and seems to be so much more respectable. That philosophy, in its early days, helped to organize the sciences and get some rationality into human thinking is quite true, but once it had achieved that elemental task it apparently had nothing more to offer. Its influence ever since has been

against the increase of knowledge, not in favor of it. It is a shark following the ship of science, hoping that something will fall overboard that it may devour."

About seventy years ago a German philosopher, Friedrich Albert Lange (1828-1875) wrote a "History of Materialism", in three large volumes. It was translated into English and published in London in 1878. Lange was not a Materialist, but a decided critic of that system. While he was as fair as any opponent could possibly be, his work is as much criticism as it is history. As Lange was a metaphysician, his language is not easy for the layman to follow.

There is a need in this country for a history of Materialism. Not only is there no history of this important subject published in the United States, but there is no work devoted to it exclusively. Materialism is, of course, mentioned in thousands of books, usually being grossly misrepresented.

In the first three chapters of this book is set forth a plain outline of materialism from its beginning down to our time, stating the essential doctrine of every noted materialist through the ages. No space is consumed in criticism. The reader can do his own criticising. The names, dates, and doctrines are given in understandable language. The author believes he is capable of stating plain facts in clear language for common people, and he takes pride in that ability. There are thousands of writers capable of muddling thoughts and things. Many persons believe them to be profound just because they do not understand them. And these same persons are not impressed by those whom they do understand, just because they have no confidence in their own understanding.

CHAPTER I

ANCIENT MATERIALISM

MATERIALISM had its beginning in Greece in the sixth century, B.C., and was the first attempt to explain the world and events on natural grounds. The Ionian school of theoretical science or "Grecian Cosmologists", as they have been called, were Materialists to a startling degree from the very beginning. They took a long step from the doctrine that the gods did everything to the doctrine that nature did everything and the gods could be dispensed with.

These materialists from the very beginning were believers in the unity of nature, in opposition to the duality of the religious interpreters of that and previous periods. They discarded the dualism which prevailed, the notion of opposite forces, such as God and Devil, the world and heaven, mind and body, good and bad spirits. They appealed to physical causes to explain the world, thus breaking with both religion and dualism by starting with matter as a basis for their naturalism.

Thales (about 600 B.C.) is credited with being the father of speculative science. The substance of his astronomy he developed while in Egypt. He explained the inundations of the Nile from natural causes,

measured the pyramids by their shadows, and accurately calculated and predicted the time of a solar eclipse. He taught that the moon derived its light from the sun, and declared the shape of the earth to be that of a globe. He believed that all life sprang from the water, a material and not a spiritual source.

Anaximander (611-547 B.C.) was a disciple of Thales, and the author of a work, "On Nature", in which he, too, attempts to explain the world and life on naturalistic grounds. He has been credited with being the first evolutionist. In his "Pioneers of Evolution", Clodd says: "Anaximander was the first to assert the origin of life from the non-living, i. e., 'the moist element as it was evaporated by the sun,' and to speak of man as like another animal—namely, a fish in the beginning."

Anaximander taught that the earth is a cylindrical body, and floats freely in the infinite ether, being held in equilibrium because of its equal distance from all other heavenly bodies. There are an infinite number of worlds, which are alternately formed and destroyed. The first animals were produced in the water, and from them the more advanced species gradually arose. Man sprang from the fish. Individuals and species constantly change, but the substance whence they are derived is indestructible.

Anaximander taught that matter is indestructible because it is uncreated. It envelopes everything, produces everything, governs everything, and possesses a perpetual vitality of its own.

Anaximenes of Miletus (588-524 B.C.) was the disciple of Anaximander, and a decided mechanist. His theory, which is a more exact formulation of Anaxi-

mander's doctrine, may be summarized in the following words: Infinite matter, a perpetual motion of condensation and rarefaction that is something like a plastic principle, necessity directing the motion; matter, motion, motive force, directing necessity. We find among the Ionians all the elements of the explanations of nature attempted afterwards.

Anaxagoras (500-428 B.C.) was the teacher of Pericles, and is to be credited with freeing the mind of Pericles from the religious superstitions of the Greeks. This great thinker reasoned out some remarkable theories that have been verified by modern science, such as the cause of the moon's light, earthquakes, meteors, of the rainbow, of wind, and of sound.

He held that all matter existed originally as atoms, or molecules, that these atoms, infinitely numerous and infinitely small, had existed from all eternity. He also maintained that all bodies were simply aggregations of these atoms. Anaxagoras is credited with being the first to oppose anthropomorphism. He believed in a Dynamism instead of the gods as the mover of matter. Is 450 B.C. he was accused of Atheism, and was banished to Lampsacus, where he died. His influence on Pericles and other thinkers of that period was profound and lasting. He aided greatly in freeing the minds of the Athenians from the beliefs in oracles and gods.

The preceding speculative scientists are not usually classed as Materialists, but the reader will observe that they were dealing not in spiritual, but in material things. They were not metaphysicians.

Democritus (450-357 B.C.) was termed the "laugh-

ing philosopher". He laughed at the metaphysical philosophers of his day, and was despitefully treated by them, as well as by every generation of them since.

Democritus lost no time splitting hairs with metaphysicians and Sophists. He did not believe in them or their methods. He said: "He who is fond of contradictions and makes many words is incapable of learning anything that is right." They insisted that nothing could be known; in fact, they boasted of their ignorance.

Democritus was the first scientific investigator. He was not satisfied to speculate about nature, but really investigated it. He traveled into every known country, exploring for knowledge. He was the first empiricist as well as the first acknowledged Materialist. He has been called "the greatest thinker of antiquity".

Bacon gave him the place of honor above other scientists of Greece, while he considered Aristotle a misdirector of knowledge and his an empty philosophy of words.

In his "The World Machine", Carl Snyder says of his scientific teachings: "Here was enough, no doubt, to lift Democritus far out of the tribe of quibbling pedants who passed for philosophers in those opulent days. He was no mere schriftsteller; no superficial Aristotle. . . . He could rise to a world conception which, in its main features, is still the most tenable we possess." Snyder says that Democritus "had reached even the distinction between force and energy which we regard as a fruit of our own time. . . . He was the father of modern physics and of modern chemistry as well. . . . When, in our modern time, men again began to turn their minds to physical prob-

lems, it was to begin where Democritus left off. . . . What is certain is that we owe to Democritus, so far as our knowledge extends, the idea of a world machine."

Democritus wrote seventy books on various subjects, and Aristoxenus says that Plato wished to burn them all. (Plato was a metaphysician.) Two of these books were on psychology: one on the Mind, and the other on the Senses. He taught that the seat of the mind was the brain, "the monarch of the body". He was an unbeliever in philosophy, preceding those men mentioned in the introduction by two thousand years. He was quite positive in scientific matters. He was the contemporary of Socrates, who said that nothing could be known. Democritus held that astronomy was a true science and he taught many things about it that have since been demonstrated to be true. Socrates said of astronomy that it was "impossible to understand and madness to investigate".

Democritus taught the infinity of worlds in astronomy. He believed in the slow, incessant destruction and re-formation of worlds. He taught that the stars were suns. His atomic theory gives us the explanation of light, of heat, of sound, of chemical and physical changes of things in general.

Democritus was not only a first-hand investigator and careful observer, but was also a great mathematician. In geometry he was not excelled by the geometers of Egypt. One of his famous sayings was: "We should strive not after fullness of knowledge, but fullness of understanding."

For the purpose of explaining the origin of the

world, Democritus laid down a complete theory of atoms. He had no way of determining their size, and assumed them to be much larger than they are known to be. From these atoms he derived every existing thing, both physical and intellectual.

Lange gives a summing up of the atomic teaching of Democritus, as follows:

I. Out of nothing arises nothing; nothing that is can be destroyed. All change is only combination and separation of atoms.

II. Nothing happens by chance, but everything through a cause and of necessity.

III. Nothing exists but atoms and empty space: all else is only opinion.

IV. The atoms are infinite in number, and of endless variety of form.

Democritus rejects the idea of a personal immortality of the soul or psyche. He also rejects the idea of design in nature. He did not hold to the idea of chance, but to natural law and order.

Empedocles (455-395 B.C.) was quite materialistic in some of his sayings. One was the following: "None of the gods have formed the world, nor has any man; it has always been."

Following these materialistic teachings came a reaction in favor of the teleological conception of nature; the idealistic and metaphysical doctrines were presented with great ability and vigor by three great champions of those systems — Socrates, Plato, and Aristotle—and for a period of a hundred years Materialism receded into the background.

The author's friend, Prof. Arthur E. Briggs, said in a public address recently that "Aristotle was the

greatest scientist of all time." That he dominated the metaphysical world for two thousand years will not be questioned, but to credit him with supreme scientific knowledge is absurd. Whatever real science he had, he borrowed from Democritus without giving due credit.

A few of the absurd teachings of Aristotle were that the universe is a closed sphere, in the center of which he fixed the earth, holding that no other universe was possible. He taught that a vacuum could not exist and that motion in a vacuum would be impossible. He enumerated just how many species of animals must exist, and proved to his own satisfaction why animals must have such and such parts. He taught that fleas and lice were produced out of dust. He taught that only man had the beating of the heart; that the left side of the body was colder than the right; that man had more teeth than woman; that there is an empty space at the back of every man's head; that heavy bodies fall faster than light ones.

Aristotle was a poor psychologist even for his day. He taught that the seat of the mind was the heart, while a hundred years before, his countryman, Democritus, had taught that it was in the brain, and Aristotle was quite familiar with the teachings of Democritus, from whom he borrowed much of his real scientific knowledge. Eucken says that "Aristotle copies from him page after page, and gives little credit."

Aristotle often substituted words for things in his philosophy. He made subject instead of object to be the foundation of his "science". He inverted the true scientific method of induction. He sometimes preach-

ed induction, but usually practiced deduction. He would start from the general instead of the particular. This was "the greatest scientist of all time"! It was teaching of this kind that drove the clear-cut, scientific Materialism of Democritus into the background.

Epicurus (341-270 B.C.) wrote three hundred books, but the believers in God and gods saw to it that not one was preserved. Only fragments quoted by other authors remain. According to Epicurus, the great evil that afflicts mankind is fear; fear of the gods, and fear of death. To get rid of these fears was the ultimate aim of his ethics. He believed in making science to be the servant of life, in opposition to Aristotle, who advocated science for science's sake.

Epicurus taught the atomic theory of Democritus. He held that matter was the positive principle of all things, in opposition to Plato's teaching that matter is non-being. Epicurus held that matter is composed of innumerable uncreated and indestructible atoms in perpetual motion. The creation or destruction of the world was out of the question. Atoms, space, and weight, that is, mechanical causes, were sufficient to explain the world, and he scouted the idea of final causes.

The teachings of Epicurus coincide with those of Democritus. He held that the laws of nature were to be discovered by actual observation of facts. To abandon observation is to depart from facts and to land in the region of idle fantasies. He taught that the moon may get its light from the sun. He was much opposed to the Greek paradoxical habits, the dialectic tricks that won the philosophers such fame. Epicurus believed in explaining things in household

words instead of confounding ideas by strange-sounding technical terminology. Therefore, he rejected the Greek dialectics. His own logic was distinctly sensorial and empirical. He was the John Dewey of his day.

Lange summarizes his teaching on nature as follows:

"Out of nothing, nothing comes, for otherwise anything could come out of anything. Everything that is is body; the only thing that is not body is empty space.

"Among bodies some are formed by combination; the others are those out of which all combinations are formed. These are indivisible and absolutely immutable. The universe is unbounded and therefore the number of bodies must also be endless.

"The atoms are in constant motion, in part widely removed from each other, while in part they approach each other and combine. But of this there was never a beginning. The atoms have no qualities except size, figure, and weight.

"Similarly the time in which the atoms move in the void is quite inexpressibly short; their movement is absolutely without hindrance. The figures of the atoms are of inexpressible variety, and yet the number of actually recurring forms is not absolutely infinite, because in that case the formations possible in the universe could not be confined within definite, even though extremely wide limits.

"In a finite body the number as well as the variety of the atoms is limited, and therefore there is no such thing as infinite divisibility. In void space there is no above or below; and yet even here one direction of motion must be opposed to another. Such directions are innumerable, and with regard to them we can in thought imagine above and below.

"The body encloses the soul, and conducts sensations to it; it shares in sensation by means of the soul, and yet imperfectly, and it loses this power of sensation at the dissolution of the soul. If the body is destroyed the soul must also be dissolved.

"But death is really quite indifferent to us, just because it deprives us of feeling. So long as we are, there is yet no death; but as soon as death comes, then we exist no more."

The great poet, Lucretius, was materialistic, and popularized the theories of the preceding materialists. He was one of the noblest and most courageous men of antiquity. He taught that nature does all things of herself, and without the aid of gods.

Titus Carus Lucretius (97-53 B.C.) was a Roman philosophical poet, whose name is immortalized by his atheistic work, "De Rerum Natura", in six books, which is the finest dialectic poem in any language. Lucretius expounds the Materialistic system of Epicurus in verse, with great dignity and sublimity. He invests Materialism with the grace of genius. His purpose was to eradicate religious belief, for he considered it the source of man's wickedness and misery. One verse will indicate his trend of thought about the conditions of man, and give an idea of his poetic style:

> Sprawling in the mire in foul estate,
> A cowering thing without the strength to rise,
> Held down by fell religion's heavy weight—
> Religion scowling downward from the skies;
> With hideous head and vigilant eyes of hate.

In his "Last Words on Materialism" Prof. Ludwig Buechner says: "Epicurus brings the history of ancient Materialism to a close, which now for fifteen centuries or more passes almost entirely into oblivion through the overwhelming influence of Christianity. Only timidly and under deceptive disguises Materialism dared, after the expiration of this time, to show itself again in a few philosophical thinkers of the Middle Ages, such as Petrus Pomponatius, Giordano Bruno, Gassendi, and others, some of whom had to atone for their doctrines on the funeral pyre".

CHAPTER II

MATERIALISM FROM THE RENAISSANCE TO THE NINETEENTH CENTURY

GIORDANO BRUNO (1549-1600 A.D.) revived the Epicurean doctrine of the infinity of worlds, connecting it with the Copernican system, "that all fixed stars are suns, which extend in infinite number through space, and have in turn their invisible satellites which are related to them just as the earth is to the sun, or the moon to the earth". "The infinity of forms under which matter appears", said Bruno, "it does not receive from another and something external, but produces them from itself, and engenders them from its own bosom".

Lange says that Bruno "makes matter the true essence of things, and makes it bring forth all forms out of itself. This principle is materialistic, and we should therefore be justified in claiming Bruno for Materialism, but that his development of his system assumes a pantheistic turn on certain decisive points". Lange admits that pantheism "is in itself only a modification of some other monistic system".

Bruno says: "That which was seed at first, becomes grass, hence the ear, the bread, nutritive juice, blood, animal seed, embryo, man, corpse, then again

earth, stone, or other mineral, and so forth. Herein we recognize, therefore, a thing which changes into all these things and essentially remains ever one and the same. Nothing appears to be really durable, eternal, and worthy of the name of principle save matter only.

"Matter as the absolute includes within itself all forms and dimensions. But the infinity of forms under which matter appears is not accepted by her from another nor as it were only in outward appearance, but she brings them forth from herself and bears them from her own womb. When we say there is death, there is only the outgoing towards new life, a loosing of one union which is binding into a new".

Thomas Hobbes (1588-1679) the great English philosopher, was one of the most noted materialists of any period. While it is said that his philosophy is quite contradictory, it must be remembered that he lived in a dangerous period for thinkers, and he wrote some things to placate the clergy. His great book, the "Leviathan", was assailed by all of the clergy, and was condemned by the House of Commons in 1666.

The clergy were correct in viewing him as an enemy of their religion and their church. He called their religion superstition, and showed that it had its origin in fear. He refers to their miracles as pills which one must swallow down without chewing. At this time in England the authority of the Bible was established by law. So strong and threatening was the opposition, Hobbes fled to the protection of the Duke of Devonshire, Chatsworth, where he died at the age of ninety-one, writing up to the very end of life.

Hobbes has been credited with being the forerunner of modern Positivism, Criticism, and Materialism. He defines correct philosophy as reasoned knowledge of effects from causes, and from causes to effects. To be a philosopher means to think correctly, and to think correctly means to combine what ought to be combined, and to separate what ought to be separated.

He had great contempt for the Scholastic logic of his day. He referred to the metaphysical philosophy as "paint and false colors of language," and termed it "poor and in appearance deformed".

Hobbes held that true philosophy would enable us to foresee effects and therefore be a practical thing of life. He is considered a logical successor of Bacon. His natural philosophy is experimental physics. Real knoweldge is obtained only by observation of facts. Knowledge consists in the addition of sensations.

In his "Human Nature", Hobbes sometimes takes the strictly materialistic position of Democritus, Protagoras, and Aristippus, and at other times and on other questions, he takes the position of the Idealist, agreeing with the position afterwards held by Berkeley.

Pierre Gassendi (1592-1655) is credited with the regeneration of Materialism. He was a bold advocate, and greatly influenced all succeeding generations. His first book was an attack on the philosophy of Aristotle. He was a professor of rhetoric, which embraced scientific teaching at that time. He espoused the doctrines of Epicurus and Lucretius. He advocated the Copernican theory of astronomy and the Greek doctrine of the eternity of the world. He clung to empiricism, and the analogy of experience.

Rene Descartes (1596-1650) French mathematician and philosopher, was not strictly speaking a Materialist. Many of his writings are materialistic, but others are as definitely idealistic and metaphysical. Descartes was an emulator of Gassendi, Galileo, Pascal, and Newton. His philosophy was a generalization of mathematics. His aim was to apply the geometric method to universal science, to make it the method of metaphysics.

Doubt was made the starting point of his philosophy, which is the foundation of skepticism. However, he was not contented with mere skepticism; he wanted to know, and he formulated a method he believed would make knowledge certain. Cartesian doubt was to be applied to everything, and only that which could be demonstrated was to be accepted. He doubted everything except his own existence, and thought he proved that by his "Cogito, ergo sum" (I think, therefore I am).

Descartes argument for establishing his one certainty has been rejected by all philosophers since, just as he rejected all previous philosophy. It was pointed out that all other attributes are as conclusive of one's existence as thinking is. "I walk, therefore I am," is as evident. Buechner pokes fun at him with this formula: "A dog barks, therefore he is."

While the Materialists and Mechanists can quote Descartes in favor of their position, the Spiritualists and the Theists can do the same. He is very popular with many schools for that reason. Weber says he was "the father of modern rationalistic philosophy." Religious people quote him with approval. This is

the value of paradoxes or contradictions. Like St. Paul, they are all things to all men.

Lange says of Materialism and Descartes: "Materialism is empirical, and rarely employs the deductive method, and then only when a sufficient stock of materials has been acquired inductively out of which we may then attain new truths by a free use of the syllogism. Descartes began with abstraction and deduction, and that not only was not materialistic, but also not practical. It necessarily led him to those obvious fallacies in which, among all great philosophers, perhaps, no one abounds so much as Descartes."

Lange goes on to say that: "Descartes was not an adherent of rigorous atomism: he denied the conceivableness of the atoms." But Lange gives him credit for originating the mechanical view of animal nature, and being the predecessor of La Mettrie's "Man a Machine". Descartes certainly held that plants and animals were machines.

Fear, as well as his dualism, prevented Descartes from being an outspoken Materialist. Lange says of his writings: "Whether his original system of the cosmos may have stood somewhat nearer to Materialism than his later theory, we cannot say; for it is well known that out of fear of the clergy he called back his already completely finished work, and subjected it to a thorough revision. Certain it is that he, against his better convictions, withdrew from it his theory of the revolution of the earth."

Descartes' fear of the Church made him one of the first harmonizers of religion and science.

Pierre Bayle (1647-1706) was empirical in scientific method, and a decided Materialist. He differed from

Descartes' belief that religion could be harmonized with science. Bayle vividly pointed out their disagreements. Descartes was possibly the first reconciler of the positions that are mutually exclusive, so Bayle seems to be the first in modern times to point out the impossibility of harmony between the inharmonious. Bayle's style was vivacious and dramatic. It was bold and clear. He goes to the depths of the subject, dissecting the intellectual fallacies without mercy. His controversial style is said to have been borrowed by Voltaire and by the French Encyclopedists.

Bayle advocated religious toleration on the ground of the difficulty of distinguishing truth from error. His criticism of Maimbourg's "History of Calvinism" was ordered to be burnt by the hangman. Jerieu persecuted him, and he was ordered to modify his "Dictionary".

Friedrich Wilhelm Stasch was a German Materialist and the author of a book in 1692 that was quite materialistic for that period. His book created great excitement and indignation. It was banned, and those possessed of a copy were subject to a fine of five hundred thalers. Here are two paragraphs which will show his general tendency. He denies that the soul is immaterial and also immortal. He says of the soul of man: "That it consists of the brain and its innumerable organs of a subtile matter, which is likewise variously modified". And again he says: "It is clear the soul or spirit in itself, and of its own nature, is not immortal, and does not exist outside of human body."

Claude Adrien Helvetius (1715-1800) was a descendant of a long line of celebrated French physicians.

He had a large fortune which he spent in works of benevolence. Attracted by reading Locke, he resigned a lucrative situation as a farmer-general to devote himself to science. He published a book "On the Mind", which was condemned by Pope Clement XIII and burned by the order of Parliament for the hardihood of its materialistic opinions. He visited England and Prussia and became an honored guest of Frederick the Great.

Julien Offray de La Mettrie (1709-1751) was a French physician. He was surgeon to the French guard, served at the battles of Fontenoy and Dettingen. Falling ill, he noticed that his faculties fluctuated with his physical state, and drew therefrom materialistic conclusions. The boldness with which he made his ideas known lost him his place, and he took refuge in Holland. Here he published "The Natural History of the Soul", under the pretence of its being a translation from the English of Charp (Sharp), 1745. This was followed by "Man a Machine" written in 1747, and published in 1748, a work which was publicly burned in Leyden and orders given for the author's arrest.

La Mettrie barely escaped the storm. A Leyden book dealer came to his assistance. A writer says: "They start away on foot at night without shelter, without provisions; without any other equipment than La Mettrie's indomitable cheerfulness." King Frederick wrote Maupertuis thus: "He is the victim of priests and blockheads. Here he will be able to write in peace. I have a feeling of sympathy for the persecuted physician". The king appointed him to the position of physician to the king, and at his death

the king composed his funeral eulogy. The following are La Mettrie's last words: "Since life is nothing but the sport of nature, we must know how to laugh in the tempest."

Descartes had written much nonsense about God and man's soul, but had a clear idea about animal life. He said that animals were machines. La Mettrie made man no exception to nature's laws. He does not form a separate creation of favored endowment. Natural laws are the same to all; there is no difference in the development of man and animal. Man is a machine.

La Mettrie was the boldest and clearest Materialist of his period in France. He held that the senses are the only avenues to knowledge, and that it is absurd to assume a God to explain motion. Only under Atheism will religious strife cease.

La Mettrie acknowledged that his idea that man is a machine was derived from Descartes' theory that animals are machines. But Descartes denied the possibility of man being a machine. La Mettrie teaches that the body is a machine and speaks of it as machinery of the body. La Mettrie was an empiricist in both method and psychology. He did not believe in any spiritual reality. He gave matter the attributes of motion and thought. He believed that the body was the only reality, and that anything spiritual is unimaginable.

To La Mettrie, matter contains the function of sensation and the form of motion as well as the quality of extension. He believed that the differences in men are due to differences in the constitution and organization of their bodies. As there is nothing but mat-

ter and motion, it is evident that man is merely a very complicated machine. He rejects any external cause of motion, or external animation whatever. He thinks a God is possible, but that he had no effect in natural matters.

La Mettrie opposed the doctrine of Innate ideas. He taught that ideas are derived from sensation; that experience is the source of all knowledge. He is properly considered one of the first French Sensationalists, holding that reason is a modification of sensation.

Diderot (1713-1784) was considered the leader of the French Materialists of the eighteenth century, and was the recognized leader of the French Encyclopedists. He connected the "Locken Sensualism" with Materialism. Diderot had a rare literary talent and great working energy. As editor of the Encyclopedia, he needed these qualities in abundance. In the beginning of his work he was not the clear-cut Materialist that he became under the influence of La Mettrie and Holbach. Lange says of him: "Diderot had actually been long fighting for Atheism whilst he was still in theory 'demolishing' it." In one of his articles describing the Christian God's neglect of his children, he says that a "righteous soul must be tempted to wish that he did not exist."

In his "Pensees Philosophiques" Diderot had stated that one could slay the Atheist with a butterfly's wing, or the eye of a gnat, while one had the weight of the universe with which to crush him. La Mettrie replied to this design argument with the statement that when we know all the workings of nature, we would see that she was able to produce everything out of herself; that only ignorance of nature's ways had

caused us to take refuge in a God; that the "weight of the universe" will not frighten a true Atheist, to say nothing of "crushing" him. The Atheist can offer arguments of greater weight than the Theist. Afterwards, Diderot's Theism was evidently crushed by the "weight" of Atheist arguments, for he was recognized as the leader of the Atheists.

Baron Paul Heinrich Dietrich von Holbach (1723-1789) was born in Germany, but lived nearly all his life in Paris. Rich and generous, he was the patron of the Encyclopedists, Buffon, Diderot, d'Alembert, Helvetius, Rousseau, Grimm, Raynal, Marmontel, Condillac and other authors often met at his table. Hume, Garrick, Franklin, and Priestley were also among his visitors. He contributed many articles to the Encyclopedia. In 1765 he visited England, and from that time was untiring in his issue of Freethought works, usually put out under pseudonyms. Thus he wrote "Christianity Unveiled" (attributed to Boulanger)—the "Spirit of the Clergy, History of Superstition". This work was condemned to be burned by a decree of the French Parliament the eighth day of August, 1770. Holbach published these and other books he wrote, pledging the printer, M. Rey, to secrecy of their authorship. In this way he escaped persecution and prosecution.

In 1770, he published his principal work, the "System of Nature". This text-book of Materialism and Atheism attracted nation-wide attention at once. Its authorship was attributed to Mirabaud, who was safely dead, but no scholar believed him to be the author, as he was incapable of producing such a masterpiece. Within two years Holbach published a sort of sum-

mary under the title of "Good Sense", and attributed it to the priest Meslier, another dead man.

During the storm created by these books, many men were accused of being the author, but Holbach was never suspected of being the guilty one. His modesty and gentle, retiring manner precluded the idea of his being the author of so aggressive and radical a book. His personal good qualities were testified to by many who considered it a great honor to be known as his friend.

His "System of Nature" was a book of plain and straightforward language, with a German thoroughness, brilliant ideas, and up-to-date facts of science. It was said that this German shocked the French as much as the French La Mettrie shocked the German people.

The work was atheistic as well as materialistic. The author held that all beings placed outside of nature have always been creatures of imagination, of whose character we can form an idea as little as of their abiding place and modes of action. He held that man is a physical being, and his moral existence is only a special aspect of his physical nature. He accepted the phenomenal world as the world of realities.

Holbach was convinced that the world shows us nothing but matter in motion, an endless chain of causes and effects, action and reaction. Our senses are capable of receiving impressions from certain objects. These are the intellectual data of man.

He taught that everything in nature was in constant motion; that rest is only apparent. A heavy stone presses against the earth and the earth against

the stone constantly. There are no miracles in nature. All is law and order. There is no design or purpose in nature, for outside of it there is nothing to aim for or at.

Holbach insists on the necessary connection between body and soul; that man is a purely material being. He denies the possibility of spiritual reality. He makes matter the only substance in the world. Holbach was a determinist, believing that man is controlled by rigid necessity; that freedom of the will is a delusion.

Holbach was a fearless Atheist. He vigorously opposes the possibility of a God. He holds that Theism is both a retarding and a degrading doctrine; and that Atheism would ameliorate the condition of mankind. A God is not needed and should be dismissed. Like La Mettrie, Holbach was an Empiricist. He says: "As soon as we take leave of experience, we fall into the chasm where our imagination leads us astray."

The historian, Buckle, tells us that: "In 1764, Hume met, at the house of Baron d'Holbach, a party of the most celebrated Frenchmen then residing in Paris. The great Scotchman, who was no doubt aware of the prevailing opinion, took occasion to raise an argument as to the existence of an Atheist, properly so-called. For his own part, he said, he had never chanced to meet with one. 'You have been somewhat unfortunate,' replied Holbach, 'but at the present moment you are sitting at the table with seventeen of them.'"

Of the love for the miraculous, Holbach says: "Thus men ever prefer the marvelous to the simple; what they do not understand to what they can under-

stand. They despise familiar things, and only value those they are not able to appreciate. Though of these they have only vague ideas, they conclude that they possess something important, supernatural, divine. In a word, they need the stimulus of the mysterious in order to excite their imagination, to occupy their mind, and sate their curiosity, which is never keener than when it is engaged upon riddles that it is impossible to answer."

Pierre Jean George Cabanis (1759-1808) called by Lange, "the father of the materialistic physiology", was a pupil of Condillac and a friend of Mirabeau, whom he attended in his last illness. He was also intimate with Turgot, Condorcet, Holbach, Diderot, and other distinguished Freethinkers, and was elected member of the Institute and of the Council of Five Hundred in the Revolution.

Weber says of him that he "formulated the principles of psychological Materialism with such frankness and vigor as has never been excelled. Body and mind are not only most intimately connected; they are one and the same thing. The soul is body endowed with feeling. The body or matter thinks, feels, and wills. Physiology and psychology are one and the same science. Man is simply a bundle of nerves. Thought is the function of the brain as digestion is the function of the stomach, and the secretion of bile the function of the liver. Impressions reaching the brain cause it to act, just as the food introduced into the stomach sets that organ in motion. It is the business of the brain to produce an image of each particular impression to arrange these images, and to compare them with each other for the sake of forming

judgments and ideas as it is the function of the stomach to react upon food in order to digest it. Intellectual and moral phenomena are, like all others, necessary consequences of the properties of matter and the laws which govern beings."

CHAPTER III

MODERN MATERIALISM

JACOB MOLESCHOTT (1822-1893) was a Dutch physiologist and materialist. Studied medicine at Heidelberg, and taught there physiology, anatomy, and anthropology from 1847 until 1854. In 1853 he established a private laboratory and worked in it until 1856, when he was nominated professor of physiology at Zurich. In 1861 he moved to the University of Turin, and in 1878 to that of Rome. Becoming a naturalized Italian in 1876, he was made a Senator, and in 1878 professor of physiology at the University of Rome.

Moleschott wrote a number of books, but his "History of Man and Animals" published in 1855 caused Lange to call him "the father of the modern materialistic movement." But Ludwig Buechner wrote his "Force and Matter" the same year in Germany, and is much better known to the world, and has far more influence in spreading materialistic doctrines. Moleschott's writings were not the plain, direct attack on superstition that were Buechner's, and did not educate the common people in scientific principles as did the latter.

Here are three paragraphs of Moleschott's that show clearly just how materialistic he really was:

"Force is no impelling God, no entity separate from the material substratum; it is inseparable from matter, is one of its eternal, indwelling properties."

"A force unconnected with matter, hovering loose over matter, is an utterly empty conception. In nitrogen, carbon, hydrogen, oxygen, in sulphur and phosphorus, their several properties have dwelt from all eternity."

"The times are gone by in which man dreamed of spirit independent of matter. But the times are also past in which the spiritual was supposed to be degraded if it was manifested through matter."

Ludwig Buechner (1824-1899) German physician and materialist philosopher, held a chair at Tubingen University, which he lost when he published his work, "Force and Matter", in 1855. This bold work startled the world by its clear-cut language and fearless attack on superstition. It has gone through numerous editions and has been translated into nearly all European languages. He wrote ten other books, but "Force and Matter" was the one that made him famous.

Buechner fearlessly attacked metaphysical philosophers and "philosophical technicalities" in general as having discredited philosophy in the eyes of intelligent people. He held that we should dispense with "learned tall-talk", "intellectual legerdemain", and "philosophical charlatanism".

Buechner stated in his preface that "Philosophical disquisitions which can not be understood by every educated man are not, in our opinion, worth the printer's ink that is spent on them. What is thought clearly can be expressed clearly and without circumlocution. The philosophical mist which enshrouds the

writings of learned men seems rather intended to hide than to reveal thoughts."

No man in modern times met such a storm of opposition as did Buechner from the metaphysical philosophers. "Crude Materialism" was their unanimous cry against him. He lacked that "lofty language" necessary to philosophy and science. He was an "enemy of spiritual things", a "destroyer of idealist concepts".

Buechner anticipated all of this opposition from the mystic-minded, for he said in his preface: "We shall meet with no lack of opponents, and of the bitterest, too. But we shall take no notice of any but those who meet us on the grounds of facts and of empiricism."

Buechner says: "He who rejects empiricism, that is to say, experimental thought, rejects all human comprehension and fails to see that human knowledge and thought, without results drawn from experience, must be looked upon as nonsense. Thinking and being are as inseparable as force and matter, or spirit and body, and the idea of thought without being, or of an immaterial spirit, rests on a mere arbitrary theory which has not an inch of reality to stand on; it is a hypothesis floating in the air."

No wonder the metaphysicians called his a crude materialism. He was as crude as is our own John Dewey. He, too, bases his philosophy and psychology wholly upon empiricism. They tell us that materialism is dead, but John Dewey is by far the most popular philosopher in America. His language is not as plain as was that of Buechner's. No doubt that is why he has escaped the wrath of the stupid.

Buechner pays his respects to skeptics of knowledge

with the statement that the only actual limit to knowledge is ignorance. Whatever we can know, we may know. He says: "The enthusiasts or fanatics of know-nothingism are in their way as intolerant as those of faith, and are the more dangerous in that they know how to spread around them the deceptive veil of obscurity, whilst in reality their pretension at trimming is merely based upon a contemptible fear of being taxed with Atheism and upon want of the moral courage required for consistent thought."

He speaks of those who despair of positive knowledge as persons who kneel submissively before the shadow cast by their own ignorance. He says: "We find that the 'Unknowable' of modern Agnostics is nothing more than the good old God of the theologians, who has already made his appearance in so many deceptive disguises in the history of philosophy."

Buechner had a philosophic grasp of modern science that only a few scientists possess. He had no confidence in a philosophy not based on science. He said: "According to our views, no philosophy that lays claim to being true or clear can exist without those sciences; they are the essential and bitter foe of ignorance, fanaticism, and inanity of thought. Any discussion of philosophic problems which can not be brought into unison with the results obtained by science is worthless and senseless." And he concludes that real "philosophy has its basis in the consciousness which empirical science gradually acquires of itself."

A common statement of opponents is that Materialists believe in the indivisibility of the atom, but

such is not the case. Take Buechner as an instance: In his book, "Force and Matter", page 38, speaking of the atom, which was regarded by some as elements or original bodies, he says: "They are nothing of the kind, but are themselves compounds, and the so-called atoms therefore consist of units of a higher grade, as the molecule does of atoms."

This was written a half century before the discovery of radium, or the division of the atom. Materialists are not behind, but ahead, of their age. So Buechner was not "crude" and "out of date", but "ahead of the hounds".

As Buechner's writings are still available to readers there is no need to quote further from him. He was a thorough-going Materialist, dodging nothing implied in that system.

When the atom was divided, the cry went up that now matter had been dissolved into energy, and had disappeared as matter, that Materialism had finally been disposed of. But it was found upon investigation that even the electrons were matter, and the protons forming the nucleus, were the most solid chunks of matter that had ever been discovered. Both protons and electrons have measurable dimensions. They come under the only acceptable definitions of matter. They are quantitative. They occupy space. They are the material units of the universe.

The modern atom is a kind of solar system on a minute scale, the electrons revolving around their nuclear protons. The electron is a particle, extremely small, and charged with an invariable quantity of negative electricity, while the proton is still smaller, nearly 2,000 times as massive, and charged with an

equal quantity of positive electricity. One or more protons form a nucleus, and a number of electrons revolve around them with incredible speed; and each of the ninety-two chemical elements is characterized by an atomic number, which is nothing but the number of electrons around its nucleus in its un-electrified state.

In his "Philosophy" Bertrand Russell, in discussing the results of the work of Sir Ernest Rutherford and Niels Bohr, describes the protons and the electrons in a succinct and clear way. He says: "All matter is composed of two sorts of units, electrons and protons. All electrons are exactly alike, and all protons are exactly alike. All protons carry a certain amount of positive electricity, and all electrons carry an equal amount of negative electricity. But the mass of a proton is about 1835 times that of an electron: It takes 1835 electrons to weigh as much as one proton. Protons repel each other, and electrons repel each other, but an electron and a proton attract each other. Every atom is a structure consisting of electrons and protons. The hydrogen atom, which is the smallest, consists of one proton with one electron going around it as a planet goes around the sun. The electron may be lost, and the proton left alone; the atom is then positively electrified. But when it has its electron, it is, as a whole electrically neutral, since the positive electricity of the proton is exactly balanced by the negative electricity of the electron."

Ernst Haeckel (1834-1918) was a distinguished German naturalist, born at Potsdam. He became professor of zoology at Jena in 1862. In his scientific researches, he visited the North Sea shores and the

Mediterranean, Madeira, the Canaries, Morocco, Spain, Arabia, India, and Ceylon. Haeckel was the first scientist in Germany to champion the Darwinian theory of evolution, and was its greatest exponent. He devoted his life to the subject, and was the author of forty-four books on that and kindred subjects. He made many original discoveries, and was as bold as Huxley in applying evolution to man, and showing its irreconcilable nature to the doctrine of creation.

Haeckel was a thorough-going Materialist and Realist, believing in the existence of the external world of matter and its manifestations. He held that matter and energy were the fundamental attributes, or principal properties, of universal substance.

Haeckel gives us the trinity of substance, as he calls it: "(1) No matter without force, or without sensation. (2) No force without matter, or without sensation. (3) No sensation without matter, or without force. These three fundamental attributes are found inseparably united throughout the universe in every atom and very molecule."

On the last page of his "Riddle of the Universe" Haeckel states the law of substance thus: "The fact that substance is everywhere subject to eternal movement and transformation gives it the character also of the universal law of evolution. As this supreme law has been firmly established, and all others are subordinate to it, we arrive at a conviction of the universal unity of nature and the eternal validity of its laws. From the gloomy problem of substance we have evolved the clear law of substance. The monism of the cosmos which we establish thereon proclaims the absolute dominion of 'the great eternal iron laws'

throughout the universe. It thus shatters, at the same time, the three central dogmas of the dualistic philosophy—the personality of God, the immortality of the soul, and the freedom of the will."

Haeckel's theory of the atom differed from that of certain noted physicists and others, who held that atoms were created in a "dead matter form" and must have a vital force imparted to them by the creator. In 1899—or four years before the division of the chemical atom—Haeckel wrote in the chapter on "Substance" in his "Riddle of the Universe" that "we have succeeded in reducing all the different forces of nature to one common original force; gravity and chemical action, electricity and magnetism, light and heat, etc., are only different manifestations, forms or dynamodes, of a single primitive force (prodynamis). This fundamental force is generally conceived as a vibratory motion of the smallest particles of matter—a vibration of atoms."

Haeckel's Materialism pointed to the necessity of an electrical condition of matter before its discovery. Let those who speak of his "crude Materialism" ponder on their own crude statement of facts.

The Materialists have been accused of believing in a solid atom. If they did, their day of triumph has arrived. There has been discovered the hardest atom ever conceived. We will let Dr. W. D. Harkins, Professor of Chemistry, University of Chicago, tell us. In the Scientific Monthly, July, 1933, he writes:

"The year 1932, which has just closed, will always be memorable in the history of human progress as that in which Neutron, the most remarkable of all the known kinds of matter, was discovered. Like all the

other fundamental types of matter called elements, Neutron is made up of atoms, but these possess a remarkable, previously unknown characteristic—that is, while they are like all other atoms in being electrically neutral, they are excessively small. Thus they are so minute that more than a million-million of these atoms, or neutrons, could be contained in the volume of any ordinary atom and still leave some space which is not occupied. Since a neutron has about the mass of an ordinary atom, this means that its density is excessively high. Thus, if a lady's thimble could be filled with the neutrons in contact, the material in it would have a weight greater than that of all warships of all the navies of the earth.

'However, this new material could neither be held in a thimble nor in a heavy, tightly-sealed metal box, since it passes easily through any known material. That is, these neutrons are so minute that they pass very readily through other atoms without producing any disturbance, or, indeed, any noticeable effects."

This is a shocking demonstration to the no-matter folks, those who have been rejoicing that matter has been dissipated, that only energy or spirit remains. It now turns out that they have gotten down to a very small particle of real matter, that is, the smallest, the hardest, the heaviest form of matter ever conceived. It has all of the qualities of matter in an extreme form, and instead of the "crude Materialists" being disposed of, it looks that the atom of the old Materialists has been found.

CHAPTER IV

ETERNITY OF MATTER

Matter is uncreatable as it is indestructible.—CARL VOGT.

If matter is indestructible, then it is also uncreated.—Professor SPILLER.

The universe as a totality is without cause, without origin, without end.—Professor DU PREL.

Matter and energy are the unchangeable realities that can neither be created nor destroyed. . . . The universe is eternal.—Professor FREDERICK SODDY.

It is an experimentally ascertained fact that no process at the command of man can destroy even a single particle of matter, still less create a new one. It is on this definite basis that the great science of chemistry has been accurately built.—Professor TAIT.

A particle of iron is, and remains, exactly the same thing, whether it shoot through space as a meteoric stone, dash along on the tire of an engine-wheel, or roll in a blood-corpuscle through the veins of a poet. Its properties are eternal, unchangeable, untransferable.—DU BOIS REYMOND.

THE MATERIALIST is convinced that there was "no first cause" or "beginning" for the universe; but that it is eternal. Here is the way he reasons about it:

All things that are now always, in substance or in some form, were.

He asserts that the common sense and only logical

answer to the inquiry as to the origin of the universe in its totality is that it always was.

He insists that matter is eternal; that energy is eternal; and that, whatever now is always in essence was —that the universe, considered in its oneness, as a whole, is a self-existent, ever-acting and eternal verity.

The mind arrives at its conception of the reality of the quality of extension, by first perceiving an object, then by further noting that the object is extended (has size), and this quality having been found to belong to all objects thus apprehended, the quality of extension becomes a reality in the mind.

It is clear that the idea of extension is more than an intuition or a mere perception. We have, first, an object, second, an extended object, and third, the quality of extension.

Energies, as well as matter, have been included in what are designated as things; and it is just as impossible to conceive of energy coming from no-energy as matter coming from no-matter. By nonentity is meant an absence of energy as well as an absence of matter.

Matter, as has been said, has been demonstrated to be indestructible; and by a more recent, but no less certain, discovery of science, energy has been found to possess this same property.

There is no doubt that the material of the world was once in a chaotic condition, as compared with its present form. And if it should be admitted that the whole substance of the universe was once a formless mass, it does not follow, by any mean, that it had been always in that condition.

We can readily conceive of local or of even general

temporary "chaos", for this is consistent with the changing active character of nature; but a dead universe strikes the mind as an infinite absurdity.

In nature the old is constantly giving way to the new; and hence, destruction of present forms is as necessary as is the formation of what is to be.

So-called chaotic conditions may exist and at the same time be necessary to the transitions constantly going on.

With man, old material is often useless, or nearly so, and destruction and decay mean permanent loss; but it is not so in nature.

Here may lie apparently a formless mass, but touched anew by other masses, form ensues, and life and activity is the result. So it does not follow from the admission of a chaotic condition of things that eternal chaos ever was a fact.

And though the universe, viewed as a oneness, may have been at one time a vast chaotic mass, it does not follow that it had always been such; for it is much more thinkable that all the active or subsequently active energies were, for the time—an instant it may have been—potential in the mass.

And this seems, also, to be the clear teaching of science—a necessary deduction from the admitted theory of the indestructibility of matter and energy.

It is hardly to be doubted that if all the matter of the universe were at once drawn into one body, a relatively chaotic condition of things would be the result; but at the same time, every particle of formative energy, before existing, would be preserved, and a new universe—new heavens and new earths—would be produced.

Actual, real chaos—if it is proper to call it such—would be but for the "twinkling of an eye", like the stopping of an elastic ball thrown against a hard substance. It stops, but every particle of its matter is thrilled with life and energy, and the rebound attests the fact that, as a ball, it had been for an instant at rest, but was still alive.

Indeed, it is well-nigh demonstrable that such would be the case; that, as with the destruction of one particular form other forms are produced, so with the destruction of the present phenomenal universe as a whole, another universe would take its place. Further, in this same line of thought, it can fairly be said that as no single body is exactly alike at different times, neither is the universe as a whole alike at any two instants of time.

A man of a year ago, or an hour ago, was not exactly what he is now. Neither was a river, a mountain, or a world. So new heavens, and new earths, and new universes are constantly forming out of the old.

Most transitions are slow. Others may be sudden and grand beyond the power of human imagination to conceive, but still all is change; all is transition; and nature with its changes and transitions is all that we can know, and all there is to know.

To know is to think, and to think is to have our organism acted on by matter in motion. Knowledge comes from and is produced by matter in motion. Were there no matter, there would be no motion and no knowledge.

Knowledge results from the activity of matter, and is bounded by matter and its activities on all sides. Matter in motion is not only a condition precedent to

the existence of knowledge but its limitation as well. This subject will be treated in the chapter "Materialistic Psychology".

The activities of the universe, therefore, afford the only scope for the exercise of rational thought, and, this being true, it is supremely absurd to affirm a beginning or an end of succession.

Human knowledge is born of nature and is as much her offspring as is the human power of digesting food, and it can not get away from nature nor before her.

> "In every sand before the tempest hurled,
> Lie locked the powers which regulate a world,
> And from each atom human thought may rise
> With might to pierce the mysteries of the skies."

As the aviator can not go higher than the earth's atmosphere in which he floats, so human reason can not soar so high as to isolate itself from material things. Like the aeronaut who looks down on the earth and may forget for a time that it is his only permanent resting place, reason looks out on nature and seems at times to be its superior.

By means of reason man may rise from a simple mental perception of an object to a conception of its character, and thence to a conception of this first conception, and by thus building thought upon thought, climb into the domain of abstract truth, and rise higher and higher in this seemingly immaterial region. He may use the abstract truths thus found as aids in solving other practical problems, as the aeronaut uses for practical purposes the information gained by the extended view his elevation has given him; but he is forced, at the risk of his mental destruction, to re-

turn to the solid foundation of material things, and to find in them the real things.

The oft-repeated statement that the "invisible things are the real things" is far from proving that immaterial things are the real things; matter is only visible in certain forms, and it is possible that the greater portion of the matter of the universe is invisible.

Man is a creature of circumstances; he is from nature's mould. He also makes circumstances, it is true, but so does the smallest insect. Nature is a unit; each part acts on other parts and no one thing is independent of other things. It is mighty, living, eternal fabric—uncreated, indestructible, infinite; and there is no knowledge that is not within it and of it. It makes no revelations except of its movements; and knowledge is of what is revealed, to wit: the things of nature, the succession of events.

It is now universally admitted to be the province of science to push as far back into the past as possible any so-called supernatural agency; and year by year such alleged causes are becoming more and more remote. With the special advocates of the doctrine of a first cause, the theological writers and thinkers, a short time ago. it was a prevalent belief that the earth actually had a beginning about six thousand years ago.

Now it is admitted, by all such writers who are put forward as authority, that the earth in some form has existed for an indefinitely long period of time—for millions of years—and also, that the whole solar system, as it now is, had its origin in the operation of natural energies acting in accordance with their own inherent laws.

Since momentum, centrifugal force, and attraction are known to exist, and reasonably supposed to be inseparable from matter and the relative positions and motions of the various planets have been determined, it is the necessary and prevailing view that the earth was once a part of the sun; and therefore owes its origin to a change in the location of matter rather than in its creation.

In short, it is now known that the earth was not created six thousand years ago; and, in fact, not at all as an earth. As a planet which we inhabit, it was formed, not out of nothing, as stated by Bible commentators, but out of matter and elements previously existing.

Matter has been found to be indestructible. Energy has been demonstrated to be persistent, correlated, and eternal. Summer and winter, life and death, it is known, succeed each other; and continuous succession is the acknowledged order of things.

The doctrine of eternal or endless succession—the view that affirms that the totality of things in some form always existed—is restful and mentally satisfying. It is the doctrine of reality.

In this view there is mental contentment as to the stability of things in general; because they are found to rest on eternal material reality, instead of having as their foundation a bottomless void, or, at most, nothing but the will of an immaterial personal Creator, who need never have made anything nor need, except as suits his own supreme pleasure, permit anything longer to be.

It is true that this doctrine not only affirms endless being, but also perpetual change and dissolution of

particular things. But the mind does not shudder and startle at change, when it is, at the same time, assured that change is not destruction.

That the universe is, is the fact of all facts, of both sense and consciousness. That it was in the immediate past, is equally certain.

And, that it was at any conceivable time in the past, is, as has been shown, a necessary sequence of the fact that it is now, and that was in time just passed.

And, if it was at any conceivable time in the past, it always was, so far as human reason is competent to pronounce.

Science, in truth, teaches that matter and force always existed; and logic not only fails to shake the mighty truth, but can not even find a fulcrum for her lever of disturbance—a footing on which to stand to attack the foundation fact.

Our powers of perception and sense do not ask any other doctrine, for they deal only with things existing.

Consciousness is content, for she feels only things and their forces and relations.

Desire is averse to meddling with the question, is loath to antagonize the great truth; and looks not towards non-entity, neither in the future nor in the past.

"To me, the conclusion has for many years commended itself—that the materialist and mechanical scheme of nature (including man's nature), elaborated by physical science, is true and trustworthy, whatever there may be outside and beyond the possibilities of human knowledge."—Sir RAY LANKESTER.

"As far as we are concerned, matter is matter, force is force; the Materialism of science is a sound hypothesis, and no other hypothesis has yet been shown to be sound."—HUGH ELLIOT.

"According to this principle, the total amount of energy in the universe is constant. Energy may take new forms, but it can not be created or destroyed."—J. W. SULLIVAN.

"It has seemed for some time to me that the observed facts of astronomy logically indicate that the universe did not have a beginning, although it could hardly be doubted that cyclic periods of evolution and devolution occurred in succession."—Prof. EDWIN B. FROST.

"My guiding principle in this expostion of cosmogonic problems has been the conviction that the universe in its essence has always been what it is now. Matter, energy, and life have only varied as to shape and position in space."—SVANTE ARRHENIUS.

"So far as I can see the idea that the universe has always existed is a rational one, provided you give a proper definition to the term 'universe.' It is unquestionably true that our solar system had a definite origin in space, deriving from some earlier organism which may have been simply a single star. Similarly, there is no question but that our stellar system has a different organization from the organization it had in some epoch of past time; but the universe as a whole, including in that term all the material now organized into the portion revealed to us by our telescopes and that that may be beyond the reach of our telescopes, has undoubtedly always existed in some form or other." —Prof. R. G. AITKEN.

CHAPTER V

MATERIAL OR PHYSICAL INFLUENCES ON THE DEVELOPMENT OF MANKIND

THE ANTHROPO-GEOGRAPHERS have furnished a vast amount of evidence concerning the influence of physical environment on mankind, and this evidence has demonstrated that these material influences have determined man's mode of life almost completely.

It was not the spiritual or occult basis that man built his civilization upon, but upon material things, like land, food, climate, water, and locality. These geographical factors are ever present, and are always influencing the conduct of mankind.

Material factors, like fertility or non-fertility of soil, determine whether there is to be a high state of civilization or not. Without rich soil and water productivity is too limited to permit much development. It is only where there have been fertile soil and moisture that wealth and wisdom have followed. Where these factors are recognized and utilized, great advancement is made. Let the reader compare Egypt with other portions of Africa, or with India, with its devotion to spiritual beliefs instead of material forces.

Physical elements, like extremes of climate—that is, intense cold or heat—unfit men for great tasks. The

cold of the north prevents a great development, and the heat of the torrid zone is too enervating for great accomplishments. These physical conditions determine within certain limits the activity of mankind.

Climate fixes the habitat of man. The extreme poles prohibit population. The temperate zones provide favorable conditions for habitation. Too much, or too little, water will disperse human beings. Arid sections are unsuitable for agriculture, unless irrigation is provided.

As man is a product of the earth, he cannot be understood apart from its influences. He is influenced by the soil he tills, and the road he travels. He is influenced by the seas or rivers that he navigates. The mountain fixes the passes through which humanity pours to other sections of the earth. The valleys and channels fix the course of the rivers that man follows for the fish they contain and the game they provide with water and grass. Man usually locates where the rivers meet the sea.

INFLUENCE OF LAND

It matters not whether man is considered as an individual or as a family, as a clan, tribe or nation, he cannot be studied apart from the land which he inhabits. Land is the common bond that holds primitive and modern society together. These bonds grow stronger as society advances. Land is the "tie that binds" the city folk together more than any other single factor.

Human life is dependent on the land; it is the basic thing. We obtain our substance from it, and, dead or alive, no one escapes permanently.

Land is the source of all natural wealth, as well as much artificial wealth. Oil, which is now king, as was cotton some years ago, has the same material sources as does other mineral wealth. Those minerals have built large cities and great industries that would have no existence without them. Commerce must have a landing abroad and at home. Even the flying machine must come to mother-earth occasionally.

The location of land is more important than is its area. Size is not the most important point in a city, but location is. The same is true of islands. If located in sub-tropical latitudes, on warm ocean currents, and favorable trade winds, they are valuable lands, and if subject to opposite conditions, the land, though rich in soil and extensive in territory, is of little value and use.

The greatest political value is placed on certain locations. Strategic points have determined the rise and fall of kingdoms and peoples. Important arteries of commerce, like the Rhine and the Danube, have determined the course and culture of more than one race of people.

Next to land in importance comes food. Not "spiritual food" but "bacon and beans". Without food, the child cannot grow into the man. Without proper food the child becomes a weakling. One of the results of malnutrition is degeneracy. Races deprived of an ample supply of food are stunted. Children deprived of proper food are not only physically inferior, but they are mentally defective as well.

The anthropo-geographers have shown abundantly that food determines the question of increasing or diminishing population. Where there is an abundant

supply of food, the population increases. Where supply is meagre, the population declines to the point of subsistence. Food supply determines the number that survive, if it fails to limit the number born.

Winds have played a large part in the affairs of man. They have determined his course largely. The trade winds aided him when he went with them; they hindered him when he opposed them. The trade merchant took advantage of the driving power of those winds. From them is derived the name "trade winds".

These trade winds have determined more than the trade of merchants. They have prevented sections of continents from becoming civilized, and in other cases have aided civilization. Brazil is an example of retarded civilization due to the trade winds. These winds, blowing on the eastern coast of South America, and proceeding from the east, from across the Atlantic Ocean, reach the land surcharged with the vapor accumulated in its passage. On striking the high Andes Mountains, which they are unable to pass, they pour the whole of their moisture on Brazil, and deluge and inundation are the frequent result.

This produces vegetation so dense that penetration is almost impossible. Man has made no headway against it. Three and one-half centuries of effort, aided by European migrations, have had but little success in establishing a civilization there. Man is a puny being amid the vegetable life of that section of the world.

That large country has been held in the grasp of the trade winds, which has determined that its inhabitants shall be barbarous men and savage beasts. The mountains are too high to scale, and the rivers too

numerous and wide to bridge. These natural conditions have prevented the rise of a higher civilization in Brazil.

Nature sets up barriers that determine very largely the permanency of population. Natural barriers are often the greatest protector of a nation of people. They are more efficient than forts and walls. These barriers are mountains, deserts, seas, and dense forests. A people surrounded by natural barriers are most likely to remain a pure race, as their isolation guards them against infusion of foreign blood. Obstructive boundaries are of great historic value. These restrictions confine a people to their own territory, and develop racial characteristics of individuality and genius. Boundless territory causes dispersion of a people and loss of racial identity.

The child's physical environment consists in his mother's milk, the home in which he was born and reared, his playmates at home and at school, the games he plays, the air he breathes, the water he drinks, the sights he sees, and the sounds he hears. The man's physical environment consists of the work he does, the wages he receives, the farm he cultivates, the auto he drives, the girl he courts, and the family he raises. All material objects which shape his life this way and that are his environment and director.

Man's mental equipment is built up out of the images of material things. The brain centers register impressions derived from contact with real objects. His organism is influenced by all physical phenomena that play upon him. Thus the saying, "man is a creature of his environment." Heredity is the impression of past environment, and with the present environ-

ment, makes up the life and character of the individual and the race.

Not only is man's cultural equipment to be traced to the influence of his environment, but so also are his superstitions to be found therein. Superstitions arise from fear, and the primitive man, with his limited knowledge of nature's forces, was filled with fear. These manifestations affected even the educated with awe. Much of natural phenomena filled our ancestors with terror, and made impressions on them that have never been shaken off by modern man.

To mention a few natural disasters such as storms, cyclones, pestilences, lightning, and earthquakes will suffice. These phenomena produced terror. Fear inflames imagination, and man feels his own insignificance in the presence of a power he can not control. He falls down and worships the power he imagines can contnrol those awful happenings.

Even those constant influences, such as great depths and heights, affect man greatly. The high mountains and deep canyons inspire him with awe, and more often with dread. Even highly cultured persons have testified that, in the presence of the Himalaya Mountains, they have sensations of dread rather than pleasure. The force and majesty of nature makes impressions on the greatest of mankind that they are inferior or insignificant in comparison.

Not only are the strictly physical things classed as environment, but the more abstract influences are so classed. Art, poetry, and music are environment; literature and education are environment; the press and politics are environment; so are football and baseball; so are war and peace; so are honor and dishonor; so

are failure and success. All external influences are properly classed as environment, and man is largely a creature of external impression. Heredity equips him internally; environment equips him externally.

This does not imply fatalism, as so many think, for man does change his environment, and when environment is changed, the individual also is changed. The anthropo-geographers do not hold to the theory that man is a slave to his environment, but they do contend that it is a constant and powerful influence that is unescapable. It can be changed but it can never be dispensed with. It may be altered to be good or bad, but its existence is inevitable.

Man believed that God gave him "dominion of the earth", and he speaks of conquering nature and directing his own course. But it is found that those who did not conform to the natural advantages did not survive long to boast of their indifference to the provisions of mother-earth. Nature has not been noisy but she has been quite effective in the affairs of man.

The anthropo-geographers have abundantly shown that the earth is the mother of man. She brought him into existence and has fed him through the ages. The contest with these natural conditions built up his intellectual awareness. The mountains developed his leg muscles, the streams and lakes developed his arms and chest in swimming and paddling the boat. The storm drove him to build a shelter when the caves were overpopulated. Fertile soil of the river valleys produced a greater abundance of the needed food than did the rocky slopes and mountains. Water determined where man would live. It was the moist valleys

that produced the grass that fed the animals he ate and worked.

These evidences point to the conclusion that man's behavior is physically determined; that this influence is insurmountable, yet man can and has changed it to a large degree. The hopefulness of the case is that a beneficial change has a good effect on man; good physical environments have resulted in producing higher specimens of human beings, just as bad environments have produced degraded individuals. This points the way to the cultural climb of human beings.

The doctrine that natural influences were the dominant factor in racial development was advocated in the eighteenth century by men like Vico and Montesquieu, but it was Buckle, in his "History of Civilization", who first set forth a clear and fairly complete description of the physical forces operating on mankind and determining the mode of life.

A quarter of a century later appeared a monumental work by the German Friedrich Ratzel (1844-1904), the "History of Mankind". It is considered a standard work on anthropo-geography. It is in three large volumes, and has not been translated, but his American disciple, Dr. Ellen C. Semple, has popularized this masterpiece for English readers (in one volume). The title is "Influences of Geographic Environment". A most complete and clear work, in a field occupied by many great writers.

Ratzel insisted on the control of human activities by natural conditions, on the permanency of those conditions and the strictness of the limitations they impose; in other words, human development along certain lines is inevitably given a certain set of physical con-

ditions in the environment. Some of Ratzel's followers, especially in France, went so far as to agree with Demolins that if history were to begin all over again, it must in all essentials follow the same lines given the setting of the natural stage. This school of Determinism insisted on the absolute "geographical control" exercised by the newly studied geographical factors.

Materialists generally do not go to that extreme. They recognize other material factors operating, such as man himself. The creative power of human beings exercises a reciprocal control or influence on their environment, to adapt themselves to natural circumstances, deliberately to attempt the moulding and even reshaping of their environment. Thus "geographical determinism" becomes modified by the conception of a reciprocal control, to one of "geographical influence".

Dr. Semple, in her volume, attributes a long series of physical characteristics of man to the direct and indirect influences of geographic environment. Following many of her predecessors, and especially Ritter and Ratzel, the author, in a somewhat milder form, tries to show by several examples the validity of her principal correlations. Many other authors in a more technical and more competent but in a narrow form support the same thesis of a correlation between geography and racial characteristics in the zoological sense of the term. As examples of such theories I will mention those of J. A. Allen, W. Ridgeway, Sir Arthur Keith, Dr. Franz Boas, and others.

Dr. E. Huntington, in his principal sociological works, "Civilization and Climate", "World Power and

Evolution", and "The Character of Races", has shown that climate is one of the most important factors influencing civilization. His method is by establishing a series of correlations between climate and health; between climate and energy and efficiency of labor; between climate and mental qualities such as intelligence, genius, and will-power; and finally between climate and the character, growth, and decay of civilizations. Dr. Huntington's corroborations and discussions are new and more inductive and factual than those of many of his predecessors. Any analysis of social phenomena which does not take into consideration geographical factors is extremely incomplete.

CHAPTER VI

MATERIALISTIC INTERPRETATION OF HISTORY, OR ECONOMIC MATERIALISM

THE BELIEVERS in the economic interpretation of history hold that the evolution of mankind and of social institutions was brought about by the inherent law of development; that the material conditions surrounding man determined his character and his actions; that alterations in economic conditions also change the individual and institutions; that different economic conditions alter the moral and social relations of mankind.

Those holding to the economic interpretation of history maintain that the production and distribution of the product is the basis of social order; that changes in society are to be found in the modified mode of production and distribution. That it is not philosophy or religion that changes mankind, but his economic condition. They hold that the moral standard conforms to the prevailing economic standard; that the political situation is dominated by the masters of production and distribution; that where there is any political change, it is produced by a preceding economic change.

In his work, "The Economic Interpretation of His-

tory", Prof. E. R. A. Seligman defines this theory as follows: "We understand, then, by the theory of economic interpretation of history, not that all history is to be explained in economic terms alone, but that the chief considerations in human progress are the social considerations, and that the important factor in social change is the economic factor. Economic interpretation of history means, not that the economic relation exerts an exclusive influence, but that they exert a preponderant influence in shaping the progress of society."

The philosopher Feuerbach said: "Man is what he eats," and Napoleon said, "Armies travel upon their stomachs". John Keracher says: "All of the ideas of man have sprung from the material environment in which he has lived and moved. This is the substance of the Materialist Conception of History." Buckle says that "The distribution of wealth is, like its creation, governed entirely by physical laws."

Economic Materialism is revealed by history, for wherever peoples have been subjected to similar conditions, similar social types have been developed.

The economic interpretation of history as a theory is over three hundred years old. Some Socialists have claimed that Karl Marx was its originator, but it is now known that it preceded him by three centuries. In his great work, the "Economic Foundations of Society", Prof. Achille Loria (a Socialist) gives the honor of being the first to set forth the theory that the political constitutions are the product of economic conditions to James Harrington, who wrote his book, "Oceana", in 1656.

Harrington wrote at a time when the landlord was

the dominant economic power. He pointed out that if a few landlords owned the country, they would dominate it politically. He pleaded for "the whole people to be landlords," as the solution. In that event, the country would then be "a commonwealth". In his life of Harrington, Toland says that Harrington was the first to discover that "empire follows the balance of property", and this discovery he thinks is equal to any other ever made. And he says: "What gross and numberless errors were committed by writers before him, even by the best of them, for want of understanding this plain truth, which is the foundation of politics."

A half century later Harrington had a great champion in Davenant who added money to land as an influence in determining the political and legal status of affairs. He states that "Those who possess money have at all times and in all countries dictated the laws, and subjected the majority of the people to their power." Montesquieu, Dalrymple, and Sir James Stewart held the same view, that political power was created by the power of property. Stewart said "industry gives wealth, and wealth gives power."

The historian, Mommsen, wrote over a century ago: "We must study history according to the economic and social conditions of a people."

The religious and spiritual interpreters of history hold that events are directed by spiritual force; that all religious history, at least, must be interpreted spiritually to be understood; that economic interests do not enter into great world movements like the Reformation, that it was a great outpouring of spiritual

indignation against religious intolerance, and not in any way materialistic.

The Protestant leaders of the Reformation knew better what the influences were that they were fighting than do the Christian writers of our day. They understood the economic forces that they were contending against better than do some of our economic teachers in universities. A page from Martin Luther will be sufficient to demonstrate how economic his interpretations were of their revolt against the Roman Catholic Church. He says:

"How is it that we Germans are forced to suffer such theft and exploitation by the pope? . . . I think that Germany gives much more now to Rome and the pope than it did in former days to the emperors. Yes, many of us think that every year over 300,000 gulden go from Germany to Rome, purely in vain, and in return we get but derision and abuse. And then we wonder that princes, nobles, cities, and monasteries, land and people, grow poor! We ought rather to wonder that we still have something to eat. . . . If we hang thieves by law, and behead robbers, why should we allow this Roman miser, who is the greatest thief and robber that has ever appeared or ever will appear on earth, to go free? . . . There is in Rome a constant buying, selling, exchanging, bartering, intoxication, lying, deceiving, robbing, stealing, boasting, whoring and villainy. . . . Venice, Antwerp, and Cairo can in no way compete against this fair and traffic of Rome. . . . At last the pope has erected an exchange especially for all these noble commercial transactions, the Datorius House at Rome. Thither must come all those who act in this way in order

to obtain fiefs and livings. . . . If you have money in this exchange, then you can get everything, and not only that, but here all sorts of usury are considered honest money, and stealing goods is vindicated. . . . Oh, what skinning and what exaction go on there; it is made known that all the laws of God are only made so that money can be amassed, money which must be had in order to be a Christian." (From "The Eve of the Reformation", by Henry C. Lea.)

In his book "Utopia", written in 1516, Sir Thomas More shows very clearly that he understood that economic influences were directing the affairs of state. He says:

"I can have no other notion of all the other governments that I see or know, than that they are a conspiracy of the richer sort, who, on pretense of managing the public, do only pursue their private ends, and devise all the ways and arts that they can find out; first that they may, without danger, preserve all that they have so ill acquired, and then, that they may engage the poorer sort to toil and labor for them, at as low rates as is possible, and oppress them as they please."

John Locke (1632-1704) in his book on "Civil Government" has this to say about men who form the state for economic advantages to themselves: "The great and chief end, therefore, of men uniting into commonwealths, and putting themselves under government, is the preservation of their property; to which in the state of nature there are many things wanting."

The establishers of this Republic were revolters not only against political tyranny, but against eco-

nomic oppression. They expressed their sentiments for all to read in the Declaration of Independence. Among the reasons given for that revolt, they charged the King of Great Britain with many injustices. Among others they said:

"For cutting off our trade with all parts of the world."

"For imposing taxes on us without our consent."

"He has plundered our seas, ravaged our coasts, burned our towns, and destroyed the lives of our people."

These statements were generally understood to be cause for revolt. The colonists were aware of the need to protect their "material interests," as it is sometimes called, against those of the British Empire.

The writers of the Constitution recognized also the economic factors they had to deal with. The Constitution provides for taxing the people; borrowing of money; the regulation of commerce; for bankruptcy courts; for coining money; for fixing standards of weights and measures; to establish post-offices and post-roads; to grant patents and copyrights; to punish piracies, etc.

The Constitution contains enough evidence to show that the economic factor was a powerful one in determining its character. Many historians have stated that the Constitution was framed by men who were interested in protecting property, and was written by the upper ruling class, men of wealth, of both the agriculturist and the merchant class.

In his "History and Social Intelligence", Prof. Harry Elmer Barnes devotes many pages to the "fathers at work", and quotes numerous statements from them

showing their interest in the economic welfare of their own class. Some were agriculturists, others were merchants. To quote just one paragraph from Professor Barnes: "Thomas Jefferson, while the great political rival of John Adams, stood squarely with him upon the matter of the economic determination of political and social institutions. Jefferson was particularly insistent that the continuance of the American system of government was contingent upon the persistence of the domination of agriculturists in our society." (p. 321.)

The mercantile class was a rival for favors then as now, and disputes between them and the agriculturists for supremacy was waged constantly. It was the task of Congress to serve both interests, which was some task as their interests conflicted at many points, as they still do. No congressman escaped economic pressure then any more than he does now.

It was no different in Daniel Webster's term in Congress. He recognized that economic power dominated political affairs. He said in one of his speeches: "In what then does real power consist? The answer is short and plain—in property. Could we want any proofs of this, which are not exhibited in this country, the uniform testimony of history will furnish us with multitudes. . . . Wherever we cast our eyes, we see this truth, that property is the basis of power."

The greatest modern advocate of the economic interpretation of history was Karl Marx, a German Jew. He built an extensive economic system around this idea, and so persistently insisted on its all effectiveness that he is, by many of his followers, believed to have been the original advocate. He was original

in the belief that it was the dominant factor. He made it to be the beginning and the end of social and economic influence.

But we have already seen that men of the Renaissance understood this economic factor fairly well, and this knowledge has been utilized by many from those days to our period. But Marx is entitled to credit for making the economic world sit up and take notice of what he believed to be the one all-important element worth considering. His extreme view of it attracted attention to its importance as nothing else could.

Marx held that the political and legal organization of society is absolutely dependent upon its economic structure; that the future of the race is dependent upon economic forces; that there is an economic determinism. In his preface of his "Critique of Political Economy", he says:

"In the social production which men carry on they enter into definite relations which are indispensable and independent of their will; these relations of production correspond to a definite stage of development of their material powers of production. The sum total of these relations of production constitutes the economic structure of society—the real foundation, on which rise legal and political forms of social consciousness.

"The mode of production in material life determines the general character of the social, political, and spiritual processes of life. It is not the consciousness of men that determines their existence, but on the contrary their social existence determines their consciousness.

"At a certain stage in their development, the material forces of production in society come into conflict with the existing relations of production, or—what is but a legal expression for the same thing—with the property relations within which they had been at work before. From forms of development of the forces

of production, these turn into their fetters. Then comes the period of social revolution. With the change of the economic foundation, the entire immense superstructure is more or less rapidly transformed.

"In considering such transformations the distinction should always be made between the material transformation of the economic conditions of production, which can be determined with the precision of natural science, and the legal, political, religious, aesthetic, or philosophical—in short, the ideological forms in which men become conscious of this conflict and fight it out. Just as our opinion of an individual is not based on what he thinks of himself, so can we not judge of such a period of transformation by its own consciousness; on the contrary, this consciousness must rather be explained from the contradictions of material life, from the existing conflict between the social forces of production and the relations of production."

From the above quotations it will be seen that Marx taught that the law and the government are rooted in economic conditions; that man's productive activities are independent of his own volition; that man's productive powers constitute the economic structure of society; that this economic power determines the social, political, and mental activities in general.

In speaking of these economic laws, Marx, in his preface to the first volume of "Capital", says that "We are concerned with these tendencies working and forcing their way with iron necessity". Marx's coworker, Frederick Engels, took the same stand for economic determinism. Many passages could be quoted, but one will suffice. In his book "Socialism: Utopian and Scientific" (p. 45) we read:

"The materialist conception of history starts from the proposition that the production of the means to support human life and, next to production, the exchange of things produced, is the basis of all social structure; that in every society that has appeared in

history, the manner in which wealth is distributed and society divided into classes or orders, is dependent upon what is produced, how it is produced, and how the products are exchanged. From this point of view the final causes of all social changes and political revolutions are to be sought, not in men's brains, not in men's better insight into eternal truth and justice, but in changes in the modes of production and exchange. They are to be sought, not in the Philosophy, but in the Economics of each particular epoch."

The attitude of these two men created a storm of opposition for years, in fact it has never ceased from the time they issued the "Communist Manifesto" in 1848. They were accused of preaching an economic fatalism that outdid the theological fatalism of John Calvin. The "inevitability of socialism", and "iron necessity", matched Calvin's "predestination". They were charged with resolving all motives into one motive: "economic interests". Engels felt the necessity of issuing an explanation in 1890, to this effect:

"Marx and I are partly responsible for the fact that the younger men have sometimes laid more stress on the economic side than it deserves. In meeting the attacks of our opponents it was necessary for us to emphasize the dominant principle denied by them, and we did not always have the time, place, or opportunity to let the other factors which were concerned in the mutual action and reaction get their deserts.

"According to the materialistic view of history, the factor which is, in the last instance, decisive in history is the production and reproduction of actual life. More than this neither Marx nor I have ever asserted. But when anyone distorts this so as to read that the economic factor is the sole element he converts the statement into a meaningless, abstract, absurd phrase. The economic condition is the basis, but the various elements of the superstructure—the political forms, the class contests, and their results, the constitutions—the legal forms and also all the reflexes of these actual contests in the brains of the participants, the political, legal,

philosophical theories, the religious views—all these exert an influence on the development of the historical struggles, and in many instances determine their form". (FEUERBACH: *The Roots of the Socialist Philosophy,* p. 25").

In his masterly work, the "Economic Foundations of Society", Professor Loria gives an economic interpretation of the Reformation that is in harmony with the facts, as well as the theory. He also agrees with Martin Luther's explanation. He says of the Reformation that it "occurred as the result of an essentially economic conflict between the feudal lords and the ecclesiastics who protected feudal property from the attacks of the serfs. The feudal lords endeavored to exclude the ecclesiastics from too large a share in revenues from property, while the clergy, relying on the precious support they lent to the feudal system, pretended to an augmentation of their rewards. Every one knows that the Reformation began with a reaction on the part of the property owners against the sale of indulgences, and that the first victory of the proprietary classes over the ecclesiastics was followed by an alliance between the latter and the serfs, which gave new life to the Peasants' War." (p. 372.)

On the question of the basis of law and the State, Professor Loria scouts the old ideas that economic conditions depend upon the law, or that the State can change its economic base. He holds that changes in the prevailing economic conditions necessarily involve corresponding alterations in the law. He says:

"Political science has heretofore been dominated by the idea that laws spring full born from the mind of the inspired legislator—"prolem sine matre creatam"—and that their function is to regulate social relations according to immutable principles of

justice. This concept gave jurisprudence its former prestige, and made public law the foundation and keystone of social science. This was particularly true of the last century, but with a deeper insight into the compostion of society a new concept has since arisen, and the law is now coming to be regarded as an organic product of economic conditions, rather than the chance result of the legislator's will. Thus the earlier superficial idea of the relations existing between legislation and economics is gradually giving place to the deeper concept which regards the political constitution as the necessary outgrowth of the existing economic system. The process by which the economic system thus determines its corresponding political constitution, the organic bond which unites the one to the other, is the political monopoly of property. By its means economic conditions determine the composition of the State, and direct legislation in the way best calculated to serve the interests of the exploiters of the economic system, and consolidate their power. Thus politics is but a method of survival, and a means of preserving and extending the property system. The older concept, with law as the determinant of economic relations, made jurisprudence the social science par excellence; but the more modern concept that takes economic conditions as the basis of politics and legislation canonises political economy (whose very name it justifies), and makes it the foundation of all the social sciences.

"We should hasten to remark that this theory does not go so far as to maintain that economic conditions may not be modified by law. It is a great mistake to suppose that the theory which makes legislation depend upon economic conditions can be successfully combated by showing that these relations can themselves be effectively modified by law. The economic concept of the State is in no wise disturbed by such considerations, as it rests upon the truth of this proposition. If legislation were really powerless to modify economic conditions, and if the immediate economic situation were irrevocably determined by natural law, there would then be no reason for the proprietors to possess themselves of political authority; for in this case, even though the non-proprietors possessed legislative functions, they would still find it impossible to effect any modification in the existing social order. If then the concept of economic law, as conceived by ortho-

dox science, were in conformity with the true state of things, the capitalistic composition of the State would no longer have any logical justification, and the political constitution would cease to have any connection with the economic system. It is thus only by admitting that legislation is capable of modifying social conditions that we arrive at the conclusion that, in the interest of their own preservation, the proprietary classes must possess themselves of political power in order to direct legislation in accordance with the property system. Our immediate deduction must then be that the law is only capable of modifying economic relations in so far as economic conditions are able to modify themselves. If, in short, the economic system determines the political constitution, and the latter in turn may by legislative action alter its economic base, it is evident that the law simply acts as an intermediary, through whose instrumentality the economic system succeeds in modifying itself, and that, as a matter of fact, economic relations develop and change by a natural process of intrinsic elaboration." (pp. 327-28-29.)

Professor Seligman traces the economic interpretation of history back to Harrington, as does Loria. After giving a long list of men who contributed to that theory, and a brief summary of their part, he says:

"In the case of Roman history the relation between the land question and national progress has always been so obvious that such historians as Nitzsch and Mommsen did not have to wait for the rise of the school of economic interpretation. Even in the case of Rome, however, good work has since then been done, especially in the imperial period, in emphasizing the controlling influence of economic factors on the general development. So, also, some neglected points in the history of Hebrew antiquity have been brought out by writers like Beer and Mehring.

"When we come to more recent periods of history there is an embarrassment of riches. The economic forces which were instrumental in shaping the transition from feudal to modern society are so obvious that the historians have for some time been laying stress on economic interpretation almost without knowing

it. This is true, for instance, in the treatment of the military system, which has been clearly described by Burkli in his account of the transition in Switzerland. One of the most accomplished of Belgian historians, Des Marez, has recently voiced his conviction that 'no one can investigate the deeper causes that have influenced the peoples between the Rhine and the North Sea without perceiving that it is above all the economic conditions, and not racial, linguistic or other factors, that have determined national progress.'

"The newer view has led investigators to accentuate the economic factor not only in the Crusades but also in the Reformation with the victory of Calvinism and Puritanism. The professed historians themselves have been so far influenced by the movement that Lamprecht, one of the most distinguished of German scholars, has recently made the economic factor the very foundation of the entire political and social development of mediaeval Germany. In the acrimonious discussion that this 'audacious' move has engendered, and which is not yet concluded, the gradual triumph of the newer tendency seems by no means improbable.

"When we approach the centuries nearer our own time, it has almost become a commonplace to explain in economic terms the political transition of England in the eighteenth century, as well as the French and American revolutions. To take only a few examples from more recent events, it is no longer open to doubt that the democracy of the nineteenth century is largely the result of the industrial revolution; that the entire history of the United States to the Civil War was at the bottom a struggle between two economic principles; that the Cuban insurrection against Spain, and thus indirectly the Spanish-American War, was the outcome of the sugar situation; or, finally, that the condition of international politics at present is dominated by economic considerations. Wherever we turn in the maze of recent historical investigation, we are confronted by the overwhelming importance attached by the younger and abler scholars to the economic factor in political and social progress." (*The Economic Interpretation of History*. pp. 83-86.)

Economic influences may have been hidden in the

past so that only the keen student could discern them, but today, those factors are apparent to all capable of reading the daily newspaper reports of business development. The papers demand a business administration of officials. "We want a business administration," is the cry raised by the press, and it says that is what the people demand. The press knows whom it represents in these matters, and it says nothing of those interests directly, but it pretends to represent the people in this demand and it may represent them also, for it has propagandized the people in these matters until they may believe that government should represent the economic interests of big business as its proper function.

CHAPTER VII

THE DUCTLESS GLANDS DETERMINE CHARACTER

THE MATERIALIST points with satisfaction to the ductless glands as evidence of what a vest-pocketful of matter can do to the life and character of an individual. The importance of these glands, in view of their size, has astonished scientific men. It has been known for decades that the thyroid gland in the neck has a surprising influence on mental vitality, but it is only in recent years that the investigators have discovered that the thyroids are only one of a number of pairs of small glands, or single glands, which have a remarkable influence on life and character.

Character or personality or temperament very largely depends on the functioning of the ductless glands, and not on "spiritual influence". The difference between the bold and the timid; the easy-going and the go-getter; the shy and the aggressive; and so on, is one of body, and no doubt very largely, one of gland.

Gland determinism has been thoroughly demonstrated in the last dozen years, not in any absolute form, but within the limits of their functions. The ductless glands wield an influence that establishes certain traits and characteristics. They are not fatal-

istic, because they can be changed, and their effect modified, as will be pointed out later in goiter and cretin cases, in the diseases of the thyroid gland.

So we will devote this chapter to a description of the nature and influence of these small, but very important forms of matter known as "endocrine glands". The author is not an expert on this subject, so he will quote from a number of experts who have shown very clearly what a few ounces of gland matter in action can accomplish in building and directing the life and doings of a human being.

In the introduction to his "How We Become Personalities," Dr. Edward H. Williams, says: "We know now that the size and shape of a person's body, the quality of his mind, his personal characteristics—his 'personality'—all are dependent upon a group of minute structures in the body known as endocrine glands, or 'ductless glands', or glands of 'internal secretion' The action of these glands determines every vital function of the body, physical and mental. And, what is more important, science in recent years has solved the riddle of controlling and directing this action."

Dr. Lewellys Franklin Barker tells much the same story about the ductless glands. He says: "More and more we are forced to realize that the general form and the external appearance of the human body depends to a large extent upon their functioning. Our stature, the kinds of faces we have, the length of our arms and legs, the shape of our pelvis, the color and consistency of our integument, the quantity and regional location of our fat, the amount and distribution of hair on our bodies, the tonicity of our muscles, the sound of the voice and the size of larynx, the emo-

tions to which our exterior gives expression—all are, to a certain extent, conditioned by the productivity of our hormonopoietic glands. We are, in a sense, the beneficiaries and the victims of the chemical correlation of our endocrine organs."

It is not only the physical make-up of the individual, but his mental as well, that is determined by these glands. "Acuteness of perception, memory, logical thought, imagination, conception, emotional expression or inhibition and the entire content of consciousness are influenced by the internal secretions" is the way one of the authorities on glands puts it. In his book "The Glands Regulating Personality" Dr. Louis Berman, on this subject, states the case as follows:

"Mind, still regarded by most of mankind as something distinct and apart from the body, is thus exhibited as but part and parcel of it. A deaf, dumb and blind animal, deprived of tongue, and olfactory mucous membrane, without sensation from the outside world, can grow no mind in the sense of intelligence The sense organs of the body mediate the primary mind-stuff. Without internal secretions and a vegetative system, there could be no soul, in the sense of complex emotion. Nor those combinations of thought and emotion which synthesize attitudes, sentiments, and character. The internal secretions and the vegetative system mediate the primary soul-stuff. Mind is thus emulsified with body as a matter of cold literal fact. The soul was once a subtlety of metaphysics. Now, when mind appears soaked in matter saturated with chemicals like the hormones, therefore woven out of material threads, the inde-

pendent entity created out of intangible spirit flies like a ghost at dawn."

THE THYROID GLANDS

The Thyroid is a ductless gland located in the neck made up of two lateral lobes, joined together below by a transverse bridge (isthmus). The lobes are applied to the sides of the thyroid cartilage (Adam's Apple), and the upper part of the trachea. The organ is copiously supplied with vessels, and under the microscope is seen to consist of minute spaces filled with yellow glairy fluid (colloid), and lined by columnar epithelial cells. Simple enlargement of the thyroid or goiter is endemic in many parts of the world, especially in valleys at high elevation. The cause of this disease has long been ascribed to the water in these localities, and all the evidence points to it being due to an organism in the water

Functionally, the thyroid is of great importance as it elaborates an internal secretion which has a profound influence on general nutrition. The progressive destruction of the glands in goiter is responsible for the development of cretinism, which is so common in children in goitrous districts. In goiter cases, the physican supplies the missing secretion, which is the thyroid extract, and the result obtained in some cases is little short of marvelous. A born idiot can be transformed into a sane child. Whole districts, in which a large portion of the children have, for ages, been born idiots (cretins) have been rid of idiots by means of thyroid extract. This is a concrete example of how the mind depends upon the body. It is a well estab-

lished fact that the thyroid glands have a large influence on mental activity.

The thyroid personality is described at length by Tasma Carey, the bio-analyst. Just two paragraphs will be quoted to give some idea of the influence of the thyroid. She says:

"A well-balanced thyroid secretion is the strongly determinative factor towards an all-round physical development. Its harmonious influence goes a long way towards insuring an active, efficient, smoothly co-ordinated mind and body. They are medium height, well muscled, long muscular neck, inclined to be on the move, physically and mentally. Some are prize-fighters, wrestlers and gymnasts, as well as mental masters. Their fondness for speed gives them a desire and a special aptitude for operating fast-moving machinery, either stationary or moving through space."

When the thyroid is too active, she says, they become "the lean-meat personality, clean-cut and smooth-faced, with thick hair, long eyelashes, sinuous eyebrows, glittering prominent eyes, sparkling white teeth and a sensitive mouth. Symptoms of over-secretions are indicated when there is an excitability of the nerves and an overwhelming reactivity of the human being to environment. The heart's action is too fast, and under stimuli gets faster, to the degree of palpitation. Temperature increases, and the individual has a high, warm color, does not sleep well, and remains thin, no matter how much food is eaten. The personality is unstable, impulsive, restless, emotional, lacking in tenacity and endurance, and inclined to cerebral excitation as a result of exaggerated sensitiveness to experience. Owing to emotional reactions, there is a tendency to sleeplessness and insomnia. Alert, neurotic, highstrung, and imaginatively impressionable,

are some of the adjectives descriptively applicable to the thyroid personality. They are cold-blooded people."

The parathyroid glands are four small bodies attached to the back of the thyroid, but differing entirely from it in structure. Their complete removal means immediate death. The animal develops spasms, a rise in temperature, rapid respiration, vomiting, diarrhea, and finally dies. These glands probably also have an effect on the nervous system by interfering with the discharge of nerve cells.

THE THYMUS GLAND

The Thymus Gland is a vertically placed organ extending from the lower part of the neck to behind the sternum. It consists of two lateral lobes between which often is a narrow bridge. Each lobe is made up of smaller sub-divisions, which in turn are filled with microscopic follicles. The latter are composed of two distinct parts, a large external cortex and a smaller central medulla.

The Thymus increases in size up to the age of two, and in most cases, atrophies so that at puberty only a vestige remains. The gland may, however, persist or even enlarge with age, and from its position give rise to various mechanical disturbances, even causing asphyxia. Much more commonly, the persistent thymus is associated with enlargement of other lymph tissues, a condition known as lymphatism or status lymphaticus.

The deranged thymus gland is found in quite a high percentage of criminals. Dr. S. J. Morris, of the West Virginia Medical School at Morgantown, reports that:

"It has been shown that out of twenty criminals dissected all had persistent thymus glands. It has also been shown that an abnormal secretion of the thymus gland interferes with the relationship between the impulses and the inhibitions so that a person responds to emotions that he would not respond to normally."

One of the functions of the thymus, according to Dr. George A. Dorsey, is "to hold back the development of the sex glands until puberty. Post-mortem examinations of four hundred idiots showed no thymus in seventy-five per cent. Its removal in young animals retards growth but hastens sexual development; the sex glands remain weak, the body flabby and dwarfed."

Dr. G. W. Weddell states that: "Man's physical construction is such by virtue of his glandular development. The body clearly reflects the relative influence of the various segments of the endocrine system. The ancestral genes manifest their potency through promoting or inhibiting the growth and secretion of the various elements of the same organs. Weakness, or better, lowered resistance to certain disorganizing and destroying influences, is transmitted. . . .

"Interesting indeed is the Thymus Type. Here we have an hormonic syndrome producing persons with a very fine skin, red face, kite-shaped head with a childlike face resisting evidence of age. When the capillary networks are visible through the attenuated cuticle, the persons are rosy-cheeked, expansive, socially minded. These make entertaining friends and pleasing people with which to do business. They have the enthusiasm to organize and energize others.

"But predominating Thymus influence means unbalance and these otherwise favored individuals find their organisms often fail locally in maturity of cells and thus fall victims of malignancy. They are those who have small resistance to disintegrating diseases and are the types who quickly succumb to degenerative metabolic change. They are the alkaline types and as malignancies usually show high potential hydrogen ionization or relative acid-alkaline balance. They conform to above findings. But while they seem to escape the skin ravages of time, yet, not entirely, for their hair frequently greys at an early age, and we see the phenomenon of a young face accompanied with white hair."

THE THYMUS PERSONALITY

Tasma Carey tells us what the personality and characteristics of the normal physical type are. She says: "The normal thymus personality is distinguished by a broad, well-developed form, wide shoulders and full chest with upper forehead a little fuller than the average. He is governed by his emotions, quickly enthuses and as quickly cools, marries hastily, and often forms an unhappy alliance. He is very pleasant, putting everyone at their ease and often using them better than they can use themselves. He has the ability to commercialize the ideas of thinkers. He talks from the heart, and is warm and enthusiastic."

THE GONAD GLANDS

The gonads, or sex glands, wield a decisive influence on human character as well as the physical organism. The secretions of these glands are in part taken into the blood-stream; they energize both the

brain and the muscles to a marked degree; they interact with, and upon, other glands; they excite a most complex and important system of effects; their insufficiency in greatly lowered sense of personal power.

William J. Fielding says: "A man who lacks the internal sexual secretion, whether congenitally, through disease, or deprivation by surgical operation, loses the source of the physical attributes of manhood and psychic maturity."

The effect of loss of the male internal sexual secretion can be observed on eunuchs, men who have been deprived of their testicles. Authorities who have made a special study of eunuchs declare they are generally characterized by mental inactivity, timidity, lack of enterprise, selfishness, envy, fanaticism, mysticism, a mixture of childish and neuter-sex traits. There are but few exceptions where eunuchs have risen to positions of prominence.

In any event, we know that the sexual hormone determines the shading of the characteristic masculine development or lack of it. If the hormone is deficient in quality or quantity or is absent, the man tends towards the secondary physical attributes of the woman, with the corresponding psychic disposition. That is, he is inclined to broad hips, round breasts, lack of beard, layers of fat underneath the skin instead of a more muscular development, a high pitched voice, effeminate features, mannerisms and idiosyncrasies.

The female gonads, the ovaries, are analogous to the testes in the male, and are two oblong flattened bodies, and are situated on either side of the uterus, to which they are connected by ligaments and by the

fallopian tube. The ovary is composed of two well-defined portions, a superficial or "cortical" portion and a deep or "medullary" portion. The cortical portion in the adult ovary contains an enormous number of vesicles varying greatly in size. These are the Graafian vesicles or follicles, and contain the ova or germs—the female element of reproduction.

The gland experts say that the ovary, among other functions, is concerned with the skeletal, or bony growth of the girl's body. The early advent of puberty, the ripening of the ovary in the girl, checks the growth of her limbs. Long bodies, and short legs, is the result of delayed development.

Doctor Williams says: "Of course the sex life of a woman is determined and controlled by the ovaries, acting in conjunction with the other ductless glands. Yet, curiously enough, the ovary may be transplanted from one part of the body of an animal to another and all these functions, except that of reproduction, go on as before. This is true of transplantation within the individual. But when the ovary is transplanted from one body to another, although it may function for a time, it eventually degenerates. Yet, as long as any remnant of it remains alive, it maintains the sex life of its host in a normal manner, including the lunar cycle."

The gonad natural personality is thus described by Tasma Carey: "A tall, bony, strong, thick-skinned type of person, with large hands and feet, prominently knuckled and heavily-jointed, is a characteristic evidence of the gonad secretions which fix calcium and other hardening elements into the growing skeleton. He has an oblong face, angular jaw bones and

prominent features, above a hairy chest and heavy limbs.

"He is the pioneer and discoverer. He faces the material conditions of his environment with dominating force and power, using impelling impacts or repellent with resistance. He is impelled to work and exercise. In every true gonad personality, there lurks the fighting force, ready to be awakened by the least opposition."

THE PITUITARY GLAND

The pituitary gland is a small organ (about 7 grains) projecting from the base of the brain by means of a stalk into a depression on the floor of the skull. It is composed of two distinct parts, the larger front portion almost enclosing the smaller back part. This corresponds with a developmental difference, the anterior lobe being due to an ingrowth from the primitive mouth cavity, and the posterior to a downgrowth from the fetal brain. Microscopically, the former resembles the fetal thyroid gland and the latter approximates to brain structure.

The anterior lobe apparently controls the metabolism of various tissues, so that alteration of its structure, e.g., by tumors, leads to acromegaly, gigantism, and other abnormal conditions. On the other hand, the posterior or infundibular portion contains a substance which very powerfully contracts the arteries and raises blood pressure — a circumstance which has led to its employment with striking success in the treatment of shock, hemorrhage, etc. Its relationship to the thyroid and suprarenal glands is one of the most interesting developments of the present day.

The over-or under-activity of the pituitary gland during childhood, and under some conditions during later life, will produce marked characteristics in the body structure, and, what concerns us more, equally marked characteristics of mental development and function.

"The pituitary personality", says Tasma Carey, "is usually recognizable by the well-balanced oval face, with all the features generally harmonious, intelligent, and tranquil in expression. The temples of the forehead are ample and full, the eyes distinct and wide apart, the mouth well-formed, the middle incisor teeth large and square, with interdental spaces. The physiognomy as a whole suggests erudition and a constructive integrity, with a mental outlook that visualizes and idealizes more than the obvious commonplace.

"The mental characteristics of the pituitary personality seem to be manifested with a regularity that corresponds to the ebb and flow of the cosmic life. In his mental and physical states, there is expressed the harmonious relations which seldom transgress either legal or natural law. The less physical type of the pituitary personality is often highly emotional, poetic, and ecstatically sensitive to beauty."

ADRENAL GLANDS

The adrenals are duplex glands, shaped like a cocked hat, set astride the kidneys. The outer portion of each gland is called the cortex, and the inner portion, the medulla, or core. The secretion of the adrenals is called adrenin, or adrenalin. These are the glands of combat and control energy production

to meet emergencies. They are the physiological source of "second-wind".

Dr. W. B. Cannon says that the adrenin bucks us up. "It speeds up the heartbeat, draws blood from spleen, and kidneys, intestines, and other inhibited organs of the abdomen, thus also reducing their size. Drives blood to the skeletal muscles, brain and lungs. Relaxes the smooth muscles of the tiny air sacs in the lung, thus facilitating the exchange of carbon dioxide waste for the greater oxygen required in great effort. Orders the liver to give the blood more sugar, the optimum source of muscle energy. Drives fatigue from the muscles. Contracts the blood vessels of the skin and makes the blood coagulate more quickly, so lessening our liability of bleeding to death in case of wound. Adrenin wins battles and makes men brave; lack of it make them cowards."

Dr. Logan Clendening gives us a description of the effect of the adrenal gland on sex. He says: "Sexual manifestations of endocrine disease may be either impotency or a change in one of the secondary sexual characteristics. We have just mentioned the bearded lady in the circus. The unusual growth of beard upon the feminine face is due to disturbance of the cortex of the adrenal bodies, that part of the adrenal which we have said is derived from the same primitive masses of tissue in the developing embryo as the ovaries or testes. One remarkable case is related of a woman who began to develop a beard and a deep masculine voice. At the same time a tumor of the adrenal body was found, and after its removal, the hair disappeared from her face, and her voice resumed its normal tone. Practically all the effeminate men and masculine

women have either definite disease or at least unbalance of the endocrine secretions."

In the make-up of the adrenal personality, Tasma Carey says: "The brain and nervous system are more highly developed than the bones, the adipose tissue, or the muscles. The structure is finer, smaller cells, and more symmetrically arranged. The stature may be below medium height, as well as of lighter weight. The skin is thin, and glows with every change of feeling. The features are finely chiseled, the hands are flexible, and the action of the body is quick and graceful."

PANCREATIC GLANDS

The pancreas is a conglomerate gland, laying transversely across the posterior wall of the abdomen, varying in length from six to eight inches, having a breadth of about one and one-half inches, and a thickness of from one-half to one inch. Its usual weight is about three ounces. The head of the pancreas lies in the concavity of the duodenum.

Diseases of the pancreas are not very common. Hemorrhage into the pancreas and acute pancreatitis are, however, very serious conditions, and if not relieved rapidly, lead to a fatal termination. The symptoms are not very definite; they closely resemble those of peritonitis or intestinal obstruction. The pancreas of ruminating animals is a favorite article of food under the name of sweetbread.

The function of the pancreas is the control of sugar from the liver. Atrophy or improper functioning of this gland, preventing the storage of sugar in the liver, makes it impossible for the body to burn up blood

sugar (glycogen) for its energy. This is the condition known as diabetes. Insulin is the hormone secreted by the pancreas gland, whose presence in the blood is essential to life. Since 1922, insulin, along with proper food, has been demonstrated to be the preventive of diabetes.

"The pancreatic personality", according to Tasma Carey, "is easily distinguished by his rounded form. Usually there is an excess of fat and moisture and a baby-like expression of the features. The complexion is more or less pallid, the limbs are round, plump and slightly short in proportion to the trunk. Elbows, wrists, knees, and shoulders are thickly padded with soft flesh. Often the shoulders are sloping, and the hands and feet fleshy and poddy, with dimples where the knuckles ought to be. In men, the largest part of the body is round the girth; in women, around the hips.

"The pancreatic personality is built for comfort and not for speed. He is likely to take his time; whether he is entertaining his friends or absorbing the business interests of his competitors. He is not given to worrying, and does not like to be inconvenienced; he seldom makes trouble. He is often popular, and usually gets the most out of circumstances and associates. When he is not sluggish, he is generally genial in disposition and readily adaptable in company. Because of his assimilable relationship to the material things, he is often a successful financier and gainful as a business man."

The modern endocrinologist sizes up his patients in the following manner as described by Doctor Williams: "He looks for certain things with perfectly

definite scientific reason for doing so. For example, he notes that his patient has a good bridge to his nose, which indicates a good thyroid. A broad nose suggests activity of the anterior pituitary. If, in addition, the eyebrows are heavy or shaggy, this suspicion of an active anterior is confirmed, but with the added evidence that the adrenals are somewhat overactive.

"The eyes, too, hold a story of gland activity. Bulging eyes suggest that the pituitary and thyroid have been over-active at one period. If the lids follow the movement of the eyeballs slowly, the suspicion that the thyroid is still too active may be confirmed by any one of several clinical observations, as well as by definite laboratory findings. . . .

"The individual pecularities of the formation of the teeth, and of the teeth themselves, tell a very definite history to the examiner. For none of these conditions is accidental, all of them being under the direct control of the ductless glands. If the teeth have poor enamel, particularly with erosions at the sides, there is trouble with the parathyroids. Teeth that are too small, with crenated edges of 'infantile' type, are evidence that the thymus gland had got out of hand and was doing more than its share of work during dental development.

"The endocrine observer notes the complexion of his patient. The clear, pink-and-white skin, which flushes easily, indicates thyroid activity, with the posterior pituitary gland working full time. But a dark skin, with mottles or freckles, with hair on the upper lip, tells a story of adrenal activity, particularly an over-activity of the cortical part of the adrenals. Red

hair is almost certainly the result of adrenal activity; which seems reasonable and entirely consonant to the well-known fact that red-haired persons are notably fighters, and the adrenal glands are essentially the fighters of the endocrine system. . . .

"The size and shape of the hand, the formation of the bones and the muscular contour, have very great significance. Hands that are shapely, small and delicate are evidence that the posterior pituitary has been conspicuously in control during growth. But large hands, with a tendency to hairiness of the arm, suggest that the anterior pituitary dominated that period. . . .

"The exemplary person, fond of good books, with judgment above the average, and interest centering upon every-day life problems and things of importance, gives evidence of an anterior pituitary that is functioning well, while a fondness for children with a tendency to feminine traits suggests a dominance of the posterior pituitary. . . .

"These are merely some of the things that the physician observes almost at a glance. Yet, as any one will readily understand, they may be deeply significant. So also are some of the seemingly trivial questions asked. For example, the patient's response to the casual question that he has a craving for sweets, suggests immediately to the examiner that the patient's pituitary is under-active. This may be the result of an under-active thyroid which fails to check an over-activity of the pancreas, as a result of which the system is able to digest an unusual quantity of sweets. . . ."

GLAND DETERMINATION

Enough has been said and quoted to show that it is not ghosts, nor gods, but glands that determine characteristics of individuals. The old-time fatalist thought that God had fixed everything from all eternity, and nothing could be done about it. Predestination was the law of God and nature. John Calvin and his kind were sure that the great mass of people were predestined to poor health in this world, and hell in the next.

The more modern, and the more reasonable, thinkers formulated a system of philosophical determinism that did not have the fatalistic nature of the old religious predestination. But it too was quite rigid in some respects. The philosophical determinist is a man who accepts in its widest sense the assumption of science that all phenomena of nature are subject to law and that nothing can happen without some adequate cause why it should happen thus and not otherwise.

The fall of a raindrop, the unfolding of a flower, the twitching of an eyelid, the penning of a sentence —all these, he maintains, have their adequate causes, though the causes of such occurrences lie, in part, beyond the line which divides our knowledge from our ignorance. The philosophical determinist believes that it will be some day for science to demonstrate even that the fluttering of an aspen leaf in the summer breeze is wholly subject to law; and that every turn or twist upon its stem must be just what it is, and nothing else, in view of the whole system of forces in play at the moment.

He believes it may be possible to prove in detail that the complicated creature called man draws out his chair, sits down to dinner, gives his neighbor the best cut of the beef, discusses the political situation, and resists the attraction of the decanter before him, strictly in accordance with law; that every motion of every muscle is the effect of antecedent causes which are incalculable only because of the limitations of our intelligence and our ignorance of existing facts. And to him, this seems a reasonable thing, for, as is pointed out, it is, he says, progressively justified by the gradual advance of human knowledge; and even in fields in which anything like exact knowledge is at present unattainable, the little we do know hints unmistakably at the reign of law.

To be consistent, the philosophical determinist must maintain that the fall of a raindrop or the flutter of an aspen leaf could be completely acccounted for by the enumeration of antecedent causes, were our knowledge sufficiently increased; but there are a considerable number who take issue with the determinist in his view of the subjection to law of all human actions. They maintain that there is a necessarily incalculable element present in such cases, and that all antecedents taken together can only in part account for the result. As opposed to determinism, they hold to the doctrine of indeterminism, or, as it has been called through the ages, "free-will".

We have all heard much about fate and free-will, and no man with the spirit of a man in him thinks, without inward revolt, of the possibility that his destiny is shaped for him by some irresistible external power in the face of which he is impotent. No nor-

mal man welcomes the thought that he is not free, and the denial of free-will can scarcely fail to meet with his reprobation. We recognize freedom as the dearest of our possessions, the guarantee, indeed, of all our possessions. The denial of freedom we associate with wrong and oppression, the scourge and the dungeon, the tyranny of brute force, the despair of the captive, the sodden degradation of the slave. The very word Freedom is enough to set us quivering with emotion; it is the open door to the thousand-fold activities which well up within us, and to which we give expression of joy.

But the freedom which poets have sung, and for which men have died, has nothing to do with indeterminism. One must distinguish between external compulsion, and internal determinism. Determinism is not fatalism, and indeterminism is not the affirmation of freedom in any proper sense of the word, sense in which men take it when it sets their pulse bounding and fills their breasts with high resolve. The philosophical determinist affirms only the universal applicability of the principle of sufficient reason, the doctrine that of every occurrence of whatsoever sort, there must be a cause or causes which can furnish an adequate explanation of the occurrence.

This philosophical determinism has received what is believed to be a fatal blow in recent discoveries in the electrons. Strict determinism can not be traced in the behavior of the ultimate elements of the physical world. In these elements is included the "atoms of energy" or quanta, as well as electrons. The behavior of a quantum of light as, for example, in which of the two directions it will go, is found to be a mat-

ter of probabilities. In one experiment the quantum will choose one path. In a repetition of experiment repeated under identical conditions, it will choose the other path. The same holds good of the motion of an electron; its future conduct is not determined by its present state. Bertrand Russell calls them the Anarchists of substance; they conform to no law.

The old theological fatalism has been dead for centuries among thinking people, and now it seems that science has disposed of philosophical determinism. But this, in no wise, effects Materialism. Determinism does not imply, as Materialism does, that all the causes which may be assumed to be the antecedents of human actions are material causes. A determinist may be a materialist, or he may be an idealist, or he may be a composite creature. As a matter of fact, there have been determinists of many different kinds, for the dispute touching the human will is thousands of years old. It is well to remember that materialists have been determinists, idealists have been determinists, atheists have been determinists, theologians have been determinists. But determinism is not bound up with materialism, idealism, nor religion. It is a philosophical theory that may have no scientific basis whatever.

But this is not the case with the determinism of the ductless glands. Their influence has been demonstrated in a scientific way, by observation, experimentation, classification, and demonstration. When a thing or an event has been tested by those four methods, and found to have a definite influence, under test conditions, it is then properly classed a science. So it is with the ductless glands. Enough is now known

about them to classify them as determinants within their field of influence. Their influence is not absolute, nor fatal. They can be changed, they can be healed, they can be speeded up or retarded. But they determine characteristics, and they are material,—their influences are materialistic.

CHAPTER VIII

MATERIALISTIC PSYCHOLOGY

THE MATERIALIST bases his psychology squarely on neurology, believing that the mind is rooted in the neural structure and function. No spirit, no ghost, is necessary to explain the working of the mind. His is a naturalistic psychology.

The Materialist accepts the evolution of the brain from the medullary and mid-brain, to the cerebral crown—no missing links, no mystery; a perfectly natural development. When he speaks of the mind he does not mean an automatic governor having intelligence and the air of a dictator, but an assemblage of simple scattered intelligences, the aggregate of which constitutes the individual.

The present-day Materialist holds that the mind or consciousness is a function of the brain. This is the position of Dr. Chalmers Mitchell and the late Prof. Jacques Loeb. These renowned scientists find no reason to change the wording of Cabanis, that great Materialist of the 18th century, who stated that "Thought is the function of the brain, as digestion is the function of the stomach, and the secretion of bile the function of the liver."

This neurological fact, however, is dodged by nearly

all of the present-day psychologists, who make a mystery out of the mind, knowing that people love a mystery much more than an understood fact. Before proceeding to show how the brain produces the mind, it seems best to quote three honest psychologists who do not cater to the superstitious.

In his book, "The Thinking Machine", Prof. C. Judson Herrick writes that thinking is as natural a biological process as the contraction of muscles; they are the work of a machine in both cases. On page 351, he says: "Even though we do not know how the brain thinks, we know as surely as we know anything in biology that it does so. And we know a great deal about the thoughts that it thinks, for they are our thoughts, the most direct and immediate experiences that we have. These thoughts and their accompanying feelings can be attended to as they come and examined critically in retrospect, and this sort of experience makes up the greater part of the science of introspective psychology. The introspective examination of our own conscious experiences is, accordingly, one practicable method of finding out how the brain thinks, for this gives us directly the product of the activity, the end-result of the process."

In his book, "Human Nature", Prof. Max Schoen says on page 72 that "We have medical and experimental evidence that an injury or destruction of any certain part of the brain means a corresponding disturbance in some mental power, hence we can say with certainty that mind is a function of the brain, although we can not say with any degree of assurance just how this function is fulfilled. Just what it is that is happening in the brain as I am thinking

at this moment we can not say. But that something of a physical-chemical nature is happening is certain. Some day we may be able to write a formula for the brain operation of a thought. For the present we must be satisfied with the fact that where there is no brain activity there is no mental activity. And psychologically that is quite sufficient."

Prof. Durant Drake takes the same attitude towards the mind as the authorities just quoted. In his book, "Mind and Its Place in Nature" page 93, he states that "A mind is simply a brain regarded from the inside, so to speak, i.e., with respect to its psychic nature, the gradual evolution of a brain is the gradual evolution of a mind. We need to suppose no jumps in the process which has brought into existence human minds. But on the other hand, there is no implication in this that any part of the world outside of living organisms is conscious."

The brain is the part of the organism, whether human or brute, that feels and thinks, and reflects nervous energy. The mind is the function of the brain is composed of parts, and the varied movements of these parts constitute different qualities of mind action—three in number, which are first: reflex centers by movements outside of the body, which impinging on the skin, the organ of general sensibility, send nerve currents through the sense organs to such centers from which they are reflected back to the muscles, contracting limbs and executing various physical motion in unconsciousness: Second automatic action of the cerebrum, which originates with a stimulation derived from the environment of the brain, which environment may be either outside of the body or in-

side of it or both; goes on indefinitely in action constituting unconscious thought.

Third is Feeling, including sensation and consciousness and comprising all the cerebral actions involved in the production of conscious thought, pleasure and pain and all the sensations coming into the brain from the environment by way of the senses.

The material composing this organism is chiefly gray matter, called the cortex, or bark, forming a coating over the entire brain and made up of cells amounting to many millions in number, all connected together by very fine nerve fibers. The brain is also connected with the organs of sensation, eye, ear, skin, etc., by strands of nerve fibers.

The cortex, as already mentioned, is divided into numerous patches, all having functions differing in detail, some the seats of memories of various kinds, both the memories of former senations and of former motor activities.

In making use of the word brain to signify the collective organ of mental action, we must not be misled into assuming that there is but a single organ that does all the work, taking one job after another, for that is not the case. There are as many sensoriums or seats of sense as there are senses or subdivisions thereof. Each of these we are to regard as a complete machine.

It is difficult to use the word mind without attaching to it a wrong import. We frequently speak of the brain as a mind-forming machine, and so it is. That is, the brain and every sensory subdivision of it is a body of educated or differentiated brain cells, which by reason of such education are subject to being put

in a molecular motion of a peculiar kind of nerve currents generated by forces in the environment.

Such peculiarity is due to such previous education, and that is due to previous nerve currents from the outside.

The molecular motion so developed constitutes feeling; each different onset of nerve motion giving rise to a different feeling. Each feeling, however, subsides the moment the current stops, and is made continuous only by the rapid reiteration of the stimulation current. This motion, being a molecular motion, does not extend outside of the brain of whose molecules it is the motion.

When, therefore, we speak of the brain as a mind-forming instrument, we mean that the brain has become so differentiated or specialized, that upon being agitated again there will be reproduced in it functions, and these functions are in detail, feelings, and collectively, mind. We see that this feeling, this quiver of molecules, is a physical movement, set up by a physical force, therefore competent to do work, and, as shown above, it is a vital factor in about all the work we do—work that never would be done without it. When a stimulation from the environment reaches the brain, it accomplishes two things: one of which is the differentiation of a portion of the brain as an organ of the memory of that transaction, the other to create a feeling.

The effect of long-repeated sensory stimulations is to modify the structure of the brain so that its action changes with age. As adults, under the domination of different influences from the changing organ, our ac-

tions are entirely different from those of children, and will continue to differ as we approach old age; till a time arrives when the fiber of the material, becoming infiltrated and unyielding, the organ refuses to learn anything more.

We are machines, built and operated by our environment. We do not originate or create anything. Our brains are mixers like the hollow iron globes for mixing concrete used by builders and contractors. Into these mixers are dumped the stimulations darted and reflected from every point of the compass. The results of their interactions are thoughts, feelings. It is obvious these mental interactions can not contain any factors not in the environment. They originally come by way of the senses, and if they give rise to states of consciousness, or metaphysical conceptions of unusual results, we can always discern in the material environment traces of the routes taken by the several lines of sense stimulation. There is nothing that is impossible to the environment that is possible to the conception, nothing that is possible to the environment that is impossible to the conceptions.

Every sort of force applied at the cut end of a nerve produces in it a nerve current running to the brain at a speed of 50 to 300 feet per second, Such nerve current is produced by touching the nerve with any substance, as with a feather or by pinching, or by a magnetic current or electricity or best of all a galvanic battery.

Galvanism is extremely like the nerve currents, and the muscles are irritated to perform the same movements that are performed by the natural nerve current.

The processes of unconscious reflex action and

thought are well understood to be purely physical. When the foot of a sleeping boy is unconsciously withdrawn from a tickling feather, we can trace the movement of the stimulation from the molar or mass motion of the feather, becoming a nerve current at the surface of the skin, which flows to the cells of the afferent ganglia of the spinal cord or the medulla oblongata or both; thence crossing over from the afferent to the efferent cells, thence by the efferent nerve back to the neighborhood in which it started, ending in the transfer of the nervous stimulus to a muscle, contracting it and withdrawing the foot.

All this is just as mechanical as a telephone. In no stage of it is any force or energy created. At each step we see just where the energy came from and what became of it. All of the brain that was concerned in the transaction was first put in motion by a force in the environment, which motion was transferred by the brain to the muscle. The brain did not originate the action, nor did it add anything to it. This is a vital point. For if it could add any force of its own it is obvious it would either have to build that force out of nothing, or have it supplied to it from a source outside of itself. The former it can not do if the law of the conservation of energy is valid. If the latter happens, it proves the brain (or that part of it concerned in this transaction) to be dependent for its motive power on physical energies outside of itself. The actions of both ends of this chain of causation are obviously physical, or the movements of physical bodies—the feather and the muscle. It is not possible that the intermediate motions of the nerve current and the transfer of the same from the afferent or sensory to the efferent or

motor cells in the ganglion of the spinal cord can be other than of the same nature as the first and last ones, viz., physical.

It is true that in this case when the nerve-stimulating current reaches the muscle, it liberates a force that has been stored up previously in the muscle, is greater in physical amount than that small nerve current that touches it off, just as the pulling of a trigger lets off a much larger force in the explosion of the charge. But the essential contention is that the stimulation being a motion of a physical substance at the beginning it continues forever after to be a motion of some physical substance, so that every link, however small, in the chain, from feather to muscle, must be a physical substance.

It is one of the Materialists' chief contentions that all the motions of the body are caused originally or remotely by sensory impressions, darted upon by the brain, and that the disturbance caused there is passed on to the government of these organs. The mind being understood to be the function of the brain, to be its feeling in fact, we can properly say that the brain controls the body by means of the mind, as we might say, a man moves his body by means of the movement of his legs. That is, the brain moves when it is made to move by an external application of energy and its function, called mind, is communicated to nerves that conduct it to the muscles and other organs to be moved. So the mind appears in this chain as one of the factors, or rather as one of the means by which the environment controls our actions, and it is easy to be misled into the incorrect idea that the mind is a power in control. However, there is some color of truth in

the statement that the body is subject to the mind.

Some say that no motion of physical substance can constitute feeling, but admit that the conditions in the environment effect and influence the formation of feeling and determine its nature. The admission is fatal to the first contention. Feeling must be either a motion or a piece of material substance. It is certainly not a substance. It is a motion of a substance getting its stimulation from bodies in the environment. There is a chain of physical movement from the environment to the sensorium. The motion it receives there is feeling. According to the other man, it only leads to feeling. But wherever we find feeling, it will be at the extremity of such a chain of physical causation to which stimulations of a physical nature and origin have led by contact from beginning to end.

This brings us at last into the presence of the very substance that feels and proves its material nature. If the nerve motion is physical it can not constitute sensation, or lead to it, unless that too is physical. Beginning as a physical motion, each step it takes and each contact it makes is physical. There is no escape from this conclusion except an assumption that the external world has no influence in forming our minds, which is absurd.

An apparatus may be constructed, the action of which—very closely—imitates that of the brain. Suppose in a dark room there is a dynamo, connected by a wire to an arc lamp. A few feet away is a glass jar containing passive chlorine and hydrogen in equal parts. A shaft from the dynamo extends from the room to a steam engine outside. Let the steam engine start up and the dynamo will revolve.

The carbons of the arc lamp will glow with incandescence and, lastly, the two gases in the glass jar, which up to this time have taken no notice of each other, instantly rush together with a loud explosion, chemically uniting to form hydrochloric acid. In this illustration, the engine outside is the external world, the environment; the dynamo is the sense organ, eye, or ear, etc. The carbons of the arc lamp are the brain. Its light is the mind, the will. The action of this light in causing the chemical combination of the two gases is like that of the will, a part of the mind in causing the contraction of muscles, while the chemical action that takes place has its parallel in the union of oxygen with some of the carbon in the muscles forming carbonic acid.

In both these cases we have machines constructed from material substance corresponding with each other. But there is one factor in each that is not called substance, but a mode of motion that is the light in one case and correspondingly a mind in the other. This is something more than a mere similarity. There is a measure of identity between light and mind. Each is a function. The term light is applied in two ways. It is, primarily, the undulatory or wave motion, but to our senses it is the sensation of illumination, a part of our mind. That is the way it appears to us, but objectively, if seen from the outside by another person, it would be seen to be, as it primarily is, an undulatory motion identical with that of sun light or electric light.

The mind or the function of the brain is therefore not the controller of any matter except that with which it is associated in an organized body, and then

only as an agent or servant of forces outside of itself in its environment.

As life advances we continually grow into new habits by doing, repeatedly and habitually, things that at first we learn only by conscious effort and attention. Thus a girl will learn to knit or play the piano, and a boy will learn to skate or swim, by using great effort and suffering many failures, but when the lessons are perfectly learned, the required motions are performed not only with little effort but often unconsciously.

This means that the feeling-part of the brain, as well as the thinking-part, was at first engaged during the acquirement of the habit or process, but that after it was fully acquired, only the thinking part was concerned in it. As in the case of hereditary instinct, so likewise the feeling part thereafter had little or nothing further to do wtih it. We have no reason, however, to doubt that the same movement that constituted thought while the lessons were being learned in consciousness went on again every time they were practiced or repeated after the actions became partially or wholly reduced to habits.

This constitutes one strong proof that the brain is competent to acquire by practice such facility in its function of thinking, that thinking can be carried on without arousing consciousness or feeling, because the thought involved in the action is never in any case anything more than the inter-action and mutual modification of the polar currents constituting the stimulus and its modifiers, and the final development from them of a will and motor nerve action. This process must be supposed to go on whenever the action is performed, whether it be done in consciousness or not.

Other proofs are found in the unconscious action of the cerebrum or great brain that is shown to take place both in sleep and in hypnotism and also during waking hours. The consumption of blood during processes of both conscious and unconscious cerebration is very marked and of course is consumed in exclusively mental operations. It need hardly be said that only physical activities require or could use the nourishment furnished by food.

When the wind, the sun and the rain beat upon the naked skin of a savage they have a tendency to toughen, harden and tan it, and to thicken the epidermis. These effects act as a protection of the body against the activities of the environment that produce them; namely, the aforesaid wind, sun and rain. A Pawnee Indian in Nebraska, being asked why the Indians were able to go almost naked in very cold weather while the white man had to wear thick clothing, replied that the white man left his face uncovered and that made it tough. "The Indian is all face."

The wind, sun and rain also produce a feeling of discomfort, which is really in the brain. This feeling causes other motions to take place in the brain that are designated thoughts, and these movements give rise to an impulse called the will. This contracts muscles and moves limbs in such a way as to secure clothing to put about the body and in that manner obviate the action of the wind, sun and rain that started the feeling in the first place. Thus, in two ways, the forces of the environment control an organism: (1) by direct action upon its materials and constituents, called vital action, (2) by first moving its brain in the creation of

feelings and thoughts, called mental action. Both of these are purely physical.

The brain is further related to the other working parts in the fact that it loses its pliability, vigor, and aptitude for being worked by disuse either in the department of thought or that of feeling. Memory consists in the renewal of a function of the brain — any thought or feeling—by any stimulation other than the one that produced the action in the first place. The oftener a memory is reproduced the brighter and more vivid it becomes, but if its revival does not take place within a long time, it becomes very difficult, and if put off too long, it is impossible. The brain not only forgets the activities it once had, but also, by the advance of age, it becomes hardened so as to be incapable of taking on the activities it could have had in youth.

If the brain did not deteriorate in quality and activity, just as the legs and livers do, there is no reason why the mind and mental faculties should not retain their youth and virility. The removal of portions of the cerebrum of men and other animals is accompanied by loss of some memory or other mental qualities or of will-power.

Experiments have shown that our swiftest thoughts require from 1/8th to 1/10th of a second. All sensations cause a rise in temperature. This has been proved not only during the waking hours but during sleep, and the unconscious cerebral action. In the case of a patient, a part of whose skull had been removed, the brain, visible through the fracture, was seen to beat faster whenever he was spoken to, although he was fast asleep.

It matters not what sort of a mental process goes on, we observe that it requires in every case the expenditure of blood. If we run a few rods, we find the circulation of the blood greatly accelerated, which means that the violent exertion has rapidly oxidized tissue, mostly muscular and nervous. But an acceleration of the circulation may take place through purely mental excitement. Horror, fright, anger, rage, and all the more violent emotions instantly increase the circulation when it is obvious that the expenditure of tissue is that of the feeling substance alone.

The heating effect of mental work and worry, when the action is entirely separated from muscular exertion, is shown in the slang threat to "make it hot" for an antagonist, and in calling the witness stand the "sweat box".

Note how the emotions work on the physical parts in causing gestures, tears, laughter, frowning, sulkiness, cries of terror or pleasure. How, under the stimulation of strong feeling, a man is twice as strong. As the rustic bully put it: "When I am pleased I weigh 180 pounds, but when I'm mad, I weigh a ton." The story is in point of the old woman who, on an alarm of fire, carried out her box of contents, all her wealth, which it took two men to carry back.

The action of the feelings, or, as sometimes said, the mind, upon the secretions of the milk glands, tear glands, etc., is further proof of the physical nature of the feelings. This is often spoken of as the control of the mind over the body. These glands are physical organs and can be controlled only by physical agencies. The influence, therefore, of the mind, feelings and mental status proves them to be physical.

The secretion of milk is affected both in quality and quantity by the mental state of the mother, such as a fretful temper, fits of anger, grief, and anxiety. A case is related of a woman who furiously interfered in a quarrel between her husband and a soldier who was billeted in their house. She snatched his sword and broke it to pieces. The neighbors quelled the riot. Shortly afterwards, the woman gave suck to her infant, a strong, healthy child that had never been sick. In a few minutes it became restless, panted and, before the doctor could reach it, died.

A similar case is given of a puppy that suckled its mother shortly after she had been thrown into a violent rage by a quarrel with another dog. In a short time it was thrown into epileptic convulsions, from milk poisoned by rage—a feeling. There are other secretions that are affected by one kind of feeling or another. Tears are made to flow by grief, joy, anger, tenderness, and other emotions.

Experiments have shown that after dogs and pigs have been made to fast for some time and then shown food which they are not allowed to eat, a flow of gastric juice into the stomach will take place. This is a physical action produced by hunger—a feeling. Any required number of cases could be cited as examples of the action of feelings in changing acceleration, retarding, vitiating or improving such physical secretions as the milk, saliva, tear, gastric juice, and the like.

There is also a connection depending on chemical conditions between the brain and mental action, an important factor of which is phosphorus. This is supplied abundantly during the prime of life, but

sparingly in infancy and old age and to idiots. The production of thought and other mental activities depends—other things being equal—upon the supply of blood to the brain, a failure of which almost instantly produces unconsciousness. On the other hand, too much circulation produces mental excitement, perhaps delirium. Then the blood must be right as to quality as well as quantity in order to secure correct mental action. It must be properly aerated. So that it is clear that mentality requires blood and oxygen for its support, just as do the respiratory, muscular, vascular systems and all the rest.

Excessive mental activity produces increased excretion by the kidneys from the blood of an increased quantity of alkaline phosphates. Certain morbid excretions through the skin of insane persons show an effect of mental states on the vital conditions betraying themselves by what is called the peculiar odor of the insane. Then note the effects of hunger on decreased vigor of thought quickly relieved by normal refreshments.

Also note the stimulating effects on our brain produced from stimulating drugs, medicines, liquors, and alcoholic drinks. Likewise from mild stimulations of coffee and the "cup that cheers but not inebriates".

The forces expended in the production of our mental conditions, such as pressure, heat, light, motion, and sound, are produced by the same physical forces that are otherwise employed in handling parcels of matter, in constructing, crushing, melting, etc. The same sort of force that smashes a rock, differently conditioned, may help to build a syllogism.

"Every fact known to medical men compels the inference that mind, spirit, soul are the manifestations of a living brain, just as the flame is the manifest spirit of a burning candle. At the moment of extinction, both flame and spirit cease to have a separate existence. However much this mode of explaining man's mentality may run counter to long and deeply cherished beliefs, medical men can not think otherwise if they are to believe the evidence of their senses."—Sir ARTHUR KEITH.

CHAPTER IX

MATERIALISM AND KNOWLEDGE

THE MATERIALIST holds that thought is produced by the brain and in no other way. He denies that brainless thoughts exist. Even brainless spirits are produced by the addled brains of the ghost-chasers.

The Materialist holds that consciousness is a function of the brain; that consciousness has never been found dissociated from the brain.

The Materialist holds that matter was prior to thought, and would exist if there were no thought to perceive it. The old idealist held that thought was prior to matter, and its real creator. Without thought there would be no matter. In the face of facts, such idealism is an airy nothing.

Real knowledge is built up out of images made upon the brain centers by real objects. Impressions that do not have those physical qualities are mere hallucinations.

Thought is the result of certain kinds of nervous or cerebral processes—a material phenomenon. It has the same relation to the brain that fire has to fuel. The first is a manifestation of organic matter; the second is a manifestation of inorganic matter.

It has been shown that knowledge depends upon external impressions, i. e., upon natural material phenomena. The same is true with every step toward civilization.

It was a materialistic step, in each case, that caused the advancement—some materialistic invention or discovery.

Knowledge is accumulated by the stoppage of energies projected from the bodies to which the knowledge relates, since knowledge can not exist in bulk, or in the abstract but must be the knowledge of some thing. We can not define knowledge otherwise than as a mode of some sort of motion, presumably the motion of the knowing substance itself. So that by the simple laws of physics, knowledge is gained from other bodies, through motions set up by them and communicated to, and expressed by the knowing substance, in motions of its own. But involved in the acquirement of knowledge is a certain amount of work, and some of it is work requiring machinery and instruments of inquiry such as the microscope, telescope, spectroscope and others without limit. The production of these involves the production of a prodigious number of producers in the form of smelters, foundries, machine shops, blacksmith shops, instrument makers' shops, and a vast number of books. All these imply and require the talent, skill, and perspiration of members of the human race—in vast numbers, with further implication that they must be supported, housed, fed, and clothed.

Now, in order to be possessed of knowledge, it is essential that at least the knowing substance shall

have at command all these means, appliances, and facilities.

But knowledge depends on something more than mere appliances, facilities, opportunities, and even outside assistance. The knowing substance must possess capacity on it part, to arrest, appropriate and assimilate the motions that constitute knowledge. In other words, it must be of such constitution that it can receive impressions, and have them elaborated into ideas, reasonings, thoughts, and knowledge.

The brain is a thinking substance and a mind-forming organ, yet associated with the other physical organs such as limbs in mechanical motions, and with the stomach and other viscera in chemical activities, all such associations, proving the strictly materialistic constitution of all the parts thus related. We found our argument on the reality of the external world, and we are as sure of the argument as we are of its foundation.

MATTER VERSUS SPIRIT

According to Webster, Spirit is an immaterial, intelligent substance.

According to Webster's definition of spirit, there is nothing in common between spirit and the brain. Not one of the functions of the brain in carrying on the economy of life and mental activities of the organic body can be assigned to, or predicated of, immaterial spirit. As by its terms and definitions it can have no contact with matter, it would not assist the body to escape fire or flood, or stimulate a muscle to avert a blow. It could not stimulate a nerve, nor start nerve

currents to inform the organism of its surroundings, and its requirements. It could not receive impressions from objects in the environment, nor be informed of their import, nor forward impressions and stimulations to govern the movement of the parts.

In short, it is conspicuous only for the things it does not know, and can not do.

Spirit is assumed to be an immaterial substance. It is nowhere assumed to be material.

If it is material, it would have to be tried by the laws that govern matter, and tested as to its qualities and properties by the same chemical and physical tests that are applied to other material bodies.

Can an immaterial substance meet these requirements? Our human brain can and does meet them, up to its capacity. But it is matter, and called matter, and is described in terms of matter and it behaves like matter. It receives the impacts of physical energies from outside bodies, and elaborates and co-ordinates them and delivers the product to other outside bodies. The operation from beginning to end is physical, and all the phenomena are the phenomena of material forces.

All this is too simple, and too obvious, too easy, too likely, not enough mystery. Anything can happen if there is a sufficient cause for it. But what the credulous want is miracle—they want things to happen without sufficient cause. Probably for that reason they demand that the thinking and knowing substance shall be called immaterial. Or it may be that they think that the thinking substance should be of light and airy texture, extremely attenuated and elusive. Such an idea might arise from the confounding of the

thinking substance with the thought it produces, which is often done, making no clear distinction between the two. If the thinking substance be regarded as immaterial, the greater would the miraculous nature of anything it might be supposed to accomplish, because from an immaterial substance, no results at all could reasonably be expected.

Those who convince themselves of the real existence of spirit are prepared to predicate upon it any wonderful or impossible performance. The more helpless from a physical point the spirit appears, the more powerful from the viewpoint of myth and miracle, because these are what it lives upon.

The basis of the spiritist argument is an assumption. Beginning with spirit as the antithesis of matter, they think they find all the subsequent terms to repeat the constitution of the first, so, in imagination, these terms are all spirit, and the world is a spirit-world and things are not what they seem, and everything is unreal. The substance of spirit is supposed to be "essentially identical with what we call mind".

Thus the spiritist assumes, without proof, that consciousness is a spiritual phenomenon and builds all the metaphysical portion of his system on it.

What is meant by spirit here is not confined to Spiritualists, that sect who believe in spirit, as a separate entity, or in spirits as smaller entities, commonly the transfigured forms of human beings. The latter are not by any definition pure spirit. They are said to control mediums, materialize, become entranced and perform various other physical actions. If they do, they possess resistance, extension and motion, the essential qualities of matter, and they can not be classed

as spirits at all, but as a different variety of men, and they belong to the tribes of fairies, elves, and demons, and in due time will follow them to the limbo of all the venerable superstitions. All the so-called "manifestations" that go with these are material phenomena, or are fraudulent. Spiritualism will be treated in a later chapter.

As for "pure spirit" or "immaterial substance", to the Materialist, it has no existence, and is absolutely unknown.

The Materialist bases his inquiry on the matter in his environment, and feeling his way toward himself by mechanical contact and resistance and extension, he finds an unbroken continuity of physical terms of cause and effect, and himself, his mind at the end, of like intrinsic constitution to all the rest. It would make no difference if, following the spiritual hypothesis, we were to drop the terms "physical" and "mechanical", and insert "spirit" in place of "matter", provided the terms "resistance" and "extension", with their true meanings, and full significance, are retained. If the conception of "spirit" included the conditions and qualities that give to matter its energy, the name would cut no figure. The chain would be a binding chain if all the links were there, regardless of the name it goes by. But the links are not all there. By insisting that the spirit is immaterial, it is deprived of the qualities of resistance and extension. Without these qualities, spirit can have no qualities. It is sometimes said that spirit has these qualities. If it had there would be nothing to distinguish it from the material, and they would be postulating a distinction from matter without a difference and practically yield-

ing their whole contention. In short, if spirit has not the vital functions and constitution of matter, it can not exist at all. If it has them, it is not spirit, but matter.

The spiritist makes two vital assumptions — both wrong.

First, that no material body can feel. Second, that immaterial bodies can.

We have shown that there are specially organized physical bodies that do feel. Now, what evidence is there that there are immaterial bodies that do?

These alleged bodies are commonly called spirit and are of two kinds. One is an abstract body existing beyond the reach of phenomena, a conceit that on analysis yields only negation.

The argument that banishes spirit from the association of matter, on the ground of the incompetency of spirit by its constitution, definitions and terms, to unite with or come in contact or in working order with matter, holds good for the universe, as much as for a county. A spirit substance, co-existent with matter, yet not associating with it or on terms of mutual assistance, regulation and equilibration, is an illogical and unnecessary conceit, and gives us no result.

Once on a time a telegraph line running out of St. Louis suddenly gave out, and a section crew was sent out to see what was wrong. They finally spliced the gap with a piece of grapevine found there, and returned to town to report a successful repair, but were disappointed to find the line worked no better than before.

A gap in physical phenomena must be closed by something more substantial than a piece of spirit.

Conservation of matter does not include conservation of any kind of matter that does not possess resistance and extension; therefore, no provision is made for spiritual substance. Science takes no account of such a substance and has never found it.

Yet spirit in the abstract must be conceived to be thus helpless, functionless, barren, in short, a pure negation, or else not conceived at all apart from matter. The conception of spirit without the inclusion of material elements is impossible. But, as said before, all that part of the conceit that entertains conditions of force, or extension, or any property of matter, is matter and all the rest is idle myth. But as shown, destitution of the qualities of material bodies, includes inability to feel.

The consciousness with which the spiritist professes to "set out" with his metaphysical reasoning is not supposed to be composed with any factors drawn from the external world of matter, but from a factitious world of spirit, the result of a metaphysical, transcendental conception, which when analyzed and reduced to its lowest terms yields only pure negation. As a matter of fact, the spiritists introduce into their conjectures enough matter and energy to give them an air of energy, and furnish the physical motive power, without which no system of any sort can exist or appear to exist.

But their doctrine is one thing and their practice quite another. They teach spiritism and practice materialism. They deny the possibility of contact between spirit and matter, and in this they are correct,

for a substance conditioned as they condition spirit is incapable of being in contact with anything, even with another spirit.

Thus they have, by the necessity of their erroneous assumptions, made believe that the external world is altogether different from what it appears to be; that it is, in fact, mind instead of matter. They have founded numerous religious cults upon these erroneous assumptions, and raised hopes and expectations not realizeable from their own barren premises of spiritism. Consequently, they have invaded the external world of matter and picking out some of the most unusual occult, startling and mysterious phenomena, especially those related to pathology, they seize on them as spiritual and invent dogmas to occupy the territory between reality and pure myth. The effect of mental action on the secretions is not denied, on the contrary, it has been insisted upon elsewhere. It is under the influence of this that all the practical results they ever reach are attained.

Spirit or immaterial substance can not do the business of feeling. It has got to be material, because in order to feel, the feeling substance must be by energies assailed from the material environment. This assaulting energy must make an impression on the immaterial substance. But it can not by its terms, because if the immaterial substance can be affected by energies originating in the material environment, it is itself material, and masquerading under a false and contradictory and self-destroying postulate. But if it is a bona fide immaterial substance, it can not do the work of receiving, comparing and correlating the stimulations necessary to the development of a

feeling or knowledge. Every stimulation darted upon it from the environment passes through it as if it were blank. In truth, it is blank. For what other sort of proof is required or possible to prove nothingness, when no resistance is opposed to force. As long as the world outside of us is physical, only a physical body can think or feel.

For the reason that an immaterial substance does not possess resistance, it can not stop a ray of sunlight as a man or sheep can, and so it is blind. It can not stop a pulsation thrown from a sonorous body, and therefore, it is deaf. It can not stop any of the fine dust that brushes against our olfactory membrane, nor come in contact with soluble bodies, nor with bodies in motion, and so can not taste, smell or feel. Having no weight or resistance, it has no power of locomotion and so can not go anywhere. These deprivations would disqualify any sort of being for existence on earth.

The spiritist is in a dilemma. If spirit can not feel, think and act, it has no claim nor capacity for existence. If it can feel, think and act, it is not an immaterial, but a material substance, and therefore not spirit.

Whatever people may have imagined, no one ever conceived of an immaterial substance. A conception requires the expenditure of energy by the object as well as the subject. A conception must be a conception of some particular thing. If the particular thing can reflect sunlight, we could get a sensation. If we could feel it we could get another and so on until we get enough sensations to elaborate into a conception. But if the object can reflect none of these forces,

skepticism takes the place of conception and denies that there is anybody there. But the conceiving body —the soul—is also itself conceived by the spiritist to be immaterial and the case is doubly worse, because by its terms the conceiving soul or spirit is also destitute of all appartus for the establishment of a conception. It can not hear, see, speak, smell or feel any pressure or contact, or any nervous or telepathic stimulation. This sort of explanation presents us with two dummies, one of which is absolutely incompetent to hear or understand a word if it would be uttered.

When any one imagines he conceives of an immaterial thing, a little reasoning will show him that he has mistaken material phenomena for immaterial. His thoughts and images are in reality all in terms of matter, and can not possibly be otherwise.

We come to the conclusion, therefore, in regard to the conception of spirit as held by believers in it, that it is composed of two pieces. One is a small amount of odd bits of physical science designated by factitious and mysterious terms. The other piece is a collection of facitious and mysterious terms without the incumbrance of even a smattering of science. In other words, shorn of what it filches from matter and materialism, all its assets, including itself, amount to just zero.

CHAPTER X

MATERIALISM AND CULTURE

THE ANTHROPOLOGISTS have traced all of the useful arts back to low, crude forms originating with primitive peoples. The evolution of dozens of useful inventions can be traced back step by step to some simple beginning that would not be recognized as the origin if the connecting links were not available.

The anthropologists have traced the grand piano back through many kinds of harps through the music bow to the bow that shot the arrow. The grand piano is just a large harp laid on its side, and its strings struck with hammers, instead of being plucked with the fingers. It is a long way from the twang of the single string bow to the highly developed piano of today.

The great pipe organ is traced back step by step through the Scotch bagpipes to the single reed whistle, or the bone mouth whistle of the primitive savage. Every step is known, and every step was a materialistic one. No sound comes from an immaterial instrument or source.

The great combined harvester of today cuts a fifty foot swath and threshes and sacks the grain, winnows the chaff and piles the straw. This self-propelled

machine can be traced back through the binder, the reaper, the mower, the cradle, the scythe, the sickle to the knife in the hand of primitive man. It took ages to develop that gigantic machine of today. There are no missing links in its evolution. Every step was a material addition to what had been before.

The automobile, the street-car, and the railroad train can be definitely traced back through the stage coach, the wagon, the cart to the wheelbarrow. It took ages to make the climb from that modest wheelbarrow to the flying-machine of today, but every step of the way was as definite as the steps on a stairway.

The sky-scraper and the palace can be traced back to the house, to the log shack, to the hut, to the cave where our primitive ancestors lived. It is a long way from that cave to the tower building of today, but every step was a material one. It was made by addition, and not by subtraction. We still have shacks and wheelbarrows.

It was from the material cave in which he dwelt that primitive man got the idea of the hut. From its shelter and security he learned the value of matter. From it he learned to pile dirt and sticks and stones around himself and his loved ones to protect them from the elements that would destroy life, and from savage beasts and savage men. On the wall of the cave is found the first rude art drawings.

The first crude symbols of speech were made up of drawings of the objects spoken of—instead of spelling "bird" our ancestors drew the picture of a bird; instead of writing "man" they drew a picture of a man.

It was the invention of the bow and arrow that en-

abled man to come out of his cave and down from the tree-top and battle successfully with his enemies. It made it possible for him to hunt animals for their flesh and hides.

Another material discovery that aided much toward civilization was that of fire. With fire man became a social being. Around the primitive fires the homes were established, and the first social groups were formed. The fireside preserved the family from the blasts of winter that hitherto had broken over the heads of the helpless members.

From fire also sprang the art of pottery. From the hollow rock, which held food and water, our forefathers passed to the burned-clay vessels so vastly more useful. From these crude beginnings have been developed the beautiful ornamental vessels of civilization.

It was the invention of the plow that gave us the agricultural man to replace the hunting and fishing and fighting man of the forest.

The invention of printing gave to the world the ability to preserve and distribute knowledge. From the laborious task of copying by hand, we have passed to the printing of the extensive literature and the libraries of today. The believers in spirits called this invention the "black art" and branded it as the work of the Devil. In this they were consistent with Bible teaching. You will remember that the Devil was the first school teacher

The invention of the steam-engine gave us a power equal to that of thousands of men. It turns, with tireless hands, the countless wheels of industry. It has multiplied the wealth of the world many fold.

The railroad, that carries material goods to all parts of the country, enables the frozen north to have the products of the sunny south. There is a story of an old lady of spiritual inclinations, who remarked upon seeing a locomotive for the first time: "They'll never start it! They'll never start it!" and when the throttle was opened and the engine moved down the tracks, she stuck both hands into the atmosphere above her head and shouted: "They'll never stop it; they'll never stop it!" She was half right—material progress has not been stopped, and those who formerly had angels to carry them from place to place or rode broomsticks through the air, now seem satisfied to depend upon the material conveyances.

The steamship that plows its way through the ocean waves from continent to continent, never missing a beat of its mighty engine's heart, has made all countries acquainted with each other, and has done more to civilize mankind than all the spiritual goods that were ever peddled.

The invention of the loom has given to the world all the beautiful fabrics that delight the eye and warm the human body. Even the most spiritual array themselves in its products—they appear not to be satisfied with being like the Bible women who were "clothed with the sun". The sewing-machine has released millions from the needle so that they may turn their attention to other things.

The telegraph that carries messages over mountains and under seas for all the human race is a materialistic invention. The automobile that brings city and country together is a material thing. Even the

lighter-than-air machine is a material and not a spiritual thing.

I have presented to the reader but a small part of the evidence of material advancement that is to be had, but enough to establish the Materialist's assertion that progress is due to material things. When the reader hears some spiritual person speak of the "crude materialists", just ask him to mention the spiritual things that will match the material inventions which have aided man to climb from savagery to civilization.

CHAPTER XI

MATERIALISTIC ORIGIN OF LIFE

AT THE annual convention of the American Association for the Advancement of Science, at Cleveland, Ohio, December 29, 1930, Dr. George W. Crile, the noted chemist of Cleveland, exhibited to the convention his artificial life cells. The press dispatches asserted that Doctor Crile had "created life" or had "accomplished the resurrection of the dead".

Doctor Crile, a modest man, made no such claims for his artificial life cells; but they act like other living creatures in many respects. Visiting biologists watched the objects appear from seemingly nothing in a drop of water, and expand in a few minutes to round things which multiplied in life-like fashion by dividing into two cells. These cells breathe and move about. They increase in size by eating or absorbing proteins out of the liquid in which they exist.

By changing the chemical contents of their bath, some of the cells lose their round form and creep by means of lobes that appear and are re-absorbed into the main body. In this they resemble the ameba, one of the lowest of animals. These cells take in oxygen and give out about the same volume of carbon dioxide, that is, they "breathe", and respiration has al-

ways been considered a monopoly of genuinely living things.

These cells can be poisoned by strychnine, morphine, cyanides and other strong solutions, and they die just like other cells. Some other substances, such as alcohol, sodium iodide and thyroxin act as tonics or stimulants. These cells even have an electric charge.

Doctor Crile's method of procedure was to decompose some dead protoplasm and then immerse them in solutions of fats, proteins and ash from dead body cells, with the salts normal to a living body. The fats must be taken from the brain, as they only, seemingly, have the power of generating life. Doctor Crile uses the brain substance of dogs and rabbits as well as of human beings.

In speaking of these cells Doctor Crile said: "The complex molecules of the proteins and lipoids are able by the electrical energy of the salt solution, to rearrange themselves into cell structures, but primitive, simple structures lacking the fine detail which long heredity gives to normal living cells."

"For the present", Doctor Crile concluded, "let us regard the cells as somewhere in the vague ground between the lifeless and the living."

It is now known that the exact moment when a new individual begins its existence is the moment in which the nucleus of the masculine sperm-cell coalesces with the feminine ovum-cell in fertilization. There is no great ghost-business about this process. In fact, it has been shown by Professor Jacques Loeb and others that not only ghosts have been dispensed with, but that Mister Male himself can be dismissed. In a lec-

ture in Philadelphia in 1919, Professor Loeb exhibited a collection of five able bodied frogs which he himself had developed from unfertilized ova without the aid of any male frog whatsoever; and moreover they were normally sexed frogs of both genders and had attained the age of eighteen months—a ripe age, according to Professor Loeb, for a frog.

This great scientist says: "I think our experiments have conclusively shown that the old theory of the male as the lord of creation is a fallacy. If it is possible to develop young in form of life such as sea urchins without fertilization and in higher animals such as these frogs, there is no reason to believe that the theory can not be extended to human beings. It may be possible that the mature non-sexual reproduction will become the thing, and eventually lead up to the disappearance of the male animal or his evolution into the female."

I trust that this will take the strut out of the male portion of our population and lay to rest that old well-worn saying about life being the unsolvable mystery. I think that the reader will see that this process is half completed without ghosts,—holy or otherwise—and that at the same time, the death-blow has been given to the dualistic conception of life.

Professor Loeb explained as follows how he obtained this interesting result:

"Can the origin of individual life be explained physically-chemically? You know that every organism originates from the ovum. But this in general only thus develops when a spermatozoon has entered it. If no sperm has entered the egg, it generally dies quickly.

"How can the spermatozoon induce the egg to develop? Years

ago it would not have been possible to give an answer to this question in the physical-chemical sense, but today we have not only succeeded in developing unfertilized eggs solely through physical-chemical influences, but we may also show that the spermatozoon effects the stimulation to development through similar agencies as are in use in the laboratory.

"The entering of the spermatozoon conditions a change in the surface of the egg of the sea-urchin; a membrane is formed on the egg, the so-called membrane of fertilization. I succeeded in imitating this occurrence by treating the egg with a fatty acid, for example, acetic or butyric acid; it became evident that by producing the formation of the membrane artificially in the unfertilized egg its development is set a-going. But this invasion alone is not sufficient. To bring the development of the egg to a normal larva capable of development, a second invasion is necessary. After the treatment with fatty acid the egg must for a short time be treated with a hypertonic solution, i. e., with a solution of a higher concentration than that of the sea-water. If thereupon the eggs are put into normal sea-water, many or all develop to larvae, and a part of these become fully normal.

"Recently, Sheares in Plymouth has succeeded in getting larvae generated in this way beyond the metamorphal stage, and Delage reports that he brought two larvae of sea-urchins generated by artificial parthenogenesis to the stage of sexual maturity (male).

"I now succeeded in furnishing the proof that the spermatozoon likewise brings about the fecundation of the sea-urchin in a similar manner, namely, through this, that it carries two substances into the egg of which the one works like butyric acid and brings about the formation of the membrane; but the other is like the treatment with the hypertonic solution; it makes the full development possible. In order to furnish this proof in the sea-urchin, different sperm, for example, that of the sea-star, must be used. The sperm of the sea-urchin enters the egg so quickly that almost always both substances get into the egg at the same time. But when we use the sperm of the sea-star for fertilizing the egg of the sea-urchin, the formation of the membrane takes place, in a long series of cases, before the spermatozoon has fully entered the egg. In consequence of the formation of the membrane the further entering of the spermatozoon is prevented. Such eggs

act exactly in the same way as if the formation of the membrane had only been brought about by butyric acid. If these eggs are treated afterwards with hypertonic solution, they likewise develop to normal larvae. F. Lillie has recently furnished a similar proof for the developmental imitation of the eggs of annelides (Neresis).

"Artificial parthenogenesis has not only been successful with the eggs of the sea-urchin, but also with those of many other animals, sea-stars, worms, mollusks and recently even with the frog (Bataillon). The common feature in all methods always amounts to this, that the cortical layer of the egg is chemically or mechanically destroyed.

"But how can this treatment of the egg incite the development? I had found out previously that no division is possible in the egg if oxygen is withdrawn from the fertilized egg, but that the separation is immediately possible if oxygen is admitted, and I had thereupon expressed the conjecture that the immediate effect of the developmental imitation is an acceleration of the processes of oxidation in the egg. That this supposition is true was confirmed by the observations of Warburg, as also by those of myself and Wasteneys. Through fecundation the celerity of the oxidations in the egg of the sea-urchin becomes four to sixfold. This acceleration of the oxidations is also brought by an artificial formation of the membrane, as the experiments of Warburg show.

"In the developmental imitation of the egg we therefore meet the processes of oxidation and we may say that the impulse for the origin of an organism from the egg is to be sought in the acceleration of the act of oxidation in the egg.

"As the beginning of life is connected with an acceleration of oxidation, so the end of life is conditioned by the ceasing of the oxidations.

"The lack of oxygen, either through interruption of respiration or circulation, even in a short time, brings about changes in the respiratory centre of the medulla oblongata, which can not be mended, and which mean death. As soon as the oxidations cease the cells abounding sufficiently with water become more pervious to the bacteria, and the body is destroyed by these micro-organisms.

"Therefore, we are not allowed to say that the origin of life consists in this, that some principle of life comes into the body, and likewise we are not allowed to say that death consists in this,

that such a principle leaves the body and carries on an independent existence.

"As the development of the egg is sufficiently explained by the acceleration of the processes of oxidation and other chemical occurrences, so death and decomposition is sufficiently explained by the cessation of the processes of oxidation.

"It would be superfluous to attempt here to give a survey of all the individual labors which try to explain the activity of the individual organs of the body physically-chemically. The time is lacking for this and it may suffice to mention that probably no investigator doubts that some time the activity of every organ in the body will be explained successfully in a physical-chemical way down to the last point."

It is not so long ago that the chemistry of organic matter was thought to be entirely different from that of inorganic substances. But the line between inorganic and organic chemistry, which up to the middle of the last century appeared sharp, subsequently became misty and has now disappeared. Similarly the chemistry of living organisms, which is now a recognized branch of organic chemistry, but used to be considered as so much outside the domain of the chemist that it could only be dealt with by those whose special business it was to study "vital" processes, is passing every day more out of the hands of the biologist and into those of the pure chemist.

Should it be contended that growth and reproduction are properties possessed only by living bodies and constitute a test by which we may differentiate between life and non-life, between the animate and inanimate creation, it must be replied that no contention can be more fallacious. Inorganic crystals grow and multiply and reproduce their like, given a supply of the requisite pabulum.

Professor Hoffding says: "The aim of modern physiology is to conceive all organic processes as physical or chemical." And Prof. Lloyd Morgan says: "We trace the evolution backwards and find, in our interpretation thereof, simpler and simpler organisms, until the organic passes into the inorganic."

The elements composing living substance are few in number. Those which are constantly present are carbon, hydrogen, oxygen and nitrogen. With these, both in nuclear matter and also, but to a less degree, in the more diffuse living material which we know as protoplasm, phosphorus is always associated. Moreover, a large proportion, rarely less than seventy per cent, of water appears essential for any manifestation of life, although not in all cases necessary for its continuance, since organisms are known which will bear the loss of the greater part if not the whole of the water they contain without permanent impairment of their vitality. The presence of certain inorganic salts is no less essential, chief among them being chloride of sodium and salts of calcium, magnesium, potassium, and iron. The combination of these elements into a colloidal compound represents the chemical basis of life; and when the chemist succeeds in building up this compound it will without doubt be found to exhibit the phenomena which we are in the habit of associating with the term "life".

Professor Czapek agrees to this for he says: "Life is therefore, quite inseparable from chemical reactions, and on the whole what we call life is nothing else but a complex of innumerable chemical reactions in the living substance which we call protoplasm."

If living matter has been evolved from lifelessness

in the past, we are justified in accepting the conclusion that its evolution is possible in the present and in the future. Indeed, we are not only justified in accepting this conclusion, we are forced to accept it.

Prof. Felix le Dantec states the case very clearly. He says: "With the new knowledge acquired by science, the enlightened mind no longer needs to see the fabrication of protoplasm in order to be convinced of the absence of all essential differences and all absolute discontinuity between living and not living matter."

The above considerations seem to point to the conclusion that the possibility of the production of life—i.e., of living material—is not so remote as has been generally assumed. Looking at the evolution of living matter by the light which is shed upon it from the study of the evolution of matter in general, we are led to regard it as having been produced, not by a sudden alteration, whether exerted by natural or supernatural agency, but by a gradual process of change from material which was lifeless, through material on the borderland between inanimate and animate, to material which has all the characteristics to which we attach the term "life".

That life arose in the past without supernatural intervention is the conclusion of about all of the biologists. Dr. Harold Heath remarks: "Since the days of the geologist Lyell, who argued that the present universe is the result of forces acting continuously on matter, biologists have become convinced that this argument holds not only for the so-called inorganic world but for the organic world as well. Furthermore, I venture the assertion that every working, pro-

ductive biologist agrees with Huxley, who declared that at no point in the process are we warranted in claiming that here natural forces ended and supernatural forces supervened. In other words, in the evolution of the earth a point was reached where life arose, by natural forces, from lifeless material. The conditions amid which this phenomenon appeared are unknown, but that it did occur and without the intervention of supernatural forces no thinking biologist denies."

In his book "The Origin and Nature of Life" Prof. Benjamin Moore says: "There is no breach of continuity between the inorganic and the organic, or any need for the postulation of an abrupt act of creation of the organic from the inorganic at some definite past moment in cosmic history which has never been repeated."

Our own life, like that of all the higher animals, is an aggregate life; the life of the whole is the life of the individual cells. The life of some of these cells can be put an end to, the rest may continue to live. This is, in fact, happening every moment of our lives. The cells which cover the surface of our body, which form the scarskin and the hairs and nails, are constantly dying and the dead cells are rubbed off or cut away, their place being taken by others supplied from living layers beneath. But the death of these cells does not affect the vitality of the body as a whole. They serve merely as a protection, or an ornamental covering, but are otherwise not material to our existence. On the other hand, if a few cells, such as those nerve cells under the influence of which respiration is carried on, are destroyed or injured, within a min-

ute or two the whole living machine comes to a standstill, so that to the bystander the patient is dead; even the doctor will pronounce life to be extinct. But this pronouncement is correct only in a special sense. What has happened is that, owing to the cessation of respiration, the supply of oxygen to the tissues is cut off. And since the manifestations of life cease without this supply, the animal or patient appears to be dead. If, however, within a short period, we supply the needed oxygen to the tissues requiring it, all the manifestations of life reappear.

And when we consider the body, as a whole, we find that in every case the life of the aggregate consists of a definite cycle of changes which, after passing through the stages of growth and maturity, always leads to senescence, and finally terminates in death. The only exception is in the reproductive cells, in which the processes of maturation and fertilization result in rejuvenescence, so that, instead of the usual downward change towards senescence, the fertilized ovum obtains a new lease of life, which is carried on into the new-formed organism. The latter again itself ultimately forms reproductive cells, and thus the life of the species is continued. It is only in the sense of its propagation in this way from one generation to another that we can speak of the indefinite continuance of life.

CHAPTER XII

MATERIALISM AND IMMORTALITY

THE MATERIALIST holds that not only organic life had a natural origin and evolution, but that mind and consciousness are due to the same process. He contends that the mind is built up out of impressions received from the material world; that thought depends upon external impressions; that knowledge is composed of sense impressions, and that consciousness is the sum-total of our sense impressions. He holds that without these sense impressions there could be no knowledge. A new-born babe placed in a dungeon, where light and sound did not reach it nor rain and wind touch it—where the human voice was never heard—would know absolutely nothing. Its "immortal spirit" and "God-given qualities" would not raise it even to the plane of an idiot.

The Materialist calls attention to the fact that the brain is a physical organism; that when parts of it are destroyed their respective functions are destroyed with them. For instance: when the center controlling speech is destroyed the power of speech no longer exists. Now, how much of the immortal soul is left when the entire brain has ceased to function? Alcohol reanimates the fainting consciousness, while chloro-

form deadens it. How would that be possible if consciousness were an immortal entity independent of these anatomical organs?

When a person is put under an anaesthetic the spirit or soul is rendered unconscious for a while; i.e., it is made unconscious by natural means for a time. Is this not conclusive proof that death is permanent unconsciousness? Without senses we should have no mind. Without nerve-energy we should have no senses. Consequently when our senses fail to work our minds or souls have ceased to be. Science knows nothing of disembodied spirit. A spirit is something composed of nothing. Many things believed yesterday to be supernatural are today known to be natural.

There are cases of injury to the head that have made men unconscious for a year at a time, and when they were restored to consciousness they have testified that their minds were a total blank during that period. They were not aware of the passing of time. They were to all intents dead for the time. Now, where were their "immortal souls" during these months? It must be admitted that they were not functioning in the bodies of the men, and the men have no recollection of their functioning outside of the bodies. This proves that the mental part of a man can be blotted out for a year. Then, why can it not be blotted out forever?

Andy Young of McDonald, Pa., met with an injury and lost his mind for nine years. It was restored by an operation. During those nine years he was mentally dead—there was no knowledge, no memory, no recognition. What about his soul during that time? This "immortal thing" this "thing that can never die"

had a period of nine years knocked out of its life while the body lived. If the soul does not live during an injury like this how could it survive the paralyzing effect of death?

There are cases of insanity lasting many years. What is the condition of the "immortal soul" during this time? Is it sick? Is it susceptible to sickness but not to death? Was it absent during these years of blankness? Can this spirit depart from one and that one continue to live? There is much evidence to show that the spirit or soul declines with the body. We see old age accompanied with dotage: i.e., a loss of mental power. If the spirit is to survive death it should grow in strength instead of weakness toward the end. The fact is that it declines with the body.

Mrs. Annie Besant, former international president of the Theosophical societies, says: "The universe fundamentally is spiritual and matter is only an expression of spirit". What is the reason that spirit cannot express itself without matter? If it must have matter through which to express itself, then a spirit world without matter is impossible. Spirit is in a bad way when it must have matter. Matter can and does get along without spirit.

The scientists have not reported one case of spiritual causation. Every case of causation traced has been found to be materialistic. The physical laws of nature are always in operation. They do not step aside even for a moment to permit spirit to rule.

The Materialist holds that all manifestations are of matter and motion, and that there are no spirits. He holds that there is no spiritual existence apart from the material body. He contends that the thing

called spirit is a product of material forces and has no existence apart from them. The Materialist maintains that life is an inherent quality in matter; that organic life—i.e., organized life—is a combination of this general life principle in matter into a specific or individual form. It is his view that when this individual organic form is dissolved the end of this organic life has been reached. All the life that survives this dissolution is the life energy in the molecules and the atoms that compose the matter involved.

The anthropologists have shown how the belief in spirits arose. This belief was not inherited nor revealed—as many think—but was caused by external impressions. It arose from physical phenomena, not from spiritual influence. We know now that our early ancestors were wrong in their interpretations of what they saw and felt; but the point is that the belief in spirits had its origin in purely physical phenomena.

The Spiritualist mediums, those shady characters, perform various tricks in dark rooms for the amusement of the credulous. The Materialist is convinced that all these ghosts, these spiritual beings, are the products of unbalanced minds or fraud. Where there is honest belief in spirits the Materialist sets it down to mental delusion. All other spirits may be explained as the products of fraud for mercenary reasons. The mind is the source and the last resting place of spirits—they exist nowhere else. The Psychologist must drive them from that realm just as the Astronomer drove them from the planetary system.

If man can live without a body, why was he ever encumbered with one? If man is immortal he must

have lived before this life, and supposedly without a body; and if he lives without a body after he is dead it would be a proper question to ask: Why cramp this "immortal spirit" into a vile old carcass of natural substance which spirits appear to dislike so much?

If the great live on and are in a more advanced state than they were here, why do not Newton and Laplace reveal new natural laws to us? Why do not Mozart and Beethoven reveal to us some new symphonies? Why do not Demosthenes and Ingersoll deliver to us still greater masterpieces of oratory than they did when hampered with their old material bodies? Is not the answer plain? They are not alive and in communication with this world or these master minds would most surely give us of their genius.

If all, who have lived throughout the ages, have survived death, and spirits require space, a moment's calculation will show that all space would be packed tight with them for many miles around this earth to say nothing about crowding "around the throne". There would be so many of them packed together that if they moved about it would be necessary for them to pass through each other, and in doing so it does seem that they might lose their identity just as gases do when a number of them are mixed together. The Lord would have some trouble unscrambling them for identification in order to visit individual punishment on the guilty and grant reward to the good. What does God want with a great swarm of souls? What use can he make of them? Most of them were nuisances here. Why should God want to be bothered with an innumerable herd of these worse than useless things?

Those who are cock-sure of living again are just as loath to part with this life as are the Materialists. They remind me of the story of the two men who were about to be hanged. One was an Irishman and the other was a Dutchman. The Dutchman made a great fuss about it. The Irishman told him there was no use to make a fuss, since we all have to die once anyway. "Yes," said the Dutchman, "dot iss shust de hell of idt. If I couldt die tvice I vouldn't mind idt der furst dime."

Some contend that inasmuch as this life has been a miserable one they are to have a happier life to make up for the failure. If they have been out of harmony with the law of life here, what possible evidence have they that a continuation of this life elsewhere would be pleasant? Logic points the other way. Does not the same God rule there and here? Those who are miserable here will be miserable there, for that is the law of their being. Immortality might prove to be the worst nuisance that could happen to one. Just think of having it fastened upon you without your wish or consent. Just think of having a corpse hung around your neck forever. There are persons who do not want their lives, that kill themselves. Just suppose they find out that they have not got rid of the thing they most disliked; that they must go on living forever even though they wish to be free from life. Could a greater calamity than that be imagined? Immortality is desired only by the egotist who thinks his life is of so much importance that God must perpetuate it.

It is generally conceded that animals have no spiritual existence, and yet science has demonstrated that

they have the same kind of intelligence possessed by man. Their intelligence does not differ in kind but merely in degree. If a lack of intelligence prevents the animals from enjoying another life it would be reasonable to conclude that a large part of the human race would be prevented for the same reason. Who doesn't know persons with less intelligence than my dog Nellie, who understood in six different languages how to perform dozens of tricks. Are you going to give immortality to old mental fossils simply because they have two legs and deny it to Nellie because she had four legs? Or will you give these two-legged creatures immortality because they are religious and Nellie was not? If to love fervently, if to be self-sacrificing, if to possess heroic loyalty is to be religious, Nellie was ten times more religious than any Christian I ever knew. And Nellie lived and loved and served without the incentive of a future life. It would be better to give immortality to a good dog who sacrificed his life to save others, than to those Christians who would sacrifice everybody and everything to save their own little souls.

Substance in some form is permanent. It is indestructible; therefore it has always been in existence, and was never created. That which had no beginning will have no end. But organized life had a beginning. This we have witnessed. Also, it has an end, as we have observed. The natural law is that everything that lives must die. No exception to this law has been found. Nothing dead has been restored to life. That death is a permanent condition has been well demonstrated throughout the centuries. Man did not always exist. We know of his beginning in the womb.

We witness his end in the grave. Organic life consists of birth, growth, decline, and death. This is perfectly natural and is just as it appears. This old world is a veritable death-trap—no one escapes alive. This fact may be shocking to some, but the truth should be taught. Truth is a permanent good. Let us teach the truth, even though it be unpopular with the superstitious.

The universe consists of matter that is a substance without cause, without purpose, and originally without consciousness, and subject only to mechanical laws of attraction and repulsion, impact and pressure. Consciousness has been derived from this substance, and perishes with the dissolution of organic bodies.

Matter is the only immortal thing. When atoms in organic form, called man, dissociate, Mr Man, "the Lord of Creation", is blotted out permanently.

CHAPTER XIII

THE END OF LIFE

Oh, threats of Hell and hopes of Paradise!
One thing at least is certain—this life flies.
One thing is certain and the rest are lies;
The flower that once has blown forever dies.

—OMAR.

When I am asked if, after death, these faculties (personal attributes, mind, sensation, etc.) will exist, I am almost tempted to ask if the warbling of the nightingale will exist when the bird has been devoured by an eagle.—VOLTAIRE.

I do not say that to believe in a future state is to believe in a vulgar error; but this I say, it cannot be demonstrated by reason; it is not, in the nature of it, capable of demonstration, and no one ever returned that irremediable way to give us assurance of the fact.—BOLINGBROKE.

If God has not been able to render men happier than they are, here below, what will become of the hope of a paradise, where it is pretended that the elect or chosen few will rejoice forever in ineffable happiness? If God could not or would not remove evil from the earth (the only sojourning place we know of), what reason could we have to presume that He can or will remove it from another world of which we know nothing?—JEAN MESLIER, ex-priest (1678-1760).

With regard to future bliss, I cannot help imagining that multitudes of the zealous orthodox of different sects, who at the last day may flock together in hopes of seeing each other damned, will

be disappointed and be obliged to rest content with their own salvation. . . . By heaven we understand a state of happiness infinite in degree and eternal in duration. I can do nothing to deserve such a reward. I have not the vanity to think that I deserve it, the folly to expect it, nor the ambition to desire it.—BENJAMIN FRANKLIN.

To talk of immaterial existences is to talk of nothings. To say that the human soul, angels, God, are immaterial is to say they are nothings, or that there is no God, no angels, no soul. I cannot reason otherwise. But I believe that I am supported in my creed of materialism by the Lockes, the Tracys, and the Stewarts. . . . Moses had either not believed in a future state of existence or had not thought it essential to be explicitly taught to the people.—THOMAS JEFFERSON.

A sleep without dreams, after a rough day
Of toil, is what we covet most: and yet
How clay shrinks back from quiescent clay.
Death, so-called, is a thing that makes men weep,
And yet a third of life is passed in sleep.

—BYRON.

Pleasures to be enjoyed, or pains to be endured, after we shall be dead and gone, are but little regarded. There is something so ludicrous in promises of good, or threats of evil, a great way off, as to render the whole subject with which they are connected easily turned into ridicule.—ABRAHAM LINCOLN.

A dreamless sleep, that is, a purely negative state of unconsciousness is all that we can expect after death.—GEORGE CLEMENCEAU.

What I propose is that your next few contributors shall discuss not whether we are immortal, or whether the soul is immortal, or whether the dead are still seeking lodgings in infinite space, but whether I, Bernard Shaw, am going to persist to all eternity in a universe utterly unable to get rid of me, no matter how desperately tired it may become of Shavianisms, or how intolerably bored I may be by myself.

Can there never be enough of me? Never too much of me? Also am I myself to have any say in the matter? Am I or am

I not to be allowed to hand myself back to my creator and say, 'Will you be so kind as to pulp this wornout article and remanufacture it, if possible, without any of the glaring defects which made it so troublesome to myself and others?'

As a matter of fact, I have non-existed and discussion must address itself to proving or disproving that the non-existence that was possible before 1855 can never be possible again.

Let no controversialist try to evade the point by assuring me that I shall survive not as myself but as the just man made perfect. He might as well tell me the chariot of Pharaoh survives in the Rolls-Royce. When I use the word 'I', as I frequently do, I mean myself with all my imperfections, if any, on my head. Otherwise the controversy is about nothing.—GEORGE BERNARD SHAW.

Materialism has its distinct esthetic and emotional color, though this may be strangely affected and even reversed by contrast with systems of an incongruous hue, jostling it accidentally in a confused and amphibious mind. If you are in the habit of believing in special providences, or of expecting to continue your romantic adventures in a second life, materialism will dash your hopes most unpleasantly, and you may think for a year or two that you have nothing left to live for. But a thorough materialist, one born to the faith and not half plunged into it by an unexpected christening in cold water, will be like the superb Democritus, a laughing philosopher. His delight in a mechanism that can fall into so many marvelous and beautiful shapes, and can generate so many exciting passions, should be of the same intellectual quality as that which the visitor feels in a museum of natural history, where he views the myriad butterflies in their cases, the flamingoes and shell-fish, the mammoths and gorillas. Doubtless there were pangs in that incalculable life, but they were soon over; and how splendid meantime was the pageant, how infinitely interesting the universal interplay, and how foolish and inevitable those absolute little passions. Somewhat of that sort might be the sentiment that materialism would arouse in a vigorous mind, active, joyful, impersonal, and in respect to private illusions not without a touch of scorn.—Prof. GEORGE SANTAYANA.

Today we turn to the development of the soul, and consider whether man's mental development is controlled by the same natural laws as that of his body, and whether it also is inseparably bound up with the rest of the mammals.

The greatest blow was dealt at the predominant metaphysical conception of the life of the soul thirty years ago. By a series of able experiments Ernest Heinrich Weber and Theodore Fechner of Leipsic showed that mental activity can be measured and expressed in mathematical formula, just as the phenomena of inorganic matter can be so measured. Thus physiological psychology was raised to the rank of an exact science. But it had obtained other solid foundations. Comparative psychology had traced connectedly the long graduation from man to the higher animals; from those to the lower, and so on down to the very lowest. The bacteria which now play so important a part as the cause of most contagious and infectious diseases show very clearly that organic life is only a chemical and physical process, and not the outcome of a mysterious "vital force".

One important result of these modern discoveries is the prominence given to the fact that the personal soul has a beginning of existence, and we can determine the precise moment in which it takes place; it is when the parent cells, the ovum and spermatozoon coalesce. Hence what we call the soul of man or the animal has not pre-existed but begins its career at the moment of impregnation. One cannot see how a being that thus has a beginning of existence can afterwards prove to be immortal.

The soul is not a special immaterial entity, but the sum-total of a number of connected functions of the brain. When the brain dies, the soul comes to an end. The human soul has only reached its present height by a long period of gradual evolution. It differs in degree, not in kind, from the soul of the higher animals; and thus it cannot be immortal. The belief in immortality is wholly inconsistent with the facts of evolution and of physiology.

Besides the law of evolution, we have the law of substance, the law of conservation of matter, and the law of conservation of energy. These laws are irreconcilable with the three central dogmas of metaphysics: the belief in a personal God, the personal immortality of the soul, and the liberty of the human will. The eternal, all inspiring energy is in eternal infinite substance,

in space filling matter.—Prof. ERNST HAECKEL, *Last Words on Evolution.*

Thomas A. Edison was interviewed by Edward Marshall for the Publishers' Press. In reply to a question about immortality, Mr. Edison said he had come to the conclusion that there is no 'supernatural', that all there is, all there has been, all there ever will be, can or will, sooner or later, be explained along material lines. "I cannot believe in the immortality of the soul", said he.

"Heaven? Shall I, if I am good and earn reward, go to heaven when I die? No—no. I am not I. I am not an individual.—I am an aggregate of cells, as for example New York City is an aggregate of individuals. Will New York City go to heaven?" "I do not think we are individuals at all", he went on slowly. "The illustration is a good one. We are not individuals any more than a great city is an individual".

"If you cut your finger and it bleeds, you lose cells. They are the individuals. You don't know them. You don't know your cells any more than New York City knows its 5,000,00 inhabitants. You don't know who they are."

"No; all this talk of an existence for us as individuals beyond the grave, is wrong. It is born of our tenacity of life—our desire to go on living—our dread of coming to an end as individuals. I do not dread it, though. Personally I cannot see any use of a future life."

"But the soul," Marshall persisted.

"Soul? Soul? What do you mean by soul? The Brain?"

"Well, for the sake of argument, call it the brain, or what is in the brain. Is there not something immortal of or in the brain—the human mind?"

"Absolutely no," he said with emphasis. "There is no more reason to believe that any human brain will be immortal than there is that one of my phonographic cylinders will be immortal. My phonographic cylinders are mere records of sounds which have been impressed upon them.

"The brain immortal? No; the brain is a piece of meat-mechanism—nothing more than a wonderful meat-mechanism.

"The things with which all scientists who really accomplish anything, experiment, are material things.

"The psychic forces? The supernatural? Merely words for perfectly natural things, which as yet we do not understand. There may be a higher sense than those which we have developed; but if such a sense is now being developed, it is material. I am inclined to think we are developing new senses. Animals have done it when their changing environment required it. New conditions will bring new necessities, new necessities bring new discoveries, both through concentrated effort and accident.

"I don't believe a man's mind lives after him. His work lives after him, but his work is a material thing. Shakespeare's plays live in book form. He is dead, and the man who printed the book is dead, and the book itself is made of cellulose and lamp-black and other dead things. I open the book and find those beautiful thoughts all new to me. If they influence me, I derive benefit, not from Shakespeare's mind, but from the dead material thing which he has left behind him.

"I am dead five hours every night; and when I die and decompose, I shall live only in phonographs, and tickers, and storage batteries. I shan't be playing a harp, or boiling in oil, or haunting anyone. I shall be dead.

"Spirit? There is no such thing as spirit, unless mind is spirit, and mind is merely the manifestation of the brain-machine's activities. I have reached my conclusions through the study of hard facts. I have never seen the slightest scientific proof of the religious theories of heaven and hell, of future life of individuals, or of a personal God. When death comes, then the individual disintegrates."

But a God apart from Nature is to me unthinkable, and science finds no beginning of anything. It finds change, transformation only. When or where did man begin? Where does the circle begin? Self-beginning—who can think of that? Can we think of a stick with only one end? We can think of a motion as beginning and ending, but not of substance as beginning and ending. When the metabolism of the body ceases, death comes. Do we think of life, or the organizing principle, as then leaving the body? It ceases, but does it leave the body in any other sense than the flame leaves the candle when it is blown out? And is this any different in the case of man than it is in the case of

a tree, or a dog? We postulate what we call a soul in man, which we deny to all other forms of life—an independent entity which separates from the body and lives after it. But we run into difficulties the moment we do so. In the biologic history of man, when and where did the soul appear? Did the men of the old Stone Age, of whom Professor Osborn writes so graphically and convincingly, have it? Did the Piltdown man, the Neanderthal man, the Java man of Dubois, have it? Did our ancestral forms still lower down have it? Do babies have it? Do idiots and half-witted persons have it?—JOHN BURROUGHS.

Epicurus (341-270 B. C.) believed in a material soul. He said on this subject, as condensed by Weber:

"The soul is material and shares the fate of the body. What proves it to be matter—exceedingly fine matter, of course—is the influence exercised upon it by the body in fainting, anæsthesia, and delirium, in cases of injury and disease, and, above all, the fact that the advance and the decline of the soul correspond to analogous bodily conditions. The intellectual faculties are weak in the period of childhood; they grow strong in youth, and gradually decay in old age. Sickness causes a serious reaction upon the soul; without the body the soul has no power to manifest itself. Nay, more than that: the dying man does not feel his soul gradually withdrawing from one organ to another, and then finally making its escape with its powers unimpaired; he experiences a gradual diminution of his mental faculties. If the soul retained full consciousness at death, and if, as certain Platonists maintain, death were the transition of the soul to a higher life, then, instead of fearing death, man would rejoice at it, which is not the case. Moreover, our fear of death is not caused by our dread of non-existence; what makes us regard it with such terror is the fact that we involuntarily combine with the idea of nothingness an idea of life, that is, the notion of feeling this nothingness; we imagine that the dead man is conscious of his gradual destruction, that he feels himself burning, or devoured by the worms, that the soul continues to exist and to feel. If only we could succeed in wholly separating the idea of life from its opposite, and bravely relinquish all thought of immortality, death would lose its terrors. We should say to ourselves: Death is not an evil; neither

for him who is dead, for he has no feeling; nor for the living, for him death does not yet exist. As long as we are alive, death does not exist for us, and when death appears we no longer exist. Hence we can never come in contact with death; we never feel its icy touch, which we dread so much."

It has been generally supposed that there are two distinct kinds of substance in human nature—matter and spirit, or mind. I maintain that there are not. The notion of two substances that have no common property, and yet are capable of intimate and mutual action, is absurd.—JOSEPH PRIESTLEY.

In 1887 the *Christian Register* sent the following inquiries to some of the most distinguished scientists:

"1. Are there any facts in the possession of modern science which make it difficult to believe in the immortality of the personal consciousness?

"2. Is there anything in such discoveries to support or strengthen a belief in immortality?

"Or do you consider the question out of the pale of science altogether?"

CHARLES A. YOUNG, LL. D., professor of astronomy at Princeton College, replied:

"I think it must be frankly admitted that what is known about the functions of the brain and nervous system does, to a certain extent, tend to 'make it difficult to believe in immortality of personal consciousness'."

Said JOSEPH LEIDY, M.D., LL. D., professor of anatomy and zoology in the University of Pennsylvania: "Personal consciousness is observed as a condition of each and every living animal, varying from microscopic forms to man. The condition is observed to cease with death; and I know of no facts of modern science which make it otherwise than difficult to believe in the persistence of that condition, that is, 'the immortality of the personal existence.' Science has learned no more than is expressed in Eccl. iii, 19: 'For that which befalleth the sons of men befalleth beasts; even one thing befalleth them; as the one dieth, so dieth the other; yea, they have all one breath; so that a man hath no pre-eminence above a beast'."

LESTER F. WARD, A.M., at the Smithsonian Institution, Washington, D. C.: "The consciousness, when scientifically examined, reveals itself as a quality of brain. . . . It is a universal induction of science that modification of brain is accompanied by modification of consciousness, and that the destruction of brain results in destruction of consciousness. No exception to this law has ever been observed."

THOMAS HILL, D.D., ex-president of Harvard College, says: "Many facts in the possession of modern science make it difficult to believe in immortality."

ALEXANDER G. BELL: "The possibility of thought without a brain whereby to think is opposed to experience, but the persistence of personal consciousness after the death of the body involves this assumption."

Says the distinguished Dr. LUDWIG BUECHNER: "Unprejudiced philosophy is compelled to reject the idea of an individual immortality, and of a personal continuance after death."

MATERIALISM UPHELD BY THE BIBLE

CHRISTIAN ministers teach that God endowed man with immortality, and they pretend to find this teaching in the Bible, but they do not furnish any quotations. The reason is that there are no such quotations. The word "immortality" occurs but seven times in the Bible, and it is not once said to be the possession of man. The Bible does not say that man is immortal. It says that the Lord "only hath immortality". I Tim. 6:16. Some writers in the Bible teach that immortality is a thing to be attained, not something already possessed. There are but few of the Biblical writers that believe even this. Most of them were downright Materialists. Let me quote from three of them to substantiate this assertion.

King David says: "Put not your trust in princes, nor in the son of man in whom there is no help. His breath goeth forth, he returneth to the earth; in that very day his thoughts perish". Psalms 146:3, 4.

QUOTATIONS FROM JOB

Job 7: 9: "As the cloud is consumed and vanishes away, so he that goeth down to the grave shall come up no more."

14:1, 2: "Man that is born of woman is of few days and full of trouble. He cometh forth like a flower and is cut down; he fleeth also as a shadow and continueth not."

14:7: "For there is hope of a tree if it be cut down, that it will sprout again, and that the tender branch thereof will not cease."

14: 10-12: "But man dieth and wasteth away: yea, man giveth up the ghost, and where is he? As the waters fail from the sea, and the flood decayeth and drieth up: so man lieth down and riseth not: till the heavens be no more they shall not awake, nor be raised out of their sleep."

Christians say they are terribly shocked at Materialists who believe that death ends all, and they often ask this question: Do you believe that a man dies like a beast? They are not familiar with their Bible or they would know that it teaches that very thing. Solomon, the "wisest man that ever lived", says: "I said in my heart concerning the estate of the sons of men, that God might manifest them, and that they might see that they themselves are beasts. For that which befalleth the sons of men befalleth beasts; even one thing befalleth them; as one dieth so dieth the

other; yea, they all have one breath, so that a man hath no pre-eminence over a beast: for all is vanity. All go unto one place, all are of the dust, all return to dust again". Ecc. 3: 18-21.

And in another place he says: "For the living know that they shall die; but the dead know not anything, neither have they any reward; for the memory of them is forgotten." Ecc. 9:5.

Ver. 6: Also their love, and their hatred, and their envy, is now perished; neither have they any more a portion for ever in anything that is done under the sun.

Ver. 10: Whatsoever thy hand findeth to do, do it with thy might; for there is no work, nor device, nor knowledge, nor wisdom, in the grave, whither thou goest.

The Buddhists, who constitute about one-third of the human race, teach annihilation. Their Nirvana is annihilation. The Materialist has arrived at the same conclusion from scientific evidence and philosophic reasoning.

CHAPTER XIV

MATERIALISM VERSUS SPIRITUALISM

WHEN the field is completely occupied by Science the Spirits depart. Science is entirely materialistic. Physics is a correlation of physical forces, not spiritual forces. Biology deals with physical bodies, not ghostly bodies. Astronomy deals with physical planets—the greatest telescope has not revealed in all the reaches of space a spiritual planet. The chemist who investigates the composition of matter has not found a spirit. The most powerful microscope yet invented has not uncovered even one little devil without a physical body.

Spiritualists think when they show that certain scientific men believe in Spiritualism, or in a spirit life, they have proved their theory scientific. They never tire of naming a half dozen men of science who believe in spirit communication. It would be easy to name twice as many, or a hundred times as many, who do not believe. Would this prove that materialism is twice, or a hundred times as true? The number of believers does not establish a scientific fact. The names that the Spiritualists repeat on all occasions until one could sing them without having them set to music are: Alfred Russell Wallace, Sir Oliver

Lodge, Professor Crookes, Camille Flammarion, Cesare Lombroso and Prof. James H. Hyslop, who make up the famous half dozen "scientific Spiritualists".

All these famous men have indorsed mediums who have been exposed as frauds. This fact alone discredits their judgment in this matter. Let me name one medium indorsed by these men and other Spiritualists as being the greatest of all time. They had investigated this medium for years and declared her to be above reproach. Eusapia Palladino! No other medium had half the publicity or fame enjoyed by this woman. The indorsement by famous men added to her vogue. Yet she was exposed by other scientists. And the exposure was so thorough that no man of character would be willing to defend her now. Palladino was caught in her tricks on a number of occasions. On two of these, the exposure was so thorough and public that it will not and cannot be denied. Professor Herbert Lord of Columbia University, and Professor Hugo Munsterberg were the leaders in these exposures. You will find an account of the first of them in the Metropolitan Magazine of February, 1910, and in the New York Times of May 12, 1910; and of the second in Collier's Weekly of May 14, 1910.

There has not been a single medium who dealt in physical phenomena and who submitted to actual scientific tests—conditions which would detect fraud —who has not been caught, in trickery of some sort. The nearest approach to the claim of absolute honesty now set forth for any medium is found in the case of Mrs. Piper. But Mrs. Piper does not deal in physical phenomena. She is a psychic, or trance-medium, and

tells you what the spirits tell her while she is in an unconscious condition. The only fraud there could be in her case would consist in her lying about what the spirits tell her, and there is no way in which this may be determined. Many things that she has revealed have proven false, but she blames this upon the spirits.

Who can locate the lie? However, I believe Mrs. Piper is a fraud, and will give my reason. Her "control" was a French physician, she said. When he was tested, it was found that he did not understand the French language nor the Latin. A great French physician, that! Let those who are not bothered by such small discrepancies have Mrs. Piper for their only genuine medium. My generalization stands. No medium who deals in physical phenomena in connection with psychic demonstrations has escaped from the charge of fraud when subjected to scientific tests.

I wish there were space to tell the reader about all these famous half dozen "scientists" and whom they have indorsed, and what they have upheld, but I can only mention one of them. Alfred Russell Wallace indorsed "spirit photography". Think of a man who had won scientific distinction doing that! Spirit photography has been exposed repeatedly, and the methods of its production have been clearly explained. Wallace particularly vouched for Mrs. Gumppy and her spirit pictures, and this woman has been exposed as a fraud of the worst kind.

We are told that Wallace was convinced of Spiritualism by the mediumship of a Miss Cook. He gives her great praise in one of his books. Miss Cook was a materializing medium. On one occasion when un-

der examination, a Mr. Valckman caught the materialized spirit in his arms—it turned out to be Miss Cook. Wallace knew all this, and yet he published a new edition of his book, and let the indorsement of Miss Cook stand. How do you explain this? If the phenomena that converted him were fraud what is his belief worth when based upon them?

Professor Crookes, also, indorsed Miss Cook as a medium of genuine spiritualistic power. In fact, all the credulous scientists gave indorsement to the prominent mediums of their day. All of those mediums have been exposed and caught in fraud.

William James, Frederic Myers, Richard Hodgson, and other great men, who devoted years to the investigation of spirit phenomena while living and wrote many books of great value upon these subjects, have communicated through mediums since their death—that is, if we are to believe the claims of the mediums. But what have we learned from these brilliant men about the spirit world? Not a thing! They can chatter for hours about trivial earthly matters about which their friends already know, but when they are asked a pointed question about the spirit world, or for some definite fact that would settle the great question of a future life, they suddenly grow dumb, or stammer out some incoherent sentences. To believe this inconsequential chatter to be the language of these great men would be to conclude that the spirit world is not an advancement but a retrogression. I am speaking of the alleged messages of these men given through Mrs. Piper.

I do not reject this testimony merely because of its trivial character. Possibly they have gone back-

ward mentally. If it is true that they survive even in a lower mental state I want to know the truth. But the evidence points to an earthly source for this information. None of these men is able to speak out with his own voice. They must talk to an unconscious medium and we must take her word for what they say. It does seem strange to me that spirits are so strong physically and so weak mentally. They can lift tables and even pianos with ease, but they are unable to make an audible vocal sound. Nothing would be so convincing to us as to hear the voice of our departed friend in the familiar tones of earth. I am well aware of the fake trumpet voices, but they have been discredited. Even Spiritualists of the better class no longer listen to them.

William Stead was one of the distinguished men of letters who believed in Spiritualism. Spiritualists delight in mentioning him as authority for their claims. Stead received many messages from the spirit world through various mediums; much information about the future was imparted to him; but with all this source of knowledge at his command he went down with the Titanic on her fatal voyage. Possibly his spirit guides wanted him with them, and kept him in the dark about the danger.

Spiritualists are strong in seeing the future after it has become the past. Seeing the future is seeing something that does not exist, and that is the kind of thing they are always seeing. I was in San Francisco at the time of the great earthquake and fire, and was acquainted with a number of mediums. I can testify that not one of them had the slightest hint of what was coming. Not a word was spoken orally

or in print about the catastrophe before it came. But after the event there were hundreds that "knew it was coming". It does seem strange that those who knew in time did not make a "get-away" personally, even if they were too mean not to tell the rest of us. The Spiritualists were caught just as were the Materialists.

Mediums can tell you about a future journey; they can tell you what to invest your money in; they can tell you just where to locate a gold-mine—all for the small sum of a dollar. Does it not seem strange that they do not themselves go and appropriate that gold-mine? It seems like throwing away an opportunity very cheaply. These, and other things about your future, they can tell you, but their own future appears a blank. At least, they are no more successful in business than the crude Materialists who have to depend upon the ordinary means of gathering facts.

Why is it that even a few scientists believe in Spiritualism? The explanation is simple. There are men of science, who have as great credulity for pleasant beliefs as any other class of men, provided these beliefs fall outside of their particular fields of investigation. A pleasing belief is a very hard thing to eradicate, and but few men succeed in doing so. When you find men dabbling in a thing from choice, it is likely they do so because they already lean toward that belief. The attraction determines their attitude. It has been said that Wallace and others were converted to Spiritualism. This is not true. They were believers before they started to investigate Spiritualism. The investigation was for the purpose of confirming their old beliefs rather than to determine the facts. To prove this, all that is necessary is to study

their lives and beliefs before they began to "investigate".

Let us take an instance where one of these ghost-chasers went outside of his special field to exhibit his ignorance of astronomy. Alfred Russell Wallace, who attained distinction as a biologist, wrote a book on Astronomy a few years ago. Among astronomers the laugh went around the world. The opinion of all authorities was that Wallace had written himself down as an ass. The point is: Here was a trained man whose opinions in biology we are all delighted to admire and respect, going outside of his special department of science and expressing opinions which are worthless. If a man like Wallace can be so absurd even in science outside of his specialty why are we asked to accept his beliefs about things that have not even been reduced to any scientific basis? What is true of Wallace and Lodge is true of other scientists who depart from their own fields of investigation: their opinions are worthless, or have but very little value, at most. In their particular field they accept and use scientific methods of demonstration, but when they go into other fields they indulge in mere speculations, or accept as facts what would not be so classed in their own departments.

It is a common saying among magicians and tricksters that "the scientist is the easiest man of all to fool". This is true, and is no discredit to the scientist. The man of science deals in natural phenomena; he handles parts of old Mother Nature, and she plays no tricks upon him. The things he observes are "honest to goodness" things, as the boy says. He finds a natural fact today: it will be the same tomorrow, and for-

ever. His purpose is honest; his method is honest; the phenomena are honest. The experience fits him for examining the natural, but it unfits him for examining the unnatural and artificial phenomena known as black art and trickery.

I would rather rely upon the little newsboy, who has watched the sleight-of-hand performer until he has learned that things in his hands are not what they seem, than upon the judgment of a scientist in matters that involve trickery. Especially is this true in Spiritualism, when the scientist really wants to believe. I place great confidence in scientists in their own chosen fields, but little when they go beyond the parts of science they have matstered. When I want to know something about the phenomena of mind I will not go to physicists like Crookes and Lodge, but to great psychologists who have made a deep study of mental phenomena.

When we consult the psychologists we find a different story from that told by Lodge and Crookes. No wonder the Spiritualists drag in some physicists to handle their spirits. Those best fitted to handle ghosts are the men that know their origin—the brain. Prof. James H. Leuba, a great teacher and authority on psychology, has gathered the evidence on this subject, and has given it to the world in his valuable book, "The Belief in God and Immortality". He gathered statistics of the beliefs of the scientists from each field. I will give you Professor Leuba's results in two groups, the physicists and the psychologists.

Among the physicists in general there were fifty per cent that believed in immortality; while among the psychologists only twenty per cent held that belief.

Then Professor Leuba divides these scientific groups into "greater" and "lesser" man. Among the greater men of the above classifications only forty per cent of the physicists believed in immortality, and ten per cent of the phychologists. And of this small number of psychologists who believed in immortality, only a very few accepted Spiritualism.

If the reader wants to find how few, just try to find one of eminence who indorses it. This scarcity compels the Spiritualists to claim William James as one, but James never accepted Spiritualism as true, although he investigated it for years. Moreover, he did, on various occasions, declare his lack of conviction. Just a short time before his death, in an article for the American Magazine of October, 1909, he says:

"For twenty-five years I have been in touch with the literature of Psychical Research, and I have been acquainted with numerous researchers . . . yet I am theoretically no further than I was at the beginning".

This shows how hard pressed the Spiritualists are when they must claim a man like James in order to have an eminent psychologist on their side. The Spiritualists had better stay away from the group of eminent professors, also, for that group shows that only nineteen per cent believe in immortality, and possibly none believe in Spiritualism.

As the Spiritualists quote the half-dozen scientists (mentioned at the beginning of this chapter) in favor of Spiritualism, I will quote a dozen equally distinguished scientists on the materialistic side. Six of their contemporaries, and six of more recent date.

"The phenomena of consciousness correspond, element for ele-

ment, to the operations of special parts of the brain. . . . The destruction of any piece of the apparatus involves the loss of some one or other of the vital operations; and the consequence is that, so far as life extends, we have before us only an organic function, with a *Ding an sich,* or an expression of that imaginary entity, the soul. The fundamental proposition carries with it the denial of the immortality of the soul."—EUGENE DUEHRING.

"Physiology declares itself decidedly and categorically against individual immortality, as against all theories in general which include the special existence of a soul. The soul does not enter into the fœtus as the evil spirit does into the possessed, but is produced by the development of the brain, just the same as muscular activity is produced by the development of the muscles, or secretion is produced by the development of the glands."—CARL VOGT.

"That the organization of mind advances with even pace along with the organization of brain, is the merest commonplace. The fortunes of mind and brain are so interwoven at every moment that to the scientific observer it is incredible to suppose the escape of consciousness from the shattered elements of the physical organ. The general thesis of the mind's dependence on the body is buttressed in detail by the researches of the physiologist and the psychologist."—ERNST HAECKEL.

"Unprejudiced philosophy is compelled to reject the idea of an individual immortality, and of a personal continuance after death."—LUDWIG BUECHNER.

"Divorced from matter, where is life? Whatever our *faith* may say, our knowledge shows them to be indissolubly joined. Every meal we eat, and every cup we drink, illustrates the mysterious control of Mind by Matter."—JOHN TYNDALL.

"After contemplating the inscrutable relations between brain and consciousness, and finding that we can get no evidence of the existence of the last without the activity of the first, we seem obliged to relinquish the thought that consciousness continues after physical organization has become inactive."—HERBERT SPENCER.

"How vain for a man who did not live fifty or a hundred years ago, to believe that he shall live during eternity 'hereafter'. It seems to me, if a God has made such a wretched failure of a world here (though personally I have no reason to complain so

far), he can hardly be trusted to make a success of it 'over there'. If you ask me to choose between a sentence to eternal death and a sentence to eternal life, I unflinchingly decide in favor of eternal death. This, at least, insures me against possible future grief, pain or horror. Furthermore, the absolute unconsciousness which death implies will spare me from the torture during all eternity of the painful recollection of the many good things enjoyed during life, which, alas, in the absence of the physical body, will necessarily be denied to all spirits."—OTTO WETTSTEIN.

"I think it must be frankly admitted that what is known about the functions of the brain and nervous system does, to a certain extent, tend to 'make it difficult to believe in immortality of personal consciousness'."—CHARLES A. YOUNG.

"Personal consciousness is observed as a condition of each and every living animal, varying from microscopic form, to man. The condition is observed to cease with death; and I know of no facts of modern science which make it otherwise than difficult to believe in the persistence of that condition, that is, 'the immortality of the personal existence'."—JOSEPH LEIDY.

"The possibility of thought without a brain whereby to think is opposed to experience, but the persistence of personal consciousness after the death of the body involves this assumption."—ALEXANDER G. BELL.

"The conscientiousness, when scientifically examined, reveals itself as a quality of brain . . . it is a universal induction of science that modification of brain is accompanied by modification of consciousness. and that the destruction of brain results in the destruction of consciousness. No exception to this law has ever been observed."—LESTER F. WARD.

"Every fact known to medical men compels the inference that mind, spirit, soul are the manifestations of a living brain, just as the flame is the manifest spirit of a burning candle. At the moment of extinction, both flame and spirit cease to have a separate existence. However much this mode of explaining man's mentality may run counter to long and deeply cherished beliefs, medical men cannot think otherwise if they are to believe the evidence of their senses."—SIR ARTHUR KEITH.

"I cannot imagine a God who rewards and punishes the object of his creation, whose purposes are modeled after our own—a

God, in short, who is but a reflection of human frailty. Neither can I believe that the individual survives the death of his body, although feeble souls harbor such thoughts through fear or ridiculous egotism. It is enough for me to contemplate the mystery of conscious life perpetuating itself through all eternity, to reflect upon the marvelous structure of the universe which we can dimly perceive, and to try humbly to comprehend even an infinitesimal part of the intelligence manifested in nature."—ALBERT EINSTEIN.

CHAPTER XV

MATERIALISM VERSUS CHRISTIAN SCIENCE

MRS. EDDY has stated her opposition to material science in no uncertain terms. She has been accused of using meaningless words to convey her senseless ideas, but when she attacks materialistic things, she makes her position quite clear. She does not believe in matter, nor its manifestations. To her, all is mind, or the idea. A few quotations from "Science and Health" (Edition of 1909) will show this very clearly. She says:

"Christian Science reveals incontrovertibly that Mind is All-in-all, that the only realities are the divine Mind and idea." (p. 109.)

"Spirit possessing all power, filling all space, constituting all Science,—contradict forever the belief that matter can be actual." (p. 110.)

"God is all, therefore matter is nothing beyond an image in mortal mind." (p. 116.)

"The verity of mind shows conclusively how it is that matter seems to be, but is not. Divine Science, rising above physical theories, excludes matter, resolves things into thoughts, and replaces the object of material sense with spiritual ideas." (p. 123.)

"Christian Science differs from Material science, but not on that account is it less scientific. On the contrary, Christian Science is pre-eminently scientific, being based on Truth, the Principle of all science."

"Physical science (so-called) is human knowledge,—a law of mortal mind, a blind belief, a Samson shorn of his strength. When

this human belief lacks organizations to support it, its foundations are gone. Having neither moral might, spiritual basis, nor holy Principle of its own, this belief mistakes effect for cause and seeks to find life and intelligence in matter, thus limiting Life and holding fast to discord and death. In a word, human belief is a blind conclusion from material reasoning. This is a mortal, finite sense of things, which immortal Spirit silences forever." (pp. 123 and 124.)

"Health is not a condition of matter, but of Mind; nor can the material senses bear reliable testimony on the subject of health. The Science of Mind-healing shows it to be impossible for aught but Mind to testify truly or to exhibit the real status of man. Therefore the divine Principle of Science, reversing the testimony of the physical senses, reveals man as harmoniously existent in Truth, which is the only basis of health; and thus Science denies all disease, heals the sick, overthrows false evidence, and refutes materialistic logic." (p. 120.)

"Christian Science teaches that matter is the falsity, not the fact, of existence; that nerves, brain, stomach, lungs, and so forth, have—as matter, no intelligence, life, nor sensative." (p. 127.)

Mrs. Eddy says: "I recommend students not to read so-called scientific books. Man-made theories are narrow, else extravagant, and always materialistic." This is her opinion of real science, which she had the impudence to associate by name with her false and superstitious system. She says: "Christian Science silences human will." So it does, and the intellect also goes to sleep.

Mrs. Eddy's divine metaphysics is stated thus: "The divine metaphysics of Christian Science, like the method in mathematics, proves the rule by inversion. For example: There is no pain in Truth, and no truth in pain; no nerve in mind, and no mind in nerve; no matter in Mind, and no mind in matter; no matter in life, and no life in matter; no matter in good, and no good in matter." (p. 113.)

MATERIAL SCIENCE VERSUS CHRISTIAN SCIENCE

Mrs. Eddy used a material brain (albeit a poor one) to think this twaddle with; a material mouth to deny matter with, material vocal chords with which to sing

her own praises, material ink to write on material paper; used material type to print material books, to sell for material money, which she got in plenty, with which to build material temples of superstition. She had three or four material husbands.

The Christian Scientists live in material houses, warm themselves with material fires, ride in material cars, and stuff themselves with material foods, just as the rest of us do; and have the effrontery to stand up and deny all these material things exist. If they would disbelieve in the materiality of all material things for about three months the whole world would be rid of the insane crew.

If any knowledge of the universe is to be acquired and used, the reality of things must be admitted. Mrs. Eddy denies this reality. She says there is no matter; that our senses deceive us; that we should not accept our senses as a guide; that they give us no evidence of a real world. Now, our experience is evidence of the reality of things. We find it necessary and beneficial to recognize material phenomena.

A horse, running along a road where there is a tree, goes around the tree. In traveling that road in your automobile you will be wise to depend upon the evidence of your senses as to the obstruction of matter, or you will soon have evidence that the horse is wiser than you. If you are a metaphysician and can not depend upon your own senses, it will be well for you to trust to "horse-sense".

There is other evidence of the reality of matter. The photographer's camera, a material eye, registers a picture of the tree which corresponds with our own vision of it. A phonograph, a mechanical ear, regis-

ters the song of the mocking bird in the tree, and reproduces it so accurately that the notes correspond to the evidence of our own ears. Can we ignore such evidence? I suppose we can, but there is something the matter with us if we do. If we did not trust our eyes and ears, when crossing railroad tracks and traveling boulevards filled with automobiles, we should soon have evidence of moving matter sufficient to convince us, or our friend, at least, who would pay the undertakers. We can, and we must, trust our senses; they give us a sufficiently accurate representation of the reality of things. All progress has been made by this recognition.

Some of the metaphysicians hold that if you take away the perceiving subject, you take away the sensible world. That which is not perceived and does not perceive does not exist. According to this teaching, the sun, moon, and trees exist only when they are perceived, and are annihilated when we no longer perceive them.

Scientists teach that the existence of matter does not depend on our perceiving it; that a house is there after we shut our eyes, as well as it was when they were open. They hold that something persists even when we are not looking.

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If every American does his or her best for America and for Humanity we shall become, and remain, the Grandest of Nations – admired by all and feared by none, our strength being our Wisdom and kindness.

Knowledge knows no race, sex, boundary or nationality; what mankind knows has been gathered from every field plowed by the thoughts of man. There is no reason to envy a learned person or a scholarly institution, learning is available to all who seek it in earnest, and it is to be had cheaply enough for all.

To study and plow deeper the rut one is in does not lead to an elevation of intelligence, quite the contrary! To read widely, savor the thoughts, and blind beliefs, of others will make it impossible to return again to that narrowness that did dominate the view of the uninformed.

To prove a thing wrong that had been believed will elevate the mind more than a new fact learned.

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