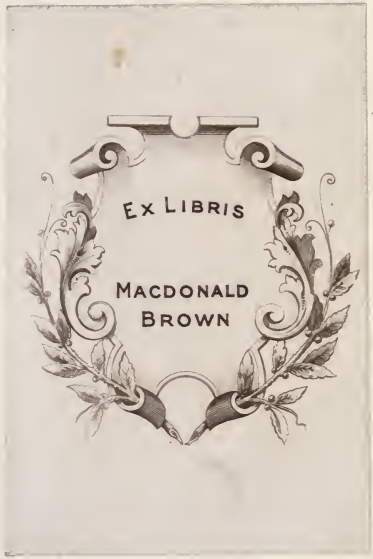
EVOLUTION
THE MASTER-KEY

C. W. SALEEBY



EVOLUTION

THE MASTER-KEY

A DISCUSSION OF THE PRINCIPLE OF EVOLUTION AS ILLUSTRATED IN ATOMS, STARS, ORGANIC SPECIES, MIND, SOCIETY AND MORALS

BY

C. W. SALEEBY, M.D. (EDIN.)

AUTHOR OF "THE CYCLE OF LIFE"

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TO
MY MOTHER

PREFACE

THE first proofs of the following pages reached me from across the Atlantic on the same day as a report of Professor George Darwin's Presidential Address to the British Association reached us from South Africa. In that fine address, entitled "Evolutionary Speculation," the illustrious son of an immortal father discussed the evolution of worlds and atoms, and suggested that the principle is of universal application. The leader-writer in the *Times*, commenting on the address, stated that only within the last few years has any one ventured to maintain the principle of universal evolution first held by Heraclitus. Neither the journalist nor the professor mentioned the name of Herbert Spencer. Thus I take it that an attempt to show how the *Synthetic Philosophy* stands in relation to the most advanced knowledge will not be entirely superfluous, even for Anglo-Saxon readers.

I know, of course, that hero-worship and reverence for our predecessors are nowadays accounted somewhat *bourgeois* and superfluous virtues, and I shall be sorry if any exhibition of them in the

following pages grates upon the reader. Nevertheless, I shall continue, whenever possible, to express my recognition of a debt which I never can repay.

C. W. S.

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St. John's Wood

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PART I

GENERAL

EVOLUTION
THE MASTER-KEY

I

INTRODUCTORY—THE MEANING OF EVOLUTION

THAT "nothing is constant but change" is no new saying; but it may be taken as expressing, in a somewhat uncritical fashion, the essential statement of the philosophy which will ever be distinctively associated with the nineteenth century and the name of Herbert Spencer—the philosophy of evolution. Apparent exceptions will occur to every one. Here is a man who believes that the British empire or the solar system or the supremacy of Shakespeare or Beethoven will last forever. Of a higher order is he who believes that, at any rate, certain intellectual propositions—something said by Hegel or Plato or Newton—are forever perdurable. One such declared that the synthetic philosophy would assuredly endure throughout all coming time, but its author rebuked him with the

query: "Shall my words be the only things in all the universe that do *not* evolve?"

The reality which is the quest of all philosophy, and the truth which expresses it—these alone are immutable: which is my reason for pronouncing uncritical the aphorism with which this chapter begins. But all else changes—even our purest and oldest forms of truth. Wordsworth has expressed this thought in noble lines:

> "Truth fails not; but her outward forms that bear
> The longest date do melt like frosty rime,
> That in the morning whitened hill and plain
> And is no more; drop like the tower sublime
> Of yesterday, which royally did wear
> His crown of weeds, but could not even sustain
> Some casual shout that broke the silent air,
> Or the unimaginable touch of Time."

We are to learn, then, that all things change, that species of animals are not immutable, nor species of atoms, nor aught else. This is a belief as old as human thinking, and some epochs in its history must be traced. Thereafter we shall be concerned with its latest and most complete expression in the evolutionary philosophy.

Evolution, the word which Spencer introduced[1] to express this truth, is more than a synonym for *ordered change*. It expresses the truth taught by Wordsworth, in the earlier part of the sonnet from

[1] Until his time, evolution and epigenesis were the names of two rival theories in embryology, both of which have now been rendered meaningless, largely by his work.

which I have quoted, that change is not a matter of chance. Typical of the many terms which we habitually employ without troubling to examine them, is this word chance; but science knows that seeming chance is but the expression of laws undiscerned by us, and that the laws of chance are as definite and rigid as those of gravitation or electric inertia. The philosophy of evolution teaches that all phenomena change in accordance with certain laws, and attempts to give these laws expression. It explicitly denies that there are any exceptions. The law applies to stars and souls, to atoms and oak-trees, to states and religions alike. With the exception of the law of the conservation of energy, upon which its author built it, this statement of absolutely universal evolution is surely the greatest of all generalizations.

When *First Principles* was written its author was faced with many apparent instances whereto evolution did not apply. Of these probably the most striking, in the light of twentieth-century knowledge, was the existence of the chemical "elements." In 1860 Spencer could do no more than notice the current belief in unalterable elementary atoms, and append a question-mark thereto. We shall see in a subsequent chapter that evolution has triumphed even in this stronghold of the creationists.

Let us, then, accept the meaning of the word evolution which was given it by its sponsor; and when we wish to refer to the operation of change

in the world of life let us use the term organic evolution; when to change in solar and stellar systems, let us speak of cosmic evolution; and when to atomic change, let us speak of *atomic evolution*. No one is entitled to use this invaluable word in any sense less than Spencer's, unless it be qualified with an adjective. Professor Weismann, for instance, has lately published in English a work entitled *The Evolution Theory*, by which he means his theory of organic evolution. Such a limitation of the term is entirely illegitimate. This I say not so much because I think it due to an author, in such a case as this, to respect his terminology, but because we cannot expect the idea of universal and orderly impermanence to become common property so long as the word that expresses this idea is persistently used in an arbitrarily restricted sense. Evolution does *not* mean that man is descended from a monkey. Such descent is no doubt interesting and not without grave implications; but it is of relatively small importance compared with the fact expressed in the true connotation of evolution[1]—that *all* things change, dust, dynasties, and dogmas alike.

In this present volume, then, I shall attempt to

[1] Examples of the limited and quite unwarranted fashion in which the term evolution is used may be found in the article of that name in the tenth edition of the *Encyclopædia Britannica;* and, in the same work, in the biography of Mr. Francis Galton, who is said to be the cousin of the "propounder of the doctrine of evolution." This is simply untrue nonsense, even if the word "organic" be taken as understood.

illustrate and discuss this process of change not only as described in the synthetic philosophy, but more especially as known in the light of the enormous mass of knowledge gained in the forty-four years since Spencer wrote the formula of evolution. Further and finally, we must attempt to discuss the highest implications of the philosophy of evolution, especially in its relation to such great ideas as are expressed in the words pantheism and panentheism.

My object is not to reduce the many and ponderous volumes of the synthetic philosophy to brief and popular form, for that task has already been admirably performed by Professor Hudson.[1] Rather do I write in the attempt to justify my conviction that the philosophy of universal and ordered change is far more easily demonstrable to-day than ever before; and I believe that these words would be true were they read a century hence. Since *First Principles* was written, new sciences—such as the comparative study of religions, comparative mythology, comparative ethics, comparative psychology, astro-physics, and physical chemistry—have come into being, each of which deals, in effect, with evolution in one or another sphere. My purpose, then, is to demonstrate the truth of the philosophy of evolution or change in the light of human knowledge in the first lustrum of the twentieth century.

[1] In his *Philosophy of Herbert Spencer.*

I have used the word change where many might have expected to meet the word development. Reasons for this preference will, I hope, abundantly appear hereafter. Development almost implies a *goal*, as does—more definitely—the term progress. This latter term, bequeathed to him by the older liberalism, was first employed by Spencer, as in the essay "Progress: Its Law and Cause." But he abandoned it and adopted the term evolution,[1] since the moral connotation of the former word rendered it inapplicable in the wide sense which he needed. The case is similar with the word development, which also suggests a goal. Now evolution, as we know it, though it may appear in our own time to be working towards "some far-off divine event," yet appears to have such only as a proximate and temporary goal. The great rhythm of the universe may show such a crest, but, as far as we can see, the wave must travel on, and the upward movement be followed by a downward in this endless cycle which the synthetic philosophy, like so many of its ancient Oriental predecessors, reveals to us. In a future section[2] we must discuss the prophecies of this philosophy.

Meanwhile we may observe that a doctrine of sempiternal change must be wholly unattractive to many minds. The fact of likeness to the past, which we call heredity in biology and the conservative principle in politics, makes appeal to nearly

[1] In 1857; see *Autobiography*, I., 503.
[2] See section VII., "Dissolution."

all of us, however "liberal" or progressive we may fancy ourselves to be. We cannot face, without some measure of horror, the idea that, for instance, the church to which we belong is, in the last resort, only somewhat less ephemeral than the insect of a day. There is something appalling in the belief that "from low to high doth dissolution climb," sparing nothing whatever. But if the evolutionary or any other philosophy be true, it must be accepted, whether we happen to like it or not; and when finally our minds are subdued to the following of Truth "wherever she leads"—as Huxley said—we may be able to say of her as did Wordsworth of duty:

> "Nor know we anything so fair
> As is the smile upon thy face."

But ere we close an initial chapter which may serve to instil an approximately adequate conception of the breadth and scope of the term evolution, it is necessary to make some reference to the antiquity[1] of the idea that all things change.

[1] The history of any subject is a permanent part of it and should always be discussed in treating it. But there is good reason why I should make only brief and casual allusions in the present volume to the history of evolutionary ideas. My purpose is to show the validity of evolution in the light of the most recent knowledge. To insert a history of these ideas would therefore not be strictly relevant to the object of this volume. But the subject is interesting and important. Fortunately it has already been dealt with by distinguished students in works readily accessible. I need only to refer to Dr.

A very scant acquaintance with philosophic works, and especially with critical works on philosophy, will convince the reader that the duty of endeavoring to recognize the elements of truth in the teachings of past writers is often too enthusiastically performed. This I say not from any lack of homage to the immortal dead; but simply because, in our respect for them, and given the natural flexibilities of language, we too often attribute to past writers views which would probably have caused them the greatest astonishment or even discomfort. This is assuredly better than the foolish and impudent practice of assuming that these ancient thinkers are of no use to us to-day, and were incapable, in their circumstances, of discovering anything that we can regard as true. But it is necessary to exercise caution when we attempt to detect anticipations of modern ideas in old writers, lest we find ourselves attributing to them views which could not possibly have survived in the mental environment of their time.

The first evolutionists, we may nevertheless say, were probably two illustrious men of genius whom students consider to have been contemporaries, though there is no reason to suppose that either was aware of the other's existence. These were

J. T. Merz's *History of European Thought in the Nineteenth Century* (especially to the chapter entitled "On the Genetic View of Nature"), and to the articles "Evolution," by Huxley and Professor James Sully, in the ninth edition of the *Encyclopædia Britannica.*

Heraclitus, of Ephesus, and Gautama the Buddha. As I have devoted an essay in a previous volume to their claims in this connection, I will only briefly deal with them here.

Neither of these thinkers, it need hardly be said, has left us a systematic philosophy of evolution. The founder of Buddhism, indeed, like the founder of Christianity, and Socrates, the founder of moral philosophy, has left us no writings whatever, and we have but scattered fragments of the works of Heraclitus. Yet it seems plain that each of these thinkers had a more or less complete grasp of the doctrine of ordered change as exemplified in such, relatively few, facts as were known in that day. I name them here because their distance from us lends something like enchantment to our view of them; but in calling them the first evolutionists I do not mean to suggest that the whole of the synthetic philosophy is implicit in any doctrines which are attributed to them.

In summing up this chapter, then, let us have it clearly set down that the popular use of the term evolution, to signify the notion that man is descended from a monkey, is little less than an abuse of the term. Similarly indefensible is the use of this term to signify *organic evolution*—the theory that animals and plants, as seen in existing species, are evolved from other forms. Still more indefensible is the ridiculous identification of evolution with *natural selection*—the unfortunate term by which Darwin sought to express a certain *means*

of organic evolution. The lasting merit of Darwin's masterpiece is this: that he demonstrated the operation of a law so simple and intelligible that it brought into lasting prominence the topic of organic evolution. We may well doubt whether natural selection has the importance which Darwin attached to it; but even though biologists were not agreed that this process has, at any rate, some measure of operation, the theory of organic and, still more, the theory of cosmic evolution would be quite unaffected. Recent apologists of orthodoxy are making much of certain omissions lately discovered—by them—in Darwin's work. We are told, in triumph, that Darwin has, so to speak, been found out. He took for granted the fact of variation, without explaining it. He took for granted the presence of life upon the earth, without attempting to explain that. All of which is quite true. Darwin, indeed, merely did that which he set out to do.

It is here claimed for evolution—all such ridiculous limitations of its meaning being repudiated—that it is the key to the problems of all phenomena: necessary alike to the chemist, the politician, and the theologian. Nowadays we "think in evolution." The word is often turned to mean uses, as when we hear of the "evolution of the picture-postcard"; but even in such a connection the principles of adaptation and integration are applicable. For the old static view of things, which regarded them as at rest, evolution substitutes the dynamic

view, which regards them as in motion. During the past generation this principle has been immeasurably fruitful. The reader who remembers Spencer's definition of science as "organized knowledge," and who sees in politics and theology —in so far as they are true politics and theology— sciences as worthy of the name as are astronomy and biology, will read their full significance into these recent words[1] of Sir William Huggins, the illustrious student who has taught us that the stars are made of the same stuff as this paper or the tissue of the reader's eye:

"On one central eminence, dominating alike the past, the present, and the future, Science has for some years firmly intrenched herself—the position that through all the ages the Cosmos has advanced, and is still advancing, by a process of orderly evolution."

In establishing the term evolution as an indefeasible part of the intellectual heritage of all coming time, Herbert Spencer accomplished a lesser and a greater thing. The lesser thing was the statement, in terms which we have yet to consider, of the laws which are observed in all change. In material and mental phenomena alike change is not a "law of higgledy-piggledy," as the once famous geologist Sedgwick pained Darwin by describing the law of natural selection, but proceeds on lines determined by the very nature of

[1] Spoken at a dinner of the Royal Society.

things. These lines Spencer discovered and named. Furthermore, he showed why these lines and none other are followed. Of course, he had to build upon something, and most fortunate it was that, before he began his work, there had already been rendered probable the great generalization, one of whose founders—Lord Kelvin—is still alive. The laws by which phenomena change Spencer founded upon a rock, indeed—the doctrine of the conservation of energy—and it is of not a little interest that the element radium, which was for a little while supposed to invalidate this law, has turned out to be a perfect demonstration of evolution in a realm where none but the thorough-going Spencerian had thought to find it.

But this demonstration of the laws and causes of change was a much less important matter than the demonstration implicit in it — of the fact that change is universal. For the old *static* conception of the Cosmos, with its hopeless and baseless dogmas, such as the assertion that human nature is the same in all ages, Spencer, more than all his contemporaries and predecessors put together, has given us the *dynamic* view, which has revealed a new heaven and a new earth. Everywhere the static view, whether of suns, societies, or any other existence whatever, has had to yield to the dynamic view, by which "change, though not decay, in all around we see"—to modify the fine old hymn. Whether or not Spencer knew more of Heraclitus than he would read in his friend Lewes's

Biographical History of Philosophy, I cannot say, but we may recognize in his work the great vindication, in a blaze of light, of that ancient Greek whom his contemporaries, for his obscurity, surnamed "the dark."

Were this assertion of ceaseless and universal change the last word of the evolutionary philosophy, we might well subscribe to that saying in which is crystallized the objection of all ages to the advance of knowledge: "Where ignorance is bliss, 'tis folly to be wise." But it is not so. We have yet to examine the profound significance of that term phenomena. The panentheism — the doctrine of all-in-God — which Spencer based upon the verities of assured knowledge, thus following Athanasius and Spinoza, if not, indeed, the founder of the former's church and the greatest of the latter's race, declares to us, with a voice in which the centuries unite, that there is a changeless unity immanent in this our impermanence.

II

THE PHILOSOPHIC TEMPER

We must define our terms; and when we speak of the evolutionary system as a philosophy, we must be sure that our use of the word is not open to repudiation by the academic or the stoic. But ere we define the meaning which the word bears in the present volume, we may, perhaps illogically, consider what I shall call the philosophic temper; and thereafter that form or corollary of it which is called toleration.

It is, of course, a commonplace that the object of philosophy and science is truth; but it needs a moment's consideration fully to weigh this assertion, not, indeed, because it expresses the cardinal distinction between the professional philosopher and scientist and other people, but because we have here a criterion which makes quite another division among men, cutting almost indifferently through the professional student and non-student alike. And the significance of a real understanding of the philosophic temper is such as infinitely to transcend that of the vulgar estimate. So that on this criterion the unlettered

peasant may take rank immeasurably above some scientists so-called whose names have once filled all men's ears.

It was my good-fortune to hear the memorable speech delivered by Mr. John Morley after a recent graduation ceremonial of the University of Edinburgh. It consisted of a pregnant warning against the fetters of formalism, academic or other. The danger of such fetters, in Mr. Morley's opinion, lies in their power of turning men from the love of truth, a love so rare that a friend of his, acquainted with wellnigh all the great of his time, could count only four of these among the chosen. Not merely scientific truth, in the narrow sense, is here spoken of—need I say? The speaker went on to explain and justify this amazing citation, but I believe that his meaning had already been expressed in language better than his. There is in the true man of science, said Tyndall, a wish stronger than the wish to have his beliefs *upheld*—the wish to have them *true*. For "man of science" substitute "lover of truth," and you have the philosophic temper defined. It is for all to gain, but how few there be that find it. Yet this alone, as Mr. Morley says, can confer "liberty of mind." In the service of truth alone is perfect freedom.

Surely there can be no misunderstanding here. It is, indeed, natural and well that, having what you believe to be a true belief, you should wish it—should wish the truth—upheld. Fortunately we are all proselytizers at heart, as Carlyle said.

But the desire to convince other people—though only too often a mere expression of egoism—is perfectly compatible with the philosophic temper —the desire to have your beliefs true, even at the cost of every belief you hold.

This is no lightly won possession. The road thereto is a hard one, nor is there any inviolable lock under which to guard it when gained. Constant searching of heart is necessary lest he who thinks this temper his may find it fled.

For all of us, without exception, are men pledged and forsworn. We stand committed to beliefs of many kinds — a belief in gravitation or transubstantiation or free trade or natural selection or the existence of a personal Deity. And our interest in the upholding of such beliefs may be of many kinds. Our peace of mind, all that makes life worth living, may be at stake. Thus the late Professor W. K. Clifford, whom to know even through his writings alone is to revere and love, has told us of his agony when, losing his theistic faith, he realized that the "Great Companion was dead." Or, on a lower plane, we may recognize the common failure of the man who has changed sides, whether in religion or anything else, to display the philosophic temper. We are all familiar with the bitterness of the "turncoat" against those who think as he once thought; and we deplore it, even though we may be of the turncoat's new party. It is almost asking more of humanity than it can give to expect the man who has changed sides—perhaps at

great cost, perhaps because he would rather have his beliefs true than upheld — to maintain the philosophic temper which may have caused his change, and to be prepared, if necessary, to change again. For inconsistency is the bugbear of all but the greatest minds, as Emerson has taught us.

And if the philosophic temper is rare enough in the priest or clergyman who has lost his faith, it is equally rare in the scientist who, like these, is pledged to serve truth. You are committed to an hypothesis. Perhaps you are its author, and it goes by your name, or you have written and worked in its defence. Do you welcome the young epoch-maker, who was neither born nor thought of when you were making your name? But rarely, under such familiar circumstances, do we see the philosophic temper. The facts that do not fit your hypothesis must be discredited or trimmed thereto. You would rather have your beliefs upheld than have them true.

When a Darwin or a Huxley or a Spencer dies, it is commonly and properly asserted of him that his leading characteristic was a love of truth. But if you listen to those who, for one reason or another, are in opposition to such men, you will hear that to claim a love of truth as a man's leading characteristic is to insist on the obvious, all healthy-minded people being endowed, as a matter of course, with some measure of this high passion. These critics are prepared to maintain that in all decent persons, themselves included, there is the

love of truth; by which is meant a dominating affection, so that to have learned the real facts in the course of an argument affords far more satisfaction than to have proved your opponent wrong, and so that it causes a grief of soul to see the thing that is not, offered in the guise of the thing that is, even to a school-boy at the antipodes or a savage in Fiji.

It can be shown, I think, that this belief in the wide-spread prevalence of a love of truth is by no means confined to the protagonists on one side in the conflict between science and dogmatic theology. Let me quote, for instance, from a French educationist, M. Laisant, who is referring to the teaching of religion and ethics in schools:

"L'éducateur habile, en stimulant dans l'esprit de son élève le culte de la vérité, en tirant parti tous les exemples, de toutes les observations, de l'expérience quotidienne, arrivera sans peine a façonner graduellement cette conscience d'enfant pour en faire une conscience humaine."

Now it appears to me that this sentence implicitly contains a very questionable assumption. The author appears to regard the philosophic temper as a natural appanage of a school-master. His pupils are constantly to see this passion exalted above all others, and are thereby to obtain a firm foundation in ethics. I believe, on the other hand, that it would be a terrible disaster if the formal and explicit teaching of morality were to cease from within our schools. I do not for a moment

believe that the love of truth, displayed either overtly or covertly by the teacher, could ever be a substitute for this, and I gravely question the assumption that such a love of truth may be taken for granted as a necessary ingredient of the teacher's temper.

On the contrary, I humbly subscribe to the opinion of Spencer that the love of truth, or the philosophic temper, is one of the rarest of virtues. Who does not know the struggle within himself when, as in controversy, the love of truth is in conflict with self-esteem, with the love of *appearing* to be on the side of truth? Is not the difficulty with which men acknowledge themselves to be wrong notorious, yet is not such acknowledgment just exactly a homage to truth? Yet, if we loved truth as we think we do, the mere demonstration of our error would be unable to cause any emotion of chagrin, for the emotion of joy on having found truth, our heart's desire, would utterly possess us.

And, finally, I think it may easily be shown from our present educational system that the great majority of us prefer convenience and ease to truth. Many recent writers have urged that the time has now come for the facts of organic evolution to be taught in schools. It seems a reasonable proposition, does it not? Organic evolution is infinitely more certain—since it depends upon evidence of a totally different order—than is the truth of any alleged historical fact. It has been

part of known truth any time these forty years; it had been proved when most of the parents of the present generation of school-children were themselves at school. Yet so far are men from loving truth, so far are they from even mere expediency in this matter, that there is no general desire among parents that their children should be taught this great and significant truth.

One other proof of my contention that the love of truth is not common property: It is the almost incomprehensible fact that there exist to-day a whole host of parents who do not believe in the historical accuracy of Adam and Eve, and who repudiate the doctrine of eternal torment, the most immeasurably horrible and inhuman of all human conceptions, and yet consciously permit their children to be taught and to believe in the literal truth of that Babylonian legend and of a dogma which conceives of Deity as the devil himself.

It is thus only too easily proved that the love of truth, the hatred of falsehood, and the philosophic temper which ignores all personal interests are among the rarest of rare possessions.

In sooth, the philosophic temper is hardly more than an ideal. It is entirely alien to the natural man to love unpalatable truths; and every true belief which runs counter to our beliefs must be unpalatable unless the appetite for truth overwhelm all other desires. Only too few, in the history of thought, are the instances of those who

were veritably possessed by the philosophic temper, which is, indeed, the mark of a supreme moral excellence. For even if a man be purged of all selfish desires, yet his very burning for the welfare of others may utterly consume the philosophic temper. To love truth as it should be loved you must be possessed of a faith almost infinitely rare—the faith that, in the long run, ignorance can never be bliss, the faith of Socrates in knowledge as virtue. Whether any man ever acted consistently on the belief that truth is always best, one may, indeed, take leave to doubt.

The writer is not so blind as to fancy that he is possessed of the philosophic temper — that he would always rather have his beliefs true than have them upheld. But it is something to have an ideal. "A man's reach should exceed his grasp"—whether there be a heaven or not.

I have called toleration a corollary of the philosophic temper; and some attention may properly be paid it here, partly because the evolutionary application of biology to sociology has afforded great support to the idea of toleration, and also because the question is of primal importance in relation to Spencer's work, since a thinker so original and heterodox could not have worked without that toleration which he received—grudgingly and perforce from the academic philosophers, generously from many representative theologians, and as a matter of course from unpledged students everywhere.

One is no less than astounded to discover the rude and thoughtless idea of toleration generally current. Keenly attempting to defend, the other day, Buckle's dictum that religious persecution is the greatest evil known to mankind, transcending war itself, one was met by the assertion that the age of religious persecution was at least the age of sincerity and enthusiasm, while toleration implies lack of real faith in anything at all. "So, then, because thou art lukewarm, and neither cold nor hot, I will spue thee out of my mouth." For "lukewarm" some would substitute "tolerant" as a synonym. Only recently, when I waxed wroth over a false and spiteful assertion about a great man, and rebutted it with some force, I was accused, to my utter astonishment, of intolerance—as if to let a lie go unbranded were toleration. Now if this were so—if to be tolerant is to be a Laodicean—who will deny that toleration is an evil?

The saying about a God who "hates the sin but loves the sinner" precisely expresses the essence of toleration. There is nothing Laodicean about the divine attitude thus conceived. The hate is implacable, the love unquenchable. So with toleration, as it is understood by those who have thought about it. The tolerant man may be as keen about what he conceives to be truth as the Grand Inquisitor, and as hateful of error; but he distinguishes between the sin and the sinner. He may believe it to be his duty to speak in terse and scornful language of the thought he holds to be

false, but he will gladly spend a night beside the bed of the thinker. This is toleration, and whoso knows the power of association of ideas will recognize that it is much easier to define than to display. "The lying mouth shall be stopped," and we are very ready to stop it—with right good will. But, easy or difficult to realize, this is the true meaning of tolerance; which may coexist—at least in theory—with a burning faith and a consuming zeal.

Now if we accept the argument that intolerance proceeds not from cruelty but from intellectual incapacity to distinguish between closely associated ideas—the sin and the sinner—we may conclude that toleration is an intellectual rather than a moral product. Calvin, the Inquisitors, the burners of Bruno, were doubtless kind to their relations. They were not emotionally deficient, but intellectually. They were fools rather than knaves. Now in Herbert Spencer the intellect was supreme, though the emotional nature was highly developed under the cold and ungenial surface. As the Reverend Professor Iverach observes, in his generous and scholarly study, Spencer certainly believed that the unknowable revealed certain truths through him. To use the noble old phrase, he knew himself to be a "Prophet of the Most High." And he had the prophet's persistence and courage and directness and conviction. But fortunately he had a somewhat rare possession of the prophet—a disciplined intellect. And hence

his toleration. A sworn servant of truth, he did more than wish well to those he believed to be wrong—he sought and found the kernel of truth in the husk of error.

In a future chapter we shall see instances of his toleration of religious systems all but the forgotten core of which he believed to be false. But let us take an instance from politics, in which he was at bottom a Liberal of the old school. We cannot understand the intellectual cause of his toleration here without recalling his now famous phrase "the social organism." His analogy between society and an organism made him a tolerator though a zealot in politics. In the realm of biology we see two opposing factors — heredity and variation. Now no biologist would write himself down an hereditarian or a variationist, as we write ourselves down Conservatives or Liberals. Spencer has taught us that, while without variation there can be no advance, without heredity there can be no *retaining the positions won*. Rigid heredity means stagnation; but too rapid variation means instability. Safety and progress are attained only by "the interplay of opposed forces." Of course you see the rest at once. Heredity in the organism is the exact analogue of the conservative forces in society; variation, the exact analogue of the liberal forces. Acceptance of authority, as typically seen in woman, is heredity; and heresy, as typically seen in the more variable creature man, is intellectual variation. And as no biologist

swears by heredity or variation as *alone* beneficent, so no philosophic student, now that Spencer has taught us, can declare that the "Conservatives are wrong" or the "Liberals are wrong." Both are necessary; each alone would be maleficent. The force of heredity or conservatism gets us no further; the force of variation or liberalism is almost as likely to lose as to win—*In medio tutissimus ibis.* "Theological conservatism, like political conservatism, has thus an all-important function. It prevents the constant advance from being too rapid" for stability.

In another work Spencer has dealt exhaustively and finally with the various forms of bias—educational, class, theological, anti-theological, political, patriotic, and anti-patriotic. To be freed from all these is to have completed the preliminary stages for becoming a philosopher; the freedom is to be purchased only by intellectual effort; and thus may be attained that rare combination of irresistible zeal with true toleration which Spencer has described as the union of "philanthropic energy with philosophic calm."

III

WHAT IS MEANT BY PHILOSOPHY?

PHILOSOPHY, or the love of wisdom, is surely one of the loftiest words in all language. But, like so many more, it has lost its original meaning, which was an expression of the humility of a school of thinkers who proposed to repudiate the arrogant claims of those who impudently called themselves sophists. The term scientist or savant is pretentious enough, but to call oneself wise embodied a greater claim than to call oneself knowing; though wisdom and knowledge are ultimately identical, as the etymology of the word wise teaches us.

Now it might reasonably be maintained that the term philosophy should be reserved for the highest conceivable kind of knowledge — knowledge of the greatest conceivable object. And none will dispute that there is an object knowledge of which would be the highest attainable, would transcend and include all other knowledge whatever; and that object is Reality. Some may object that in its highest sense philosophic should be identical with religious knowledge; but, indeed, it will appear that, on the evolutionary conception

of religion, a knowledge of Reality would be the highest kind of religious knowledge, and would, of course, include a knowledge of morality, which many confound with religion.

Yet here we shall not use the word philosophy to signify knowledge of Reality. The first reason to be advanced is, indeed, not final. It is that the greatest thinkers in all ages have sought to attain this knowledge and have failed, as we may infer from their failure to attain any measure of agreement, and from the fact that no one of them has ever had any difficulty in exposing the fallacies and unwarrantable assumptions of all his predecessors. But, as I have said, this reason is not final; for it might be maintained that though the proper quest of philosophy has hitherto failed, yet in time to come it may succeed, and therefore the word philosophy must not be debased to any lower use. Reality may be unknown, but is not unknowable.

Now it is part of the evolutionary philosophy to demonstrate that Reality, or being, the thing that really is, can never be known by us; or, in other words, to assert that the quest of philosophy, in its highest sense, is necessarily foredoomed to failure. It is not merely that the quest has hitherto been fruitless, but that, the conditions of human knowledge being what they are, it must always fail. In a later chapter we must discuss the evidence for this belief. Meanwhile let us take it that Reality is unknowable.

If this be admitted, let us coin other and more definite terms to express the quest for Reality, and let free the ancient and beautiful word philosophy for some study that is possible. Now there are already two words which express the study of Reality. One of them, metaphysics, has this connotation only by accident. It was coined by the followers of Aristotle to indicate the subject which their master treated "after physics"—in the treatises composed after that on physics. Those who regard it as of importance to use words in legitimate fashion will protest against the vulgar misapplications of this word, as in Haeckel's use of it to indicate anything he does not want to understand. But, indeed, it has no merits in itself, and its historical interest is not sufficient to justify its continued use, for Aristotle was not the first or the greatest of "metaphysicians."

The proper term to indicate the study of Reality is surely *ontology*—or the *science of being* or reality. It is of much more recent origin, but, unlike so many terms, it was coined because it was wanted. Ontology, then, may be left to the academic philosophers or metaphysicians. Students of science are well aware how it has injured their cause in the past; they believe its prosecution to be impossible and more than futile, and they are wise to leave it alone. It is of some interest, however, to observe that the materialists, of whom Professor Haeckel, of Jena, is the chief living representative, believe themselves to be literally on-

tologists, since they regard matter and energy as the ultimate realities, and fancy that they *know* them. Materialism, however, is a childish absurdity which has been refuted by the most eminent men of science as well as by all the leading thinkers of all schools in all ages. It has not revealed Reality, and is therefore not to be regarded as a true ontology.

If, then, we may use philosophy to indicate something less than the highest conceivable order of knowledge, can it still be maintained that the term indicates anything essentially different from other orders of knowledge? Obviously it cannot; for knowledge must be either of reality or of appearance. Yet there is no need, therefore, to suppose that all knowledge is philosophical, though philosophy cannot possibly ignore or do despite to any fact, however humble. But though all will admit this, many will suggest, and reasonably, that philosophy, if we deny the possibility of ontology, can no longer be distinguished from science. Each is of the same order, employs the same methods, and must arrive at results essentially the same. And certainly the old distinction between science and philosophy can no longer be maintained. It belongs to the day when science meant what is absurdly called natural science, and when the human mind and morality were not regarded as subject-matter for science.

Nevertheless, a high use can still be found for this fine word. There are many branches of

science still conveniently recognized, though the barriers between them are merely expressions of our ignorance, are purely artificial, and are rapidly being broken down. Each branch of science attempts to co-ordinate the facts that fall within its purview, and thus to unify its knowledge. But when all the barriers are broken down, when each science is shown to depend on all the rest, when the unification of knowledge is complete, then we have a philosophy—which has no departments, since it includes all the facts in one comprehensive view. It is in this sense that we speak of the synthetic philosophy, since philosophy, to be such, is essentially a synthesis, a *placing together* of all knowledge—alike of atoms, of societies, of mind, and of the products of mind. It remains to be shown, in ensuing chapters, that the conception of evolution has, indeed, accomplished this unification of all knowledge, absorbing facts discussed after its formulation, as readily as those from which it was originally inferred, and that it is therefore rightly to be called a philosophy.

The reader will observe that there is implicit in this definition a magnificent assumption. When we speak of the unification of knowledge as possible, we assume that that to which all knowledge refers is a unity; otherwise no unification would be possible. The modern conception of philosophy, therefore, contains within it what is surely the greatest of all conceptions — that, all phenomena being interdependent, the reality of which they

are the phenomena or appearances, is not many but one.

It is not expedient to postpone to the final chapters of this book the necessary consideration of the term *phenomena*, since it must frequently be used in the following pages, and since its true meaning directly bears on the question, What is meant by philosophy? And in order to understand it, we must inquire into the nature of the knowing process, for the term depends for its utility and application upon a certain conclusion as to the nature of knowledge.

It would seem self-evident that, before drawing any conclusions from observation and reflection, it is necessary for the philosopher, if not for the man of science, to make most stringent inquiry into the nature and conditions and validity of what he desires to regard as knowledge. Yet it was not until the coming of a great thinker who died scarcely more than a century ago that the fundamental importance of this inquiry was fully recognized. This is by no means to say that Kant was not preceded by many writers, such as Locke, who devoted much thought to the nature of the knowing process; but even to-day there is probably only a very insignificant minority of people prepared to make positive assertions about something—be it only the weather or the fiscal question—that have ever spent a moment in asking in what senses and in what measure any

one can be said to know anything. And the term epistemology, which connotes the study of the nature of knowledge, is not, as in logic it should be, the most familiar and the first to be learned of all the many words with the same termination.

In here attempting, not to recount in brief the doctrines taught by the immortal author of the critical philosophy, but rather to indicate the beliefs of psychology a century after the close of his long and meritorious life, we must begin by admitting that our initial problem is not merely unsolved, but insoluble. In front of me, as I believe, is a table. Few readers outside of Oxford will quarrel with me if I assume, as I do, that this table has—or, at any rate, indicates—a real existence which does not depend for its being upon my perception of it. If, then, I may assume that the external world, as represented by this table, exists by virtue of itself and independently of my mind or any other, we have first to admit that no one has yet begun to offer us the scantiest explanation of the manner in which we can have any knowledge at all of the existence of the table. Such explanations as have been offered are no more than admirably contrived verbal exercises. The prime fact that the ego can, in some fashion, become aware of the non-ego must simply be accepted. But it is of the first importance to inquire in precisely what fashion and with precisely what limitations, if any, this knowledge is attained.

Now all men have at one time in their mental development tacitly accepted the theory which we may call unqualified realism; and, in point of fact, it is only the very few who do not accept it without any question from first to last. According to this theory, which any plebiscite in any age or place would approve, things are what they seem—a table is simply a table. There can be no doubt about it. Behold it—a hard, flat, wooden object, supported upon four legs. Room for refinement or argument there is none: no sane man—say realism and its countless adherents—can possibly dispute the unequivocal evidence of his senses. There can be no use in discussing the nature and conditions of human knowledge in such a connection as this. The man who would dispute that a table is precisely what it appears to be can never have seen a table—or must be moon-struck and outside serious consideration, save as a pathological product.

If this is so, then science, which deals with tables and stars and plants and rocks and other material objects, is not subject to any necessary limitations. The eye may be short-sighted, but the telescope will remedy that. The sense of touch may be coarse, but the scales will do its weighing for it. We have merely to invent suitable instruments for reinforcing and supplementing our senses—and all may be known if we persevere. As for Reality—well, the capital letter is misplaced: what could more palpably be a solid chunk of Reality than—a table?

Crude realism, however, though it is, always has been, and doubtless will long continue to be, the most widely accepted of all beliefs whatever—answering more closely than any other belief ever did to the famous test of being accepted *semper, et ubique, et ab omnibus*—always, everywhere, and by all—has nevertheless been found out. It is more certainly untenable, the universal plebiscite notwithstanding, than the crassest superstition of the most ignorant age.

The argument is not that no two people see a table in exactly the same way; for that does not exclude the possibility that at least one person may see it—or, at any rate, might be conceived to see it—*in the right way:* steadily and *whole*, as Matthew Arnold would say. The argument against what Spencer calls crude realism is infinitely more cogent than that. For when, begging the insoluble question as to how it is possible to know at all, we come to ask ourselves what, in point of fact, we actually do know, there can be no doubt about the answer. In feeling and seeing this table, I *know* merely the occurrence of changes in myself. It is not merely that a different nervous constitution might give me a very different idea of the table, though it is obvious that the eye sees only what it brings with it the power of seeing, and that eyes vary. The point is that, no matter what my sensory arrangement be, no matter whether I have a hundred senses for every one I possess now, yet all I *know* is change in my con-

sciousness. As I cannot escape beyond the limits of my consciousness, I can never hope to know more. In order to know the table as it really is, I—or my consciousness—would have to become identified with it, which can never be.

Now, though this doctrine is not exactly of universal acceptation, yet we all employ a couple of terms in which it is implicit. The words phenomenon and phenomenal are perhaps the most consistently abused in language, as they are certainly among the most valuable and significant when rightly understood. Of course these words no more mean marvel and marvellous than they mean green cheese or hypochondriacal. A phenomenon is an *appearance*, such as this table or the Pleiades; and science deals with phenomena and their relations. When John Locke proved that we have no innate ideas, he proved that our knowledge can only be of phenomena. But we crave to know Reality: phenomenal knowledge does not satisfy us—we should be poor creatures if it did. And so we have metaphysics, or, as it is now more properly called, *ontology*—the science of being, the study not of appearances, but of the Reality of which they are the appearances. But this high emprise ordinary folk may leave until such time as, haply, two ontologists understand and agree with each other.

IV

THE FOUNDATION OF EVOLUTION

THE object of the philosopher is to survey "all time and all existence"; and, having done so, to enunciate such propositions as shall unify and clarify what was formerly multifarious and obscure. To this end he must first provide himself with certain data or assumptions such as the familiar axioms which served for the foundation of the mathematical system of Euclid. In time past every philosopher has taken more or less cognizance of the definite or scientific knowledge of his time. Similarly each new kind of religion — which is a specialized form of philosophy — has largely depended upon the state of scientific knowledge at the time of its inception. The peculiar difficulty of the theologian—whether Christian, Mohammedan, or whatever he be—is thus to reconcile the dogmas based upon the scientific knowledge or the Cosmology of any given century with the extensions and modifications to which time inevitably subjects it.

If the facts of science are to be accepted as facts, the philosopher is fortunate who has them,

numerous and incontrovertible, at his disposal. In this respect Spencer was greatly indebted to the labors of the first half of the nineteenth century. The chief intellectual achievement of that period was the establishment of the doctrine of the conservation of energy; and upon this doctrine Spencer founded his philosophy.

His predecessors were not always so wise. Philosophies have ere now been founded on the shifting sand of *a priori* ideas, reached in a "flash" of misbegotten inspiration; they have been reared in defence of religious dogma, in support of moral laws supposed to be in danger of neglect or denial, and even upon the sheer egoism of the philosopher. Many bold prophets have arisen who professed unmitigated contempt for the science of their time, as did the undoubtedly great Hegel, who not merely ignored the law of gravitation in his speculations, but spent much satire and time in an attempt to overthrow, or at least to scarify, the adamantine work of Newton. Spencer, however, had a unique opportunity, and took it at the flood.

The use of the word energy we owe to Dr. Thomas Young, the decipherer of hieroglyphics and founder of the undulatory theory of light. The doctrine of the conservation of energy was preceded by that which declares that matter is eternal. Spencer accepted this dogma of the conservation of matter, though, as we shall see, he objected to the use of the term conservation as implying a conserver. The one chapter in *First Principles* that has not

withstood the test of the forty most vigorous years in the intellectual life of mankind is that entitled "The Indestructibility of Matter." But it is impossible merely to assert that the conservation of matter is no longer accredited by modern physicists, without further discussion of this "law," which has held sway in men's minds for a century—a reign coextensive, more or less, with that of the indivisible atoms of Dalton. The assertion of the conservation of matter—which we really owe to the great Lavoisier, aristocrat and chemist, not spared by the unrighteous excesses of a most righteous revolution—and the assertion of the integrity of the atom are obviously complementary or identical. It is radium the revealer that has caused the supersession of both.

Of course, the law of the conservation of matter still holds for the ordinary purposes of the chemist. If you weigh and then burn a candle in suitable conditions, you can show that nothing was lost in the process—the resultant gases contain all that was in the candle. But the chief discovery of the twentieth century hitherto is a confirmation of the central dogma of *First Principles* as applying even to the "foundation-stones of the material universe." And if, as is already abundantly proved, matter itself is but a transition stage in the evolution of something else, we can plainly no longer speak of its conservation.

Premising, then, that physicists are now coming to believe that radio-activity is a property of all

matter, let us look at it as shown in radium. Let us also premise that the disintegration or evolution theory of the radium atom has lately been accepted by its one outstanding opponent, Lord Kelvin, who may probably be regarded as the greatest physicist of any age. With his conversion to it the theory now to be presented in outline may be said to be established.

An atom of radium—and the atoms of all the other so-called elements differ only in detail—consists of a large number (probably hundreds of thousands) of incredibly minute bodies known as electrons. These are in rapid motion, describing orbits, as is believed, around some central point. So small are the electrons that the distances between them are relatively as great as those between the planets of the solar system. In size they are to the atom "as a full stop to a cathedral." But even when we substitute for the simple conception of an atom entertained by Democritus or Newton or Dalton—that of a minute, hard speck—such a conception as modern physics entertains, we do not necessarily impugn its *stability*. Such a complex atom, microcosm though it be, might conceivably be conserved, permanent, indestructible. But far more remarkable than our recent discovery of the complexity of the atom is the discovery that it is only a stage in all-embracing evolution. All the phenomena of radio-activity—the production of heat and light and electrical disturbances—are due to the fact that these atoms of

matter are *not* conserved, but are impermanent not merely from second to second, but from one-millionth of a second to another. By the action of causes yet dimly guessed these electrons are constantly flying out from the atomic system, and pass, at speeds comparable with that of light, outward to an unknown fate.

Here, as the acute reader will observe, I have an excellent opportunity of begging the question. Having known that the atom is not conserved, I might rest content and try to persuade him that I have disposed of the conservation of matter. But he will say: "Not so fast, my friend. I grant that your so-called atoms are falsely so called, but what if I propose to transfer this term to the electrons of which the atoms (literally, the uncut) are now known to be composed? Plain it is that if the electrons be permanent, then the law of conservation of matter stands. Recent discoveries have only given it more accurate expression. It will not do to juggle with the term 'atom,' as if it were not your own fault that it has hitherto been misapplied."

In attempting to meet this most legitimate criticism I must first ask, What is an electron? Is *it* a hard, impenetrable, indestructible speck of stuff or matter? At first sight it might appear to be such, for it is certainly possessed of *mass* and *inertia*, and our minds will not permit us to imagine that it does not occupy space. But recent study has shown that mass (which may con-

veniently be here regarded as equivalent to weight) and inertia are properties of electricity. All matter, in short, is an electrical phenomenon.

Now we are in deep waters, and I am not sure that contemporary physics, utterly remaking as it is, can quite keep its head above them. But if we admit that the electron is the unit of matter, and that it is electrical, and then find evidence to show that it is a "particle" of "negative electricity," we can at any rate convince ourselves, even while admitting our sore need of a brand-new vocabulary, that the electron is really no more than a transient expression of a *relation*. When a negative and a positive charge of electricity—I quite admit that we hardly know what we are talking about—have met and "satisfied their affinity" for each other, they each cease to be. There is no annihilation of the something of which they are transient expressions, but there is annihilation of the temporary relation which formerly was, and in virtue of which they existed. Matter, then, is no more than the transient expression of a transient electrical relation.

I have every sympathy with the reader who has now come to the conclusion that modern physics, if this be a sample of it, is hardly distinguishable from metaphysics; but at least he will accept my word that I am not aiming at a general befuddlement, nor trying to refine matter into an abstraction, when I call it, in the most accurate language at my command, an expression of a relation. I

have attempted briefly to indicate the problems upon which all physicists are now engaged, since they realize that the last few years have given us a modicum of truth and a first step onward, beside which all previous inquiry into the nature of matter may be regarded as nugatory and stationary.

The late Professor Tait, joint-author with Lord Kelvin of the leading work on physics in any language, was fond, as one who had the honor of sitting at his feet remembers, of styling the law of the conservation of energy "this grand principle." He never showed the same enthusiasm for the law of the conservation of matter, though there was no reason, at that time, why he should not regard the two as peers. But Tait had the insight which many a most distinguished and useful servant of science does not possess. I fancy this partiality of his, which has often been remarked upon, was due to what we may perhaps call an intuitive perception that the two laws are not peers; in short, that the law of the conservation of energy would ultimately be found to include the other. And so it has turned out. While no one can now regard matter as other than a phase of the cosmic activity, yet no physicist is one whit disturbed in his belief that the power of which matter is an expression is eternal and uncreatable. Atoms may come and atoms may go, "and leave not a wrack behind," but assuredly this power goes on forever. The last problem of all philosophy is the relation of this power or energy

to the mind by which it is known. In the last analysis, is this relation an identity? Spinoza said yes, and Goethe declared his framing of and answer to this question to be the greatest, truest, and profoundest thought of all the ages.

And here, before we can estimate the breadth of the foundation upon which the evolutionary philosophy stands, we may inquire into the various entities, or apparent entities, with which philosophy has to deal; for if it be true that "all facts belong to science, and are her portion forever," so assuredly is it true of philosophy. The philosophic system with which one fact, of any order, is incompatible, must be mended or ended, however vast its fabric and sublime its mien.

Let us, then, take the Cosmos, or the sum of all that is, and reduce it, if we may, to its ultimate components, so that we may know with what orders of facts science must deal. But before making such a category as is compatible with the knowledge of to-day, let us contemplate a very simple one which appeared valid to many some thirty years ago.

The dogma of theoretical materialism (which we must not confound with practical materialism or mammon-worship) was not the least clear of creeds outworn. According to it, the spectator of all time and all existence had to deal with *an aggregation of moving atoms*. These atoms were very small, indivisible, hard or impenetrable bodies, of some seventy-five elemental varieties, each

atom being a unit of matter. Now the atoms were in constant movement, and the movement was so important that we might conveniently sum all things as consisting of matter and motion. Certain facts, however, indicated the existence of a subtler stuff, believed to be omnipresent, which was called the ether. Some said that this was atomic, some that it was continuous and homogeneous; some thought it imponderable, others ponderable; but at any rate it could only be thought of as a subtler form of matter. There was also, by-the-way, a certain curious manifestation, hardly to be called an entity, but perhaps worth mentioning, which was known as mind. When certain atoms arranged in an exceptionally complex fashion, and moving in a peculiar way, were observed, it was noticed that their clashing produced a sort of disturbance, somewhat different from those of sound and heat, which we could call consciousness, or mind. This was only a by-product or epi-phenomenon—to use the term applied to it by Professor Huxley; and as a by-product it could hardly enter into an ultimate category of the all.

That creed was good enough for some in the seventies, and doubtless contents a few to-day, though I have never met one. We need waste no space in criticising it here, save to remark upon the amazing ingratitude—shall we say?—which degraded mind, the percipient of all else, matter, ether, and motion, to the level of a by-product.

For if mind, the only thing of which we have immediate knowledge, be a by-product, then surely that which we know thereby — atoms, ether, and motion—is merely a by-product of a by-product —and what becomes of Reality?

Now radium and radio-activity have proved what the wise knew without their aid, that the hard atoms, "the foundation-stones of the material universe, which have existed since the creation, unbroken and unworn"—are as much a figment of the imagination as Coleridge's palace of Kubla Khan, or any other product of an opium dream. We may regard as proven the modern electrical theory of matter, which has shown that even the root-characters of *mass* and *inertia*, which we attribute to matter, are properties of electrical energy. Nor will any trained intelligence now dispute the proposition of Spencer (him the unscrupulous call materialist) that, if it were necessary to describe the all in terms of matter alone, or of mind alone, one's only chance of success would lie in the latter alternative.

Let us, then, make a category of the Cosmos as we now understand it—not, however, using the word "now" as if to suggest that at last we have reached finality. Our category must include four entities which, at the first glance, we can observe. These are *matter*, the *ether*, the many obvious forms of *energy*, such as light, electricity, heat, and *mind*. Modern theory, as I have shown, entirely disposes of the first, that matter which

was once thought to be the only reality worth mentioning. There is more to be said of this view, which upsets all our notions of every-day things, and which describes the attributes of a chair or a mountain in terms of electricity; but here we will simply accept it. This reduces us to a category of three—energy, the ether, and mind; but obviously we cannot rest here. The human intellect has an irresistible tendency to unify. All thinking people are convinced of the truth of some form of monism. Monotheism is evidently an ancient expression of this tendency—a tendency which every day's new light further justifies. At present physical theory seems to suggest that this ether, originally "invented" to account for the phenomena of light, and called the "luminiferous ether," is really the *prima materia* of the ancients, the *Urstoff* of the Germans, the *protyle* of Sir William Crookes; and all forms of energy may be referred to vibratory and other movements of the ether. Let us, then, provisionally reduce our category of the Cosmos to a dualism—the ether and its energy on the one hand, and mind on the other.

Such a dualism, as a final statement, will satisfy nobody; indeed, has satisfied nobody, for the problem is old though the terms and the details are new. The reader is familiar with the two extremes which thought has taken in time past; and they are the same to-day. The idealists maintain that mind is the only reality, and that the ether and its energy exist only in mind: as Berkeley would say,

their *esse* is *percipi*—their being is the being perceived. The opposite school say that mind must be a product of the ethereal energies, though they do not tell us how the law of the conservation of energy can be proved to hold in regard to the production of the Eroica symphony or the "Divina Commedia." The third school finds it impossible to explain mind in terms of not-mind, or not-mind in terms of mind, and regards both as manifestations of one Reality. This is the Spencer-Spinoza school. Time is not yet when men shall cease to discuss that Reality's ineffable name. For myself, I hold it literally ineffable, unspeakable because unknowable.

Having thus attempted to survey the field of philosophy, we may consider more in detail that magnificent generalization which had been provided for Spencer by the labors of such men, working both before and after the inception of the evolutionary philosophy, as Helmholtz, Joule, Mayer, Mohr, and Kelvin. Energy, as then understood, was distinct from and almost antithetical to matter. Each was regarded as ultimate and irresolvable. To-day, as we have seen, matter is not regarded as an ultimate, and the statement of its conservation is merged in the newer and greater dogma. But Spencer anticipated this view nearly half a century ago, when radio-activity and the new theory of matter were undreamed of. Seeing that matter, as known to us, is none other

than a manifestation of force, or power, or energy, he framed a new dogma, which should express this, the first synthesis, or "placing together," of the synthetic philosophy. He chose the word *force* to express both the energy of motion and the power manifested in matter, and he objected to the word conservation as implying a conserver, an act of conserving, and the necessity of this act, lest force should disappear. Professor Huxley suggested to him the use of the word persistence; and thus the synthetic philosophy is founded upon the dogma of the *Persistence of Force.*

In this relation one may make reference to the crudely materialist philosophy of Professor Haeckel, of Jena, who is in the habit of using many Spencerian ideas and terms in his popular perversions of the philosophy which two great Englishmen, Spencer and Darwin, have taught him, but whose latest book, *The Wonders of Life*, does not contain the name of his foremost master. Haeckel has built what he apparently imagines to be an original philosophy upon what he calls the *law of substance.* This he has formed by the simple device of conbining the laws of the conservation of energy and the conservation of matter, and calling that which energy and matter express by the term substance, used in the sense of Spinoza. The use of this word I think most desirable and valuable, and I regret that Spencer did not call his law the persistence of substance (literally, of that which stands under or sustains); but it is only just to observe that

Haeckel's much-boasted law of substance is merely the law of persistence of force under another name. There is this difference: that Haeckel, pledged as he is to the old-fashioned materialism—the destruction of which has left him, as Sir Oliver Lodge remarks in the *Hibbert Journal*, stranded high and dry—still persists in asserting the permanence of matter, despite the recent discoveries with which all are familiar. His dilemma is obvious: he has so framed the law of substance that if the doctrine of the conservation of matter be discredited, the law of substance falls also, and with it the whole of "Haeckelismus" as a coherent system. If Haeckel had been more than a brilliant biologist he might have avoided this disaster, as did his tutor and predecessor.

I do not propose again to use Spencer's phrase, the persistence of force, but shall simply speak of the conservation of energy: firstly, because the term is so familiar, and, secondly, because evolution has been illustrated in the meaning of the word energy, so that it now connotes exactly what Spencer desired to express when he substituted for it the term force.

Now what is this doctrine of the conservation of energy? In its fullest meaning, as it is accepted by practically every competent student to-day, it asserts that everything in the world—save mind—is from eternity to eternity ("eternal and uncreated"), that nothing is lost, and nothing is made from nothing, or "created." It is the

modern amplification and development of the ancient saying of the Ionian Thales, the father of philosophy, "Ex nihilo nihil fit." But it says more than he said; for, while it agrees that from nothing nothing can be made, it also declares that though all the forces in the universe, save one infinitesimal iota, were ranged to destroy that puny exception, they would fail. It is indeed a very great testimony to the powers of the human mind that, while the familiar "law" of the eternal permanence of matter is perishing before our eyes, we can yet assert that the sum of things is constant and incapable of the smallest diminution throughout unending time.

I cannot conclude this chapter on the basis of evolution without reference to that which gives the law of the conservation of energy its supreme importance. The crude popular theism of this and preceding ages conceives of the Deity as having called his creation into existence at a given point—or week—in past time. Before that event, nothing was, save the Deity alone. This belief is incompatible with the law of the conservation of energy, which yields the inference that there never was an act of creation; for energy is from eternity to eternity. But the serious student is well aware that time is not an entity at all, but merely, as Kant partly showed, one of the forms of our perception. When once we have realized that time is merely the way in which we express our consciousness of change, the vulgar idea of creation is seen

to be what it really is—childish and for children, and naturally leading to the very proper question, put by all wise children and not yet answered by the wisest parent of the old school, "Who made God?" Once, however, the doctrine of the conservation of energy is of universal acceptance, and as widely understood as accepted, the theistic conception will change, and the Deity will be regarded as the All-Sustainer and All-Upholder, as Goethe has it. In short, while the conception of a personal Deity is retained, the theist will endeavor to think of Him as the eternal upholder of what science has shown to be eternal energy; and for the old notion of creation will be substituted that of a perpetual creation — "new every morning." This idea of creation, in its turn, will soon become indistinguishable—save that there will always be quibblers—from the philosophic idea which is expressed as the evolution of the "Infinite and Eternal Energy from which all things proceed."

But if we recall our category of the Cosmos, it will be seen that the law of the conservation of energy is without entire applicability; for it is simply irrelevant and meaningless when applied to *mind*, of which no quantitative, but only qualitative, estimates are possible. But to make this admission is not to say that the basis of evolution is built upon only half the facts of the all; upon not-mind but not upon mind. For modern psychology has clearly shown, in a hundred works besides the *Synthetic Philosophy*, that the law of

the conservation of energy *is* strictly applicable to those nervous phenomena which, so far as we know, always accompany the phenomena of mind. The writing of Hamlet was associated—and necessarily so—with certain nervous changes and movements, which necessitated the combustion and decomposition of a certain amount of food. Though we cannot estimate the *weight* of Hamlet, as compared with that of, say, "Charley's Aunt," we can positively say that it could not have been produced without the manipulation by the nervous system of a certain amount of what the physicist calls energy; and it is quite certain that no iota of this entity—the use of which is necessary in the production of even the most ideal and intangible mental products, such as an ode of Shelley's or a myth of Plato's—was either lost or created in the process. Thus, without denying the existence of mind, we may assert that the physical doctrine of the conservation of energy, though apparently confined to the phenomena of not-mind, is yet to be reckoned with even in the realm of mind. We therefore need not be concerned that quantitative estimations of consciousness have not yet been made—as, indeed, in the nature of the case they cannot be made; but we may rest content that the doctrine of the conservation of energy is not only the most exact and the surest upon which any philosophy has ever been built, but is also adequate to bear the weight of the magnificent structure which has been reared upon it.

V

THE EVOLUTION OF THE IDEA

THE precocity of genius, and in especial of musical genius, is a commonplace, but it is worthy of note that certain orders of mental product are not commonly formed in youth or even early manhood. Conspicuous instances of epoch-making works written in their authors' sixth decade are Kant's *Critique of Pure Reason* and Adam Smith's *Wealth of Nations*. Similarly it was not until his fortieth year that Spencer began the actual construction of the evolutionary philosophy. The inference, I take it, is not that any one, by taking pains and time, can become a thinker; for the thinker, like the poet, and the man of genius of any order, is born and not made; but in the case of musical composition the product is less dependent for its development upon education than in the case of the production of philosophic systems, which can firmly be grounded only upon a great accumulation of knowledge—to which, neither for the genius nor any other, is there a royal road.

The actual genesis of the philosophy of evolution was unconscious. Its author was interested

in many and diverse matters, scientific, artistic, and political. Upon these he wrote numerous essays, which were published in the chief reviews during the fifth decade of the nineteenth century. In 1852, for instance, he wrote an essay on the "Development Hypothesis," and, five years later, one on "Progress, Its Law and Cause." He had not yet seen reason to abandon the committed word progress for the neutral one now so familiar. Meanwhile, Spencer's more serious energies were devoted to his book on psychology, which appeared in 1855, an ever-memorable date in the history of the science of mind. But hitherto there was no sign of the emergence of a philosophic system. It was not until Spencer had occasion to revise these very miscellaneous essays for republication, and thus to re-read them within a short period, that he discovered, implicit within them, an inchoate philosophy. And we may note that it was no more than inchoate. The idea was not full-fledged, as in the case of that celebrated piece of nonsense upon which Hegel founded his philosophy—"Being and not-being are the same." It is true that the evolutionary philosophy issued in a formula, but it is not built upon it, as is Hegelianism upon the aforesaid "synthesis." Evolution was not an *a priori* truth, but a generalization from an infinitely numerous and infinitely complex series of phenomena. Though Truth is a whole, yet her architecture is of immeasurable complexity, and thus the formula of evolution, as we now have it, underwent

a process of evolution, during no less than seventeen years, ere it reached a form insusceptible, during its author's lifetime, of further modification. But to regard the present form as final would be, as we have already seen, to deny its truth. For evolution teaches us that there is no such thing as finality; and we may console ourselves, if this seems to make hopeless the intellectual destiny of mankind, by attempting to imagine the barrenness of the mental life in a time—conceivable but happily impossible—when nothing is in dispute, nothing unexplained, all art and thought at a stand-still. The prospect is as drear as that of the conventional heaven, which would be a very hell to any but the veriest fool.

Ere we look further at the slow growth of the idea of evolution, as embodied in the famous formula, it may be profitable to raise the previous question, Are there any other than lying formulas? Or, if not directly untrue, are not formulas in general almost as bad in their incompleteness, or ridiculous pretentiousness, or both? Formulas there have been since men began to think; and so, also, doubtless, what Carlyle calls formulism. No one will question that formulas, theoretical, philosophic, political, have repeatedly exercised a most baneful influence over the lives and thoughts of men. If not without utility at some time, yet no formula was ever yet that did not outlive its usefulness. Furthermore, does any form of words really serve men's minds? or may it more reasona-

bly be said that a formula may be a good servant but is invariably a bad master? These questions must be answered before we expend too much admiration upon the complex proposition which Spencer applied to all phenomena. I am not here concerned to demonstrate the precision and all-completeness of this proposition, nor to spend much time in an attempt to illustrate its various sections. In the light of its own teaching, it is to be regarded as but an approximation to the truth. It is enough for the student of science in general, who believes that causation is universal and that the universe is an organic whole, to know that Spencer conceived, in somewhat complex form, the transitoriness and yet the eternal influence of all things whatsoever; and that, in seeking to illustrate this truth in all regions of inquiry, he traversed none without making the way plainer for his successors.

In discussing the genesis of the idea of evolution, it is well to begin at the beginning, and we must first observe that Spencer's advance towards it began with his acceptance of the proposition above named, that *causation is universal.* This is the first article in the explicit creed of the man of science; though it is logically preceded, we must grant, by an assumption that the universe is intelligible. The evolutionary explanation of this truth we shall presently discuss.[1] Now the uni-

[1] It is that the intellect was evolved "by and for converse with phenomena."

versality of causation, the doctrine of eternal and immitigable and all-embracing consequence, has lately become a platitude; and a platitude may perhaps be defined as an unrealized truth. When men throw this term at a proposition, the chances are high that their irritation is due to a consciousness that their subservience to the truth stated is not what it might be. The veritable philosopher, I believe, will never show irritation or scorn for a platitude; for to him an assertion of any truth can never be flat, stale, and unprofitable. Though it were older than any of the hills, yet truth is new every morning. Furthermore, it might be reasonably expected that the most salient and significant truths would be the first to be discovered, so that Robert Louis Stevenson was right when he said that the commonplaces are the great poetic truths. To confess to irritation at a platitude is to admit that one's palate for truth is sated.

I therefore commend to the reader's consideration this well-worn but never threadbare proposition that causation is universal. It is essentially a product of the age of science, which declares that there is neither chance (as the vulgar understand chance) nor contradiction nor caprice in the Cosmos, which believes in the omnipotence of law, and which has no word of a vacillating and short-sighted Providence.

In his *Study of Sociology* Spencer himself has discussed the means and training whereby the idea of causation may be adequately realized by the

student; this in relation to sociology or the study of society, which it was the great achievement of Spencer's predecessor, Auguste Comte, to include within the realm of cause and law.

In the volume named it is clearly shown that only by a training in science can the idea of universal causation be fully realized, so that it becomes an unconscious but constant factor in the formation of all opinions whatsoever.

The first point, then, on which I would insist is that, as the evolutionary philosophy is grounded upon this great scientific generalization, so it was from a wide and earnest study of science that its author started towards his goal. And in these days of gross utilitarianism in education, when Science herself is being prostituted in the marketplace, and her claims to recognition stated to consist in her financial possibilities, it must be asserted with such force as an author can command that the major function of science, beside which even such achievements as the control or extinction of disease are nugatory, is to provide the sure foundation upon which alone the highest truths knowable by man can be built. The matter of supreme importance for any man or age is what, in the inmost heart, that man or age *believes*. The age of faith is every age, and never yet was sceptic without a creed, for a denial is an assertion of a belief. Boito and Verdi may even be excused for "improving upon" Shakespeare, by reason of the appalling *credo* which they have put into the

mouth of Iago in the opera "Otello"; for they teach truly that what a man believes as to human destiny and the supreme questions, *so is he.*

It follows that each man's philosophy, whether premeditated or implicit, conscious or unconscious, is the prime fact about him; and what is true of an individual is true of a race or a civilization or an era. If, then, the contention be valid that only upon the bed-rock of scientific fact can philosophy be built, then we must conclude that the main function of science is none other than, in the long run, the formation of man's creed—and, therefore, the control of his actions and their incalculable outcome.

The first fact, then, to note concerning the genesis of the evolutionary philosophy is that it is built, whether well or ill, at any rate upon science. And it may be asserted, with expectation but not with fear of contradiction, that the contemporary and future thinkers who are now modifying and will ever continue to modify the details of this so well-grounded philosophy must themselves proceed from a firm footing upon scientific truth.

In other words, the genesis of the idea of evolution is not to be found in any intuition. Though subsequently worked out deductively, the law of evolution is essentially and typically an induction —a generalization based upon the sum of facts known to its author. In very many instances, the views held fifty years ago were irreconcilable with the doctrine of universal evolution. Many,

for instance, thought the solar system to be stable and permanent, calculated to last forever.[1] Men spoke of the "fixed stars," as many of us still do, and regarded them as eternal. The author of the doctrine of universal evolution could not concur in these views, and time has proved him right. Similarly the belief in the ultimate "elements" of matter was universally held. It was thought that an atom of carbon or iron had been an atom of carbon or iron since the creation, and would be until the sound of the last trumpet. Spencer could not accept this view; and again the verdict of time is on his side. When we turn from physics to biology, we find again that the authority of the time was totally opposed to the idea of evolution in the realm of living matter. The first independent thinker to declare that the facts pointed to evolution and not to special creation was Herbert Spencer. The essay of 1852 attests to that fact. In psychology, again, mind has always been treated as a permanent and special creation, as witness the familiar and hope - confounding lie, still current, that "human nature is the same in all ages." It remained for Spencer to inaugurate a new era by regarding mind as an evolution; by refusing to confine himself, as all his predecessors without a single noteworthy exception had done, to the study of the adult Caucasian consciousness; and by correlating with this familiar study that of the

[1] Cf. the second paragraph of *Sartor Resartus*.

mind of the child, the savage, and the lower animals. The same is true of sociology and ethics; so that it would be to lack any adequate appreciation of the facts to suppose that Spencer merely took the scientific knowledge of his time and built upon that. He did, indeed, build upon the knowledge of his time; but he had first to remake much of it. No mere study of the recognized textbooks of the various sciences could have yielded the generalization which is now the master-key to all our thinking.

Probably the germ of the idea lay in the word progress, inherited by Spencer from his liberal tutors. It was when he came to analyze the idea and nature of progress that he caught a first glimpse of principles which, as he came to see, applied, not merely to human societies, but to aggregates of all kinds. Only after many years (though he had long ceased to use the old word) did he add to the formula of evolution a further formula to express the correlative process of dissolution. But this will be discussed later.

This chapter on the genesis of the idea of evolution may fitly be concluded by consideration of the power of a phrase. Tennyson somewhere has a saying about the coming of a great thought which flashes through the brain and brings the blood to the cheeks. We need not doubt that this was an authentic reminiscence; but perhaps one may be permitted to question whether the experience is a common one among the authors of the world's

great thoughts; at any rate, I received a negative answer when I addressed this question to the one person of my acquaintance of whom such an inquiry might be made. Whatever the conditions of poetic thought, I fancy that the great ideas of philosophy have seldom flashed across the brain, but are rather the final products of long excogitation and contemplation.

A priori thinking has enslaved the human mind for so many centuries that some people in our time are inclined altogether to deny its claims, forgetful, apparently, of the triumphs of mathematics—the one purely deductive science. In other fields induction is, of course, supreme; all progress in biology, to take an instance, has resulted from the inductive method, which begins by observing facts, and then proceeds to reason from them. Hence we find the explanation of a certain objection which has been taken to the synthetic philosophy by that lower order of workers whom one may call the hodmen of science. Their argument is perfectly intelligible. They say that the formula of evolution was an arbitrary invention of its author, across whose brain this idea presumably "flashed," and who then proceeded to explain all orders of facts by this *a priori* assertion. Now, if it were true that the formula had been arrived at by a purely introspective and mystic process, that fact would not of itself invalidate the application of the formula, though it would certainly leave us hopelessly in the dark as to the process

by which the formula was framed. We should have to fall back upon some such expression of ignorance as the word "intuition"—and leave the matter there.

But, as a matter of fact, the formula of evolution was arrived at by a strictly inductive process, precisely comparable to that which enabled Newton to educe the law of gravitation—save that Spencer was his own Kepler, so to say. The formula, as we now have it, is the product of years of thought, during which it was greatly modified and amplified. Only some years after it was published—as we have seen—did Spencer discover that there is a correlative process which he called *dissolution*, but which he would probably have done better to term involution. But what, finally, was it that set Spencer on the right line? The answer to this question seems to me to be of such interest to everybody, and especially to every one with any love of words, phrases, and literary form, that we may fitly dwell upon it here.

In his first book, *Social Statics*, Spencer had reached a generalization which contained the germ of the idea of evolution. All the material was in his mind, the conclusion had been reached—but there the process stopped. The idea bore no fruit. Then Spencer came across his own conclusion, independently reached by a German scientist, but stated in a new form. Von Baer, the great founder of embryology, enunciated the truth that all progress in the organic world consists essentially

in a change *from the homogeneous to the heterogeneous.* The simplest organisms have many parts all alike and practically independent. Progress consists in the development of forms which consist of many parts that are unlike, and interdependent. Of this the human body is, of course, the supreme illustration; and the Latin fable about the revolt of the other organs against the pampered stomach is the ancient expression of the same idea. Though Spencer had shown that the same holds true of societies — the lowest consisting of individuals very independent and very similar, the highest of individuals with very various functions and *therefore* entirely dependent on one another, the soldier on the agriculturist, and the agriculturist on the soldier—yet he had gone no further. It was only when he met his own idea, crystallized in a terse and lucid form, that, given this "convenient instrument for thinking," he was enabled to take the first step towards the formula under which all the knowable phenomena of the unknowable can now be included. We shall yet see many instances in which this same gift for phrase-making enabled Spencer to serve human thought; but it was this gift, in the hands of another, that first guided him towards the greatest generalization in all philosophy. Thus we may perceive a serious and valuable truth in Stevenson's delightful piece of irony: "Man lives not by bread alone, but chiefly by catchwords."

PART II

INORGANIC EVOLUTION

VI

COSMIC EVOLUTION[1]

We are now prepared for the consideration of the principle of eternal change as illustrated in all phenomena—those of the inorganic world, of the world of life, of mind, and of the products of mind. Now, though Spencer was compelled, by the magnitude of his task and by the consequent need for subordination of aspects of evolution less significant to human life, to omit from his system the discussion of evolution as it applies to inanimate nature, he formally stated, in brief, the outlines of the process. And we may illustrate it by reference to the almost infinitely large and the almost infinitely little.

Less, perhaps, than any other science, has astronomy gained from Spencer's work. One timely service, however, he did it. The reader will remember the history of the nebular theory of the origin of the solar system. Originally suggested to Kant by a brilliant guess of Lucretius, and later given mathematical form by Laplace,[2] the

[1] Partly reprinted from an article in *Harper's Magazine*, May 1904, entitled "Whence and Whither?"

[2] Laplace knew nothing of Kant's work in this field. His

theory received, as it appeared, a crushing blow when Lord Rosse's great telescope resolved into stars certain supposed nebulæ. The natural inference was drawn that remoteness alone prevented a similar resolution of all nebulæ, and this conclusion was accepted by astronomers. The spectroscope, in the hands of Sir William Huggins, the present president of the Royal Society, had not yet demonstrated by its incontrovertible evidence that true nebulæ do veritably exist. Now, if some form of the nebular theory be not true, the evolution theory, as a cosmic generalization, is forthwith disposed of. Spencer was therefore led to consider the matter, which he did in an essay written for the *Westminster Review*. First-hand astronomical knowledge he had none, and he is certainly entitled to consider this essay, as he does, an instance of his constitutional "disregard for authority." But while the actual observations of the expert must always be provisionally accepted, it is open to any one who can to criticise the conclusions deduced by the expert therefrom. This Spencer did, advancing sundry reasons to show that the evidence of Lord Rosse's telescope could not be accepted as a refutation of the nebular theory. Later came the spectroscope and Spencer's vindication, both as to the existence of true nebulæ and

theory appeared about forty years after that of Kant, which was published in a local Königsberg paper in 1755. (See Merz's *History of European Thought in the Nineteenth Century*, II., 283.)

the nature of the sun's atmosphere. At the present time—in large part owing, it is of interest to note, to the work of Professor George Darwin, the son of the immortal Charles—the nebular theory is accepted by all astronomers save perhaps one. In it you will find, on the largest scale, an illustration of inorganic evolution. Let us consider this great theory as it is understood to-day, forty-seven years after Herbert Spencer's bold defence of it, *contra mundum*.[1]

Let us conceive, then, of an immense cloud or nebula, situated at some point in infinite space certainly far distant from the present position of the solar system—a position which, owing to the "proper motion" of the sun, is changing at the rate of nearly twelve miles a second as you read. But before you are willing to follow the argument, you will stop and ask where this nebula came from; for you have already become convinced of the laws of conservation; you know that the nebula did not spring into existence out of nothing, and you very properly decline to continue until this most legitimate question is answered. You quote that most ancient maxim of Ionian science, "Ex nihilo nihil fit" — an axiom which, nearly twenty-five centuries after Thales, is now a proven truth—and demand to know where I get this nebula of which I talk so glibly. But we must

[1] Some measure of justice was paid to his work in a lecture on the nebulæ delivered last year before the British Association.

wait until the sequel of this cosmic story, for the last chapter in the history of the solar system—in the history of that nebula—will be the same as the first; wherein will be seen exemplified Spencer's law of universal rhythm and the truth that there is no new thing under the sun.

The thesis, then, which science now believes itself to have established is that by the working of the forces inherent in this nebula—forces which act according to laws immutable, then as now—it has been resolved by a process of contraction into a central or parent mass which we call the sun, and into a number of subordinate bodies called planets and satellites. To these must probably be added those comets which have not been captured and imprisoned within the solar system by the force of gravitation, but which have originated within it, and also the meteoric particles, such as the Leonids, which occur in myriads in the interplanetary spaces, and are themselves probably of cometary origin. Astronomy having brought the evolution of the nebula thus far, other branches of science take up the tale and declare that the continued action of these same forces, and of others like them, has resulted—to take the most instant case — in the formation of the earth's crust and in that "vital putrefaction of the dust"—to use Stevenson's phrase—which we call living matter, and which has now continued the evolutionary advance so far as to result in the existence of man. Hence we believe that Newton, Shakespeare, and

Beethoven were potential in that nebula, as were Kant and Laplace, whose destiny it was to advance and establish the nebular theory of their own and our origin.

This is no less than a stupendous theory, but its basis is mathematical, and therefore essentially irrefragable. I must attempt to outline it in intelligible language.

Given a nebula or gaseous cloud of any shape whatever; given, indeed, a nebula whose particles are moving in a condition of absolute chaos, obviously without "order" and apparently without law; given, indeed, what is probably the initial stage of all nebulæ — it is demonstrable by the infallible processes of mathematics, acting upon the basis provided by the law of gravitation, that such a nebula must assume a spiral form. The law of the "conservation of momentum," which enables the physicist to forecast the history of any two or more particles moving in any direction, but constituting a system not subjected to any external influence, is the foundation of this assertion that any nebula, if left to itself, must become spiral. This spiral form is essential in the production of a stellar system such as the Pleiades or a solar system such as ours. It therefore behooves us to look more closely at the spiral nebulæ, as constituting the most important link in the chain of events.

The astronomers of this particular planet are acquainted with some hundred and twenty thou-

sand nebulæ, of which about *one-half* are spiral in form. This large proportion of the whole is sufficient to exclude chance in their formation, and to suggest that there must be a necessity in their development. We are entitled to say that the spiral nebulæ constitute, next to the fixed stars, the most important and characteristic objects in the heavens. The first to be discovered was the great nebula in Andromeda, which is still the largest that is known. It was first seen by Lord Rosse, and was one of the earliest of his rewards for constructing his great telescope. The French criticism passed at the time was that the astronomer had mistaken a spiral scratch, such as might easily be produced in cleaning the lenses of a telescope, for a celestial object. This, however, was no more than ingenious. We now know that the spiral nebulæ constitute the second stage in the evolution of a system, those which one may for convenience style the "chaotic nebulæ" constituting the first stage.

The transition is not difficult of comprehension. The countless gaseous particles of which the chaotic nebula is composed are subject to their mutual gravitational influence. The nebula, therefore, *shrinks*. (Our sun—the central mass of the original solar nebula—is shrinking at this hour at the rate of about sixteen inches each year, and has thereby produced the heat and light which enabled me to write, you to read, and the plant from which this paper is made to grow.) As the

solar nebula, which once extended as far as the orbit of Neptune, began to shrink, the atoms which composed it tended, in accordance with the law of conservation of momentum, to arrange themselves in a number of planes, of which one was the most frequented, and was called the principal plane.

When we learn the origin of the nebula we shall know what conditions determine the presence and position of the principal plane. But "the great ages onward roll," and the influence of gravitation causes the atoms in these various planes to attract one another, so that ultimately the whole substance of the nebula is disposed in one plane, which is, approximately, of course, the principal plane already described.

The chaos has now been resolved into a *flat* object, nearly all the atoms of which are now revolving in the same direction—as do planets and nearly all the satellites of the solar system—around their common centre of gravity, which in our case is now represented by the sun. But there is another most important difference between the chaotic or primitive nebula and the flattened spiral nebula to which it has yielded.

Time was when we thought it probable that a nebula was merely a star-cluster, too distant for terrestrial telescopes to resolve into its constituent stars. No advance in the construction of telescopes could ever have answered this objection; but a new astronomy arose, which left the telescope

with its limitations and wielded a new instrument, the spectroscope. In its simplest form this is simply a prism, which spreads out a beam of white light into its components, the colors of the spectrum. This was the famous experiment by which Newton proved the composite nature of white light.

Now the spectroscope gives different results according as it is placed in the path of light from a glowing gas or light from a solid body. The spectrum of sunlight is continuous, consisting of bands of colors which shade off into one another. The spectrum of a true gas, on the other hand, consists of a series of bright lines separated by dark intervals, and is known as a discontinuous spectrum. It was shown by Sir William Huggins that the spectrum of a young or chaotic nebula is discontinuous, which is a proof that these nebulæ are not distant star-clusters, but are what they appear to be, clouds of gas, often many times greater in extent than the diameter of the solar system. But Huggins applied his spectroscope to the light from a spiral nebula, with the most significant result that its spectrum was found to be continuous. The denser patches in the spiral nebulæ, therefore, indicate places where the nebula is beginning to solidify, where planets are beginning to be formed. I say planets, taking the solar system as a type, but we must remember that the nebula from which our system is formed was a comparatively small one.

The most magnificent nebula in the heavens is that in Orion, its place being indicated by the "star"—as it appears to the naked eye—which is the middle one of the three that form the sword-handle of the mighty huntsman. This superb object really consists of six stars enmeshed in and surrounded by a great nebula, which has thus already given birth to six suns.

The Pleiades, which photographic astronomy has resolved into a group of some fifty thousand stars, were probably formed in a similar manner from some nebula of ultra-titanic proportions.

We learn, therefore, that a spiral nebula is formed of more or less solid bodies—destined to become suns or planets—surrounded by a rarer gas, which ultimately attaches itself to them, so that there is produced a system of revolving bodies separated by empty space—empty but for the presence of the omnipresent ether. This is the present state of our own system. But the evolutionist does not imagine that it is final. In an ironical passage Carlyle assures us that "to many a Royal Society the creation of a world is little more mysterious than the cooking of a dumpling," and that "Lagrange, it is well known, has proved that the planetary system, on this scheme, will last forever." The "scheme" is the theory of gravitation, by which, and by which alone, as Carlyle goes on to say, Laplace guesses that the planetary system was made. But Lagrange had not taken all the factors into consideration. It is a deduction from

the law of gravitation that the planetary system will *not* endure forever.

Charles Darwin was a foremost champion of the theory of evolution in the realm of biology, and George Darwin, his son, has greatly added to our knowledge of evolution in the realm of astronomy. By a study of the tides he has forecast the future of the solar system. Even at this hour the tides are acting as a brake upon our earth as she rotates, and are lengthening the day by about twenty-two seconds in each century. The terrestrial tides are at present mainly produced, as we know, by the gravitational action of the moon. The moon herself was almost certainly formed by the breaking loose of the matter rolling upon the earth some fifty million years ago, when her surface was molten. The Atlantic and Pacific oceans probably mark the scars left by the two masses, detached from opposite points, which later joined to form the moon. Now the present effect of the tides is so to alter the relative lengths of the month and the day that the moon and the earth will eventually rotate together as if a solid bar ran between them. There will then be no moon-raised tides upon the earth.

But—to ignore the influence of the other planets—the earth will raise tides upon the sun, just as Jupiter certainly does now. These solar tides act as a brake upon his rotation just as the terrestrial tides act upon the rotation of the earth.

From these alterations in rate of rotation serious

consequences may be inferred. The law of the conservation of momentum states that a certain amount of what the mathematicians, in an unfortunate phrase, call "moment of momentum" is present in our system. Not one particle of that finite quantity can be lost by the solar system as a whole. The alterations now occurring in the distribution of this total have led Professor Darwin to predict that the moon will ultimately return to the earth which gave her sudden birth so many ages before; and from these and other considerations, such as the repulsive power of light, which checks the passage of the planets in their orbits, it may further be prophesied that the planets and their satellites must ultimately yield to the gravitational influence of our dying sun and must return to the bosom of their parent. We must imagine the solar system of to-day as then gathered into one central mass, closely aggregated around that point which, from the first, has constituted its centre of gravity. And what will be the state of this shrunken object? It will be a dark star, a dead sun. There are myriads of such in the heavens. Sir Robert Ball has said that to count all the bright stars that we can see and say, "These are all there are," would be like counting the red-hot horseshoes in England and saying, "This is the total number." This dark tomb of ours will, therefore, be just such another as many millions more. There will be no life upon it. We cannot conceive the depths of its cold, for the nebula has

been dissipating energy, in the form of light and heat, into the chilly depths of inter-sidereal space ever since the first hour of its longæval shrinkage.

What is the destiny of this dead sun, among whose constituent electrons, remember, will be those in the printer's ink before your eyes and those in the eyes themselves? Are they forever—"stable in desolation," as Stevenson has it—to be borne onward through infinite space? No; this shrivelled globe, the common tomb of sun and earth and moon and of the bodies of the great that once breathed thereon, may live again. Give it but the consuming embrace of such another voyager, and in a moment a new nebula will be born. The force of their impact will suffice to evaporate their substance into another cloud which will repeat the history of the old. The path of the two dead suns will determine the position of the "principal plane" which will form the ground-plan of the new system. A new system, I say, new in time, alien in place, yet in part composed of the same imperishable substance as the old.

You asked me whence I derived the nebula which I proposed to consider? And I replied that its last stage would indicate its first. We believe that the nebula from which the solar system is formed was itself derived from the impact of two or more bodies, each of which may well have been the dark epitome and consummation of a system such as ours.

We hear much of waves and vibrations nowa-

days. From the formation of one nebula to its phœnix-like end in the formation of another, is surely the wave-length of the great vibration. Do we want a great measure of time—an *annus magnus?* Surely this, the epoch between two nebulæ, might be taken as the unit wherewith faintly and with unutterable unsuccess to measure eternity. The rhythm of universal history, the strides of the eternal, are from nebula to nebula.

And we? — ephemeral dwellers on the doomed satellite of a dying sun; we, to whom a scroll so sempiternal has been unfolded — how does it all strike us, as from our stand-point between two nebulæ we survey the Cosmos of which we are, if an ephemeral, yet an inalienable part? For our bodily substance has a past how long and glorious, a future how fraught with possibility! The atoms in the tear wherewith your winking eyelid has just now — for its benefit — moistened your eyeball, where were they when the solar nebula reached out as far as Neptune? Or can you figure them borne on some precedent world and scattered in affright when it collided with another? Or can you trace them further back still, in an illimitable past, or forward to an illimitable future? They may have moistened the eyes of a greater than Shakespeare in the course of the history of the last nebula but one, or, gathered into overflowing tears, they may express the agony of sorrow or the ecstasy of joy in some heart like yours that may beat in the course of cosmic evolution some ten or a billion nebulæ

hence, after so many more unconsidered paces in the path of the universe.

It seems to me that the fact of the conservation of energy, teaching us that there shall never be one lost iota of power, nor ever has been—considered with the nebular theory, which teaches us afresh and in the authoritative tones of mathematics the lesson of Heraclitus and Herbert Spencer, that the Cosmos pursues an eternal succession of cyclical changes — reveals to the imagination a vista of sheer sublimity. This pen can but adumbrate it, yet surely the reader, accepting the vision of matter and energy, eternally indestructible, eternally pursuing this cyclic course, and ever and again giving rise to sentient and reasoning creatures such as himself, may agree with me that here is an epic indeed.

VII

ATOMIC EVOLUTION[1]

Our survey of evolution as witnessed in the inanimate world, and operating for infinite periods before and infinite periods after the development of life in any particular part of the Cosmos, such as our earth, must now be turned from the realm of the telescope to one so minute that the microscope is not only impotent to reveal its secrets, but can never be able to do so, whatever improvements be effected in its mechanism; for the nature of light precludes the possibility that we shall ever be able to see an atom.

The discovery of evolution among atoms is almost a revolutionary one, defiant of the most cherished and admired dogmas of the chemist.

Evolution as a universal doctrine must, of course, be rejected if we are to accept the conventional teaching of the chemist that matter consists of some seventy-five or eighty varieties of unalterable elementary atoms. If these have existed as such

[1] In this chapter is reproduced part of an article, "Radium the Revealer," which appeared in *Harper's Magazine*, June, 1904.

from all eternity or since a supposed creation, "unbroken and unworn," as Clerk-Maxwell said, then evolution is a myth or a half-truth. Spencer, of course, could not accept this view, and rejected it in *First Principles*, but, unfortunately, he has given us no prophetic discussion of this matter. The reader is aware that radium and radio-activity have demonstrated the action of evolution in this sphere also, "atomic evolution" having become, within the past year or two, a familiar phrase.

But for the first assertion of this now demonstrated truth we must go back a great deal further than Herbert Spencer — back almost to the inception of the atomic theory. It was Empedocles, the most brilliant pupil of Democritus, the first atomist, who first asserted a belief in atomic evolution and who *correctly* described its chief mode of action. Much nonsense is talked about the extraordinary coincidence that Darwin and Wallace should each have expressed, almost simultaneously —though Darwin was really first—the idea which Spencer called the "survival of the fittest." But not only had Spencer already enunciated the same truth of societies, and Hay and Wells of organisms, the latter as far back as 1813, but Empedocles had actually asserted it of atoms themselves more than two thousand years before. Those atomic forms would survive, he declared, that were most accurately fitted for the conditions, or "adapted to the environment," as Spencer would say. Now, if we turn from this almost-forgotten Greek to the latest

work of Mr. Frederick Soddy, who collaborated with Sir William Ramsay in discovering the evolution of helium from radium, we find the survival of the fittest definitely stated as the primary law of atomic evolution—which would have interested Empedocles and Spencer, too. In the light of these facts one reads with amusement that "the synthetic philosophy has seen its best days." With amusement rather than disgust, for perchance the survival of the fittest applies not only to atoms and organisms and stars, but to philosophies as well—which is another way of saying that *magna est veritas, et praevalebit.*

But let us now look more closely at the positive evidence for atomic evolution.

I must not waste space in here describing the spinthariscope, the clever little instrument invented by Sir William Crookes in order to demonstrate the activity of radium. Go into a dark room with the spinthariscope and hold it as close as possible to one eye. At once you see a shower of points of light that never ceases, night or day, year in, year out. You are witnessing atomic evolution.

Now the sight which the spinthariscope affords is really the vindication of the much-abused alchemists who sought to turn the baser metals into gold. They were evolutionists, had they known it. Later generations laughed at them, and said: "Oh no; you cannot transmute one element into another, for each has its own kind of atom; and

the atoms are the unalterable foundation-stones of the universe. They cannot be changed one into another, and so you cannot change lead into gold. Your philosopher's stone is a myth." But this supposed impossible thing is precisely what is happening in the spinthariscope. Let us consider the facts.

Radium is certainly an "element"—as much so as is gold or lead or any other. Now the atoms of an element have a characteristic weight of their own. If we represent the weight of a hydrogen atom—the lightest of all—by the figure 1, then the radium atom, according to Madame Curie, is 225. It is very heavy indeed. Only two heavier substances are known, thorium (232) and uranium (240); and these two share the remarkable properties of radium. Now if you confine some of this "element" in a glass tube, there will appear therein, after a short time, a minute quantity of a gas which was not there before. It is not gaseous radium, for when it is examined with the spectroscope it shows a spectrum other than that of radium; in fact, its spectrum is quite different from that of any other substance. But it was discovered by Sir William Ramsay that if the spectrum of this mysterious gas — often known as the radium "emanation"—be examined again after an interval of about four weeks, it has changed into a familiar spectrum easily recognizable as that of the gaseous "element" known as helium. So here is the astonishing fact: that the "element" radium

is decomposed and produces another "element," helium. Now the atomic weight of helium is about 2.2, just about one-hundredth part of that of radium, so that each atom, giving the lie to its name, breaks up into about a hundred particles, and when these have had a few weeks in which to settle down, they are recognizable as atoms of helium. Now it is these particles, flung out at a speed nearly comparable to the speed of light, from the specks of radium in the spinthariscope, that strike the little screen of zinc-sulphide paper, and thereby produce the never-ceasing shower of sparks that are seen in the instrument.

It is of no small interest that, after the completion of the synthetic philosophy, but just before the death of its author, there should have been discovered in radium a substance which proves that the formula of evolution is as applicable to atoms as it is to societies or solar systems. As I have previously taken occasion to point out, the definition of evolution, framed more than forty years before the facts of radium were known, fits those facts as well as if it had been framed to describe them. This applicability to all circumstances, new and old, is the hall-mark of a universal truth and of that alone. The most important revelation of radium the revealer is this of atomic evolution. Not even an atom is immune from the universal law of unceasing change; and the reason why every one should possess a spinthariscope is that this simple little instrument demonstrates

evolution in process even in the atom, which the distinguished physicist of a generation ago felt himself justified in describing as bearing upon it the stamp of the "manufactured article." Not manufactured, but evolved.

We must reject, then, the idea of elements. "What is an element?" Sir William Ramsay has lately been asking; and, indeed, it is not now possible to frame any definition worth having. We must not imagine that radioactivity or atomic evolution is confined to radium and its allies. It is probably an attribute of all atoms, though their rate of change varies within incalculable limits. If, indeed, we were compelled to offer some definition of an element — say, radium — as compared with a compound—say, chloride of radium—we might say that a compound is a substance which the chemist can decompose, whereas an element is a substance the decomposition of which he cannot effect, but can observe. But it would be dangerous to say that man cannot hope ever to control atomic evolution. He may learn to do so, and to transmute one "element" into another to suit his own convenience; much as he can breed new varieties of dog or pigeon. The practical aspects of the matter are, however, relatively unimportant; its cardinal significance is that atomic evolution has taken by assault what might reasonably have been supposed to be the most redoubtable stronghold of the creationists. Whether any other remains to them to-day I venture to doubt.

We may be assured, then, that the first lustrum of the twentieth century finds the doctrine of evolution firmly established as applicable to the inorganic world—alike whether we contemplate the Pleiades or the inconceivably minute atoms of what every one but the convinced evolutionist was willing, until the other day, to call "elements." The task which Spencer was compelled to pass over has been thoroughly well done for him by scientific discoveries which were undreamed of when he enounced the truth of inorganic evolution.

On March 9, 1905, the first Herbert Spencer lecture[1] was delivered before the University of Oxford by the distinguished Comtist, Mr. Frederic Harrison. In the course of that lecture Mr. Harrison said:

"It was a disaster that Spencer was unable to complete his scheme for the inorganic sciences. His system leaped from first principles and laws of evolution to biology, psychology, and sociology. He did not explain how evolution could be applied to astronomy, physics, and

[1] When the company were about to disperse from the hall of the crematorium on the occasion of Spencer's funeral, a Parsee student, himself an Oxonian, arrested us for a moment in order to announce that he proposed to offer a thousand pounds to this university for the founding of a Spencer lectureship. If the offer was refused, the University of London was to be approached. Oxford, however, doubtless under the pressure of universal opinion, has decided to celebrate in perpetuity the name of him whom it flouted during his lifetime.

chemistry. To have treated of these sciences systematically would have compelled him, it is probable, to supplement his theory of evolution by other laws."

Now we have already seen that Spencer *did* indicate the application of the theory of evolution to the inorganic sciences. That he did not do so at length was due to the fact that his object in writing the synthetic philosophy was to reach the principles upon which morality is grounded. With a task estimated at twenty years—really to occupy nearly double that time — before him, he could not spare the time to deal with the relatively unimportant aspects of evolution.

But, curiously enough, Mr. Harrison's objection was more than met the following evening in a remarkable lecture on the "Structure of the Atom," delivered by Professor J. J. Thomson, of Cambridge, before the most distinguished audience I have ever seen at the Royal Institution. In that brilliant and memorable lecture Professor Thomson, who is the chief author of the new theory of matter, and whose views were so amusingly misunderstood in Mr. Balfour's Presidential Address to the British Association at its Cambridge meeting in 1904, gave us a most satisfying account of atomic evolution, so final and complete that I must outline it in concluding the present chapter.

The actual unit of matter, as we have already seen, is not the so-called atom but the electron, which is really a literal atom of negative electricity. Now "like electricities" tend to repel one another,

and we must therefore suppose, with Lord Kelvin, that the atom is held together by a core of positive electricity, which is now known as an *ion*. The problem of atomic architecture is so to reconcile the common attraction of the ion for all the electrons, with the mutual repulsion of the electrons themselves, as to produce a stable structure. By the aid of mathematical theory, checked by actual experiment with magnetized needles—to represent electrons—floating freely in water, under the influence of a centrally placed electro-magnet, Professor Thomson has been able to unravel the architecture of the atom. The atoms of the different "elements" vary only in the number and arrangements of their electrons, every electron, wherever observed, being absolutely identical with every other. The electrons are found to be arranged in concentric rings within the atom, and the presence of a certain number of them in each ring is necessary for holding any given number in place outside them. The stability of the atom, therefore, depends on the number and arrangement of the electrons it contains. No contemporary physicist believes that such a thing as an absolutely stable atom exists, though some may undergo no apparent change in millions of years. Thomson's theory clearly explains how atoms of one element, by losing their outer ring or ring of electrons, may be transformed into those of another, and it also demonstrates the operation, among atomic species, of the law of natural selection at

which Empedocles guessed so many centuries ago. The atoms with which we are now acquainted—some eighty or so in number—are those that have survived of many more which have attempted to gain a place for themselves during countless past æons. Professor Thomson's theory is consistent not only with itself, but also with the facts. It illumines the known electrical characters of the elements, it furnishes a rational explanation of the facts of chemical combination, and it accords with, and places on a rational basis, the famous periodic law of Mendeleef, the great chemist of St. Petersburg. It brings with it, therefore, abundant evidence of its truth, evidence which is accumulating every day, and it may be confidently asserted to demonstrate the truth of the doctrine of evolution in regard to the elementary constituents of the material universe.

PART III

ORGANIC EVOLUTION

VIII

GENERAL[1]

THE action of ordered change in the inanimate world is relatively easy to discover It can be studied in large measure by exact mathematical methods. But whilst it is of immense interest, its practical import is relatively small. To us it really matters little whether the solar system be permanent or the elements really elemental; but when we enter into the realm of life and study organic evolution—which is what many people understand by evolution—the case is altered. The conclusions at which we shall arrive must inevitably affect our notions of human conduct and destiny and of our relations to the living world around us.

Let us begin by contemplating the problems which confront us.

If we are to do so in logical order we must begin with the question of the origin of life, which obviously precedes that of the origin of species. Astronomy and geology compel us to believe that there was a time when life did not exist upon the earth.

[1] The classification of our subject matter into inorganic, organic, and superorganic is borrowed from Comte.

Perhaps one hundred millions of years ago — to take an estimate of Lord Kelvin's — the surface temperature of the cooling earth became low enough to permit of the existence of water in the fluid state. Hitherto it had existed in gaseous form in the atmosphere, but when the temperature had fallen below that of the boiling-point of water, life became possible. And here evolutionary theory joins issue with the belief in creation. Of course it is not meant that it has to argue the case against the early chapters of Genesis. Time was when certain aspects of the theory of organic evolution, and especially that which concerns itself with the origin of species, had to oppose themselves to Genesis; but that time is forever past, and the ancient Babylonian and Hebrew legends of the creation may be studied beside other examples of early mythology. But until living matter can be produced in the laboratory, or, at any rate, until a feasible theory of the natural origin of life can be framed, the creationists will continue to maintain that which the evolutionists must deny: that the beginnings of life on our planet marked a unique interruption in the action of the law of continuity, that natural causes were insufficient for this new birth, and that a creative fiat went forth, saying, "Let there be life." We must therefore devote special consideration to this question, which was never discussed by Darwin, but which Spencer considered at length, as, indeed, his universal theory compelled him to do.

When we have considered this preliminary question, which is the most difficult — yet, curiously enough, perhaps the least debated—of all questions in evolutionary theory at the present time, we must proceed to look at "organic evolution" as it is commonly understood—that is to say, at the means by which the primal form or forms of life have given rise — as evolution asserts — to the millions of varieties of vegetable and animal life with which the earth is peopled to-day. Here we shall find that, while no competent critic can now be found, less than half a century after the publication of the *Origin of Species*, to dispute the fact of evolution in the organic world, yet there is scant agreement as to the nature and relative importance of the factors by which this has been brought about. We shall have to consider the doctrine systematically propounded by Lamarck in 1809 — the year of Darwin's birth — that the modification of species has been due to the inheritance of characters acquired by individuals as a result of converse with their *environment.*[1] It must be decided, if it be possible, whether this inheritance of acquired characters takes place at all, and, if so, what is its importance as a factor in organic evolution.

Then we must inquire into the evidence for the principle which will forever be associated with the illustrious name of Charles Darwin, and which he

[1] The original term used by Lamarck is "*milieu environnant.*"

called natural selection. This principle Spencer more happily styled the "survival of the fittest." We must inquire whether it really exists, and, if so, whether it is all-important, as Weismann and the neo-Darwinians assert, but as Darwin himself did not assert; or whether it is merely one of the most important of the factors of organic evolution.

Similarly we must discuss sexual selection, which Darwin described at such length and with such characteristic completeness in his *Descent of Man*, published in 1871, twelve years after the epoch-making work of 1859. Here we shall find, as in every other instance, that recent work has supplemented that of the great pioneers. In regard to sexual selection, for instance, we shall be able to adduce the conclusions reached by that new method of biological study which was founded by Francis Galton, the illustrious cousin of Charles Darwin, and which his foremost follower, Professor Karl Pearson, of University College, London, has called biometrics or biometry. The essence of biometry is the application of exact mathematical methods, and the most carefully controlled statistical inquiry, to the problems of life. We shall find that the principle of sexual selection has been greatly supported and extended through the discovery by the biometricians, of the principle of *homogamy*, which asserts that, throughout the entire realm of living matter, like tends to mate with like. This principle has doubtless

been of great importance in the isolation of species —at any rate in the animal world.

The views of Auguste Weismann, Darwin's most distinguished follower among biologists, must also fall under consideration, not only in relation to his controversy with the Lamarckians.

Thereafter we must ask whether there are still any "unknown factors" in organic evolution, or whether those named suffice to explain the facts.

But prior to our study of the factors of organic evolution we must devote a chapter to the principles, everywhere unquestioned, which render it possible. These are the correlative and contrasted principles of heredity and variation. Here, again, we shall discover that recent work has been of great significance, and, in relation to heredity, we shall have to note the rediscovery of the brilliant but obscure work quietly done by an Austrian abbot, Gregor Mendel, some forty years ago, thrown into the background by the *Origin of Species* and the controversy that followed its publication, but recently revived and amplified by the work of Hugo de Vries, of Amsterdam, and William Bateson, of Cambridge.

After attempting duly to discuss heredity and variation, and the factors of organic evolution, we must devote ourselves for a few pages to the recent study of the inference from organic evolution which so immediately concerns us—viz., the origin of man. Here we shall discover at least three new lines of evidence for which Spencer

would have given much in 1852, or Darwin in 1859. We shall find comparative pathology—the study of disease in man and the lower animals; in comparative hæmatology—the study of the blood of man and the lower animals; and comparative embryology—the study of the developing forms of man and the lower animals—most cogent and novel evidence for the theory of organic evolution.

Further, we must devote a chapter to the practical deduction from the theory which we owe to Mr. Francis Galton, and which he has termed eugenics—or *good breeding*. This chapter should justify my assertion that the discovery of organic evolution profoundly affects human destiny; or, rather, is capable of doing so to the lasting benefit of men, so soon as they come not merely to hold it as an article of intellectual faith, but as a fact which is of practical significance—capable of being utilized in the highest interests of the race.

IX

THE ORIGIN OF LIFE[1]

As we look round us, in street or country or where you please, we see objects which may be divided into two great classes. To the first belong houses, rocks, and stones, whose is, as Wordsworth has it,

> "The silence and the calm
> Of mute insensate things."

To the second belong such objects as men and sparrows, which have an apparent spontaneity and power of self-movement that sharply distinguish them from their inanimate surroundings. On much further consideration we find that it is necessary to include in the same class as men and birds a number of objects, mute and to all appearance insensate, which have no obvious power of self-movement, but are almost as stationary as the houses or the stones. These are trees, grass, shrubs, every form of vegetable life. They are not to be regarded as half-alive, or less endowed

[1] Reprinted by permission from the *Pall Mall Magazine* for June, 1905.

with vitality than the mobile bird or beast—which, indeed, owe their life entirely and directly to that of the green plant.

We have, then, an inanimate or inorganic and a living or organic world around us. Now, if we take a crystal or a brick, we can trace its history with ease. It is simply an aggregation of smaller particles arranged in a more or less symmetrical way. No question of parentage arises. But if we consider an oak or a horse, we are assured that it has had very small beginnings; that no human hands have formed it; that the beginnings were invariably and necessarily derived from some former oak or horse — no oak, no acorn. Nor do we doubt that every human being on the earth has had parents — was not formed directly from mother-earth. Now, this belief of ours may not have been consciously extended by us to lower forms of life; we may never have considered whether every mushroom implies a preceding mushroom, every bacillus a preceding bacillus. We may even be inclined to think that if a cheese be left in a damp cupboard, mould will appear upon it by a spontaneous generation from the substance of the cheese; that though every man must have had parents, the same is hardly true of a mere mould.

Now, as a matter of fact, men of science have entered exhaustively into this question; and they most positively assert, without any qualification of the smallest, that what is true of the man is true

of the mould. It also has had its parents like unto itself, and did not spontaneously develop from the cheese. We have framed various Latin dogmas on this matter—dogmas of great historical and immediate interest. The illustrious Harvey, greatest physiologist of any age, made a great contribution to this question — a contribution which would keep green his name had he not been the discoverer of the circulation of the blood. Harvey spent many an hour in preparation for his great treatise "Concerning Generation," and concluded that *omne vivum ex ovo:* he found what corresponded to an egg-stage in the history of all the living things he examined. With the microscope, and especially its employment in the nineteenth century, the dogma of Harvey has been modified—it being the custom to modify scientific dogmas in accordance with new truth, a custom which is found more convenient than that of retaining the old form and giving it a new meaning.

Rudolf Virchow, the founder of the cellular pathology—that is, of modern pathology—modified Harvey's phrase in accordance with his own researches, and propounded it in this form—*omnis cellula e cellula*. It was thought that every living thing consists of cells; but it is at least probable that the very lowest and simplest form of living matter is not even so far evolved as to possess cellular form, so it is best to read our dogma in this form—*omne vivum ex vivo*. Under no conditions can all the (dead) cheese in the world produce one

single unit of living matter. Such is the assertion to which very few dissentients are known among men of science at the present day. Of course I must assign the reasons which have led to the formulation and acceptance of this dogma; but before doing so I must just enumerate, as if no dogma had yet been framed, the possibilities as to the origin of life on this planet. The possible theories are three, with a semi-jocular one thrown in. In the first place, it is possible that the minutest and simplest forms of living matter are being constantly produced, wherever the conditions are suitable, to-day as yesterday, and ever since the temperature of the earth's surface was cool enough to permit of the presence of water in its liquid form. This doctrine is in harmony with the laws of continuity and of evolution, which are the most universal and invaluable of all modern conceptions. It is supported by the fact that the earth is everywhere flooded with the lowest forms of life. But, as we have seen, the prevailing scientific belief is a denial of this possibility.

On the contrary, this belief asserts that, *at the present day*, every living thing must have living progenitors—*omne vivum ex vivo*. This assertion is, of course, immediately faced with the necessity of stating how the first living thing—the veritable mother of all living—came to inhabit this planet. The overwhelming majority of biologists believe that *omne vivum ex vivo* was not always true. They find themselves compelled to aver that,

though living cannot now be produced from inanimate matter, yet in the distant past the conditions must have been so different that life was naturally evolved upon the earth by the continued play of continuous, unexceptionable, unintermitted, unaided law. "Supposing a planet carved from the sun, and revolving round the sun at a distance equal to that of our earth, would one of the consequences of its refrigeration be the development of organic forms? I lean to the affirmative." So said Tyndall, and so say we all—or nearly all—to-day. What were the past conditions of the evolution of life cannot be guessed. It cannot have been that a high temperature was needed, for the temperature must have been below that of the boiling-point of water. The (supposed) difference between that distant period—say a hundred million years ago—and the present cannot have been due to any present deficiency of suitable complex chemical stuffs to-day. On the contrary, the earth is filled with complex compounds, proteids, carbohydrates, and so forth, apparently ready to develop into living matter; yet (it is said) they do not; while living matter, containing all these bodies, was evolved in the past, when none of them was already there to aid in the process! It is a hard belief.

Thirdly, there is the belief of Lord Kelvin, who is not a biologist, but is assuredly the greatest living man of science, that no explanation of the origin of life is conceivable save that which refers

it to the special act of a personal God. To use the great physicist's own words, "Science absolutely demands Creative Power." Lord Kelvin's recent expression of opinion on this thought raised a storm of protest from the biologists, not one of whom came to his support.

The semi-jocular theory to which I have referred we owe to Lord Kelvin himself, who suggested, many years ago, that the first germs of life might have been brought to the earth, long æons ago, "on some moss-grown fragments from the ruins of another world." It is a brilliant effort of the scientific imagination; but I do not fancy that Lord Kelvin could now be regarded as taking it seriously. Even were we assured that meteorites are derived from the ruins of other worlds, and not from the ruins of comets, as the astronomers have excellent reason to believe; and even if we knew that, during their passage through our atmosphere, such meteorites were not necessarily raised to such temperatures as would effectually sterilize them—yet the problem of the origin of life would face us from some planet of the past if not from our own "lukewarm bullet" of to-day.

No; the present controversy is between the first two hypotheses: either life is arising ubiquitously now, by what Stevenson called a "vital putrefaction of the dust," or it arose, by a natural evolution, in the distant past, once and for all.

The *controversy*, I say; but it is almost universally believed that there is no controversy. *Omne*

vivum ex vivo is taken as finally proved, as a result of the great controversy of thirty years ago, in which Tyndall, Huxley, Pasteur, and Dr. Bastian engaged. It is thought that the "myth of spontaneous generation" has been forever refuted, and *omne vivum ex vivo* forever established. This is what I was taught, not so many years ago, in class-rooms both of zoölogy and botany; and it is so taught everywhere. But lately the matter has come up again: Sir Oliver Lodge and Professor Ray Lankester have fought a drawn battle in the *Times;* and Dr. Bastian has published a remarkable book[1] and made most important contributions to *Nature;* and we may appropriately ask ourselves what was really proved thirty years ago. It was shown, beyond dispute, that when infusions of hay, or other substances which customarily came to swarm with life in a few days, were efficiently boiled, and then protected from contamination, no life ever developed in them. The boiling had killed every germ of life in the infusion; and forevermore it must remain dead, unless living germs were brought to it from outside — *vivum* could only be *ex vivo;* spontaneous generation was a myth.

Now let us see how this view, the scientific orthodoxy of to-day, agrees with the opinions of the past. We shall find that, however difficult it may be to hold when we ask the origin of the *first* living

[1] *Studies in Heterogenesis*, 1904.

things, yet it is perfectly compatible with the wisdom of past biology.

We have already considered the nebular theory, which asserts that the solar system has been evolved from a nebula — a cloud of gas such, though much smaller, as you may see any winter evening in the sword of Orion. When, in its turn, the embryo earth was cast off from this nebula and began to cool, there came a time when the water, till then filling the atmosphere in the form of vapor, was precipitated and formed the oceans. The famous Comte de Buffon thought that life probably began in the ocean—probably in the polar oceans, which would be the first to cool; and, only the other day, an ingenious Frenchman traced a resemblance between our body-fluids—as to saline composition, etc. — and sea-water, thus lending some color to his great countryman's hypothesis. Indeed, it appears from this Frenchman's paper that we may look upon the human form divine as none other than a peripatetic aquarium. True to their ancestor's original environment — assuming Buffon's guess to be correct — the polar sea-water of many millions of years ago, our body-cells are now bathed in fluids which have little varied in that long period. When, at some intervening date, certain enterprising creatures ventured to make a bid for life upon *terra firma*, the cells of which they were composed naturally continued to prefer the old medium, and the preference has been maintained and is gratified in us to-day.

So that, dry though you feel, you are none other than a walking aquarium. You must try to think of your white blood-corpuscles, scurrying along in your saline blood, as minute marine creatures whose ancestors were formed from "the deep's untrampled floor."

Just as the older theory was framed on the assumption that life is not formed *de novo* to-day, so we find, again, that when Spencer came to consider this question he accepted the current biological teaching—not then as firmly held as at present—that life is not *now* evolved from inanimate matter. But his contributions to the problem of the gradual development of inorganic into organic molecules are of equal importance whether we believe that the process occurred once for all in the past, or that it is occurring everywhere on the surface of the globe to-day.

Charles Darwin, when he proved the possibility of the origin of species of plants and animals by natural selection, began by assuming the existence of a "few simple forms" of living matter; and never discussed the question of their origin, which was outside his province.

Professor Haeckel, of Jena, has a carbon-theory of the origin of life which, as far as I know, is supported by no one. He also is content to accept the doctrine that life cannot now originate from inanimate matter.[1] The supposed occurrence, in the

[1] See *The Wonders of Life*, 1904.

far past, of this evolution was termed by Dr. Charlton Bastian *archebiosis;* but Huxley's less-satisfactory term *abiogenesis* has been preferred, doubtless owing to the great and greatly deserved fame of its inventor.

Now it is true that boiled fluids, uncontaminated, will remain sterile indefinitely. It is also true that, under the conditions which they set themselves, our experimenters have completely failed to manufacture life in the laboratory. At best, the most successful followers of M. Berthelot, the great founder of synthetic chemistry, can only manufacture the very simplest forms of proteid or albuminous matter, and this by use of temperatures and effort of which no need is manifested by living nature.

Furthermore, it is true that if a hay infusion, for instance, be passed through a Pasteur-Chamberland or Berkefeld filter, which excludes even the minutest of known living organisms, the filtered fluid will remain sterile as long as it is uncontaminated. In so far, this experiment goes to confirm the results obtained by boiling, and the whole question seems closed.

Thirty years ago Dr. Charlton Bastian, F.R.S., was among what appeared and still appears to be the defeated party. He believed in spontaneous generation. But other duties claimed him, and his ultimate silence was taken for conviction. He had published important books, with many drawings made by himself, illustrating what he asserted

that the microscope had revealed to him. People shrugged their shoulders, and hinted at the value of imagination in guiding the pencil. Dr. Bastian bided his time. Finally he resigned his professorship at University College Hospital, London, five years before he need, learned the difficult art of photographing under the microscope, and has since taken more than five thousand photo-micrographs with his own hands, which bear, directly or indirectly, upon the origin of life. The most striking of all his observations—one which he has again and again repeated—was embodied by him in a paper which he sent to the Royal Society, of which he is a distinguished fellow. Not only was the paper refused, but a well-known member of the committee, responsible for its refusal, actually refused point-blank to move three yards in the library of the Royal Society to see Dr. Bastian's specimens.[1]

Now let us consider first Dr. Bastian's criticism of the experiments in which fluids are boiled or filtered. He reasonably regards it as necessary for the production of life that certain chemical compounds be present. If it can be shown that boiling *destroys* these compounds, then the boiling experiment cannot be held to prove that life cannot originate in non-living fluids. It is known that boiling does alter or "degrade" the chemical compounds in the boiled fluid. It might be thought

[1] Lately the Royal Society has repented itself and accepted the paper.

that, if boiling be not performed, but merely filtering through a germ-proof filter, the result (the non-development of life) would be conclusive; but it has been shown that such filtration alone suffices to alter the chemical nature of the filtered fluid. "Spontaneous generation" is not, therefore, proved to be a myth even by this experiment. So much for destructive criticism.

But Dr. Bastian has also positive results to offer. He has seen, he tells me, the development, in a previously clear fluid, of minute black spots, which gradually enlarge, and at last become *motile bacteria*. This change cannot successfully be recorded; but it seems to me to be not inconceivable that a cinematographic apparatus might be adjusted to the microscope, and thus demonstrate, beyond all cavil, the evolution which Dr. Bastian declares that he has seen.

The most remarkable photograph that Dr. Bastian has taken shows the spines, magnified seven hundred times, of a minute water-animal known as the Cyclops. In these spines, which are absolutely impervious to the smallest known organisms, there develop a number of spots, which finally are recognizable as bacteria. This his photographs clearly show. Either these bacteria have arisen *de novo* in the tissue of the spine, or they are the enlarged forms of some bacteria, hitherto unknown, which are too small for the microscope to detect—are ultra-microscopic—and which have somehow made their way through the tough covering of the

spine. But this is pure hypothesis, without a shadow of proof; and to assert it, simply because you decline to believe that the bacteria can have arisen *de novo* in the spine, is not science, but prejudice. It remains for those who deny that the bacteria can have arisen *de novo*—since this would clash with their dogma—to prove that such ultra-microscopic bacteria do exist, and can force their way into the spine of the Cyclops—or else to admit that their dogma is unproved.

Other remarkable photographs show a similar evolution of bacteria—parentless bacteria—in the cells of a potato. Of course, in both of these cases, the bacteria arise in tissue that is already organic; but, if they can so arise, we must cease to hold the accepted belief that the bacteria of to-day have all descended from bacterial ancestors which were present on the earth scores of millions of years ago.

The easiest and most natural belief, according with the law of continuity and with all known analogies, is that life still arises on the earth by natural processes. Harmonizing with this belief of Dr. Bastian's — or at any rate conflicting with Lord Kelvin's — is a recent paper by Professor Pickering, who finds excellent reason to believe that there are upon the moon traces of the action of vegetation. Now, the moon was certainly born from the earth when she was far too hot to sustain life; so that, if Professor Pickering be right, living matter has spontaneously developed on the moon.

Surely no one will suggest any exercise of a deliberate creative act so apparently purposeless as the formation of living vegetation on the surface of the moon.

Of course all this conflicts with the popular notion of the Eternal power. But, on the other hand, it perfectly consorts with the philosophic conception of the Eternal who sustains and informs all things, the "All-Upholder," as Goethe calls Him. Suppose that all the phenomena of stars and suns, of life and of mind, be reduced beyond dispute, to the law of continuity. Suppose that we know in detail the steps by which the Book of Job or the prelude to "Parsifal" evolved from the nebula which developed into the solar system; suppose that we can explain not only life itself, but even the genesis of such as these, its noblest products — can we escape from the overwhelming consciousness of the Eternal and eternally creative power "from which all things proceed?" Assuredly not; he who has some conception of the Eternal as nearly adequate as the poor human mind can form, will be no whit disturbed to learn that Dr. Bastian is right, or — some day — that life can be manufactured at will in the laboratory; for pray how would such manufacture exclude or deny or derogate from the ineffableness of the power that "rolls through all things?"

While these pages were passing through the press, Mr. Butler Burke, of the Cavendish Labora-

tory, Cambridge, made a first announcement of some experiments which he has been conducting for some years back. He has demonstrated the development, in sterilized bouillon subjected to the action of sterilized radium chloride or bromide, of minute bodies which exhibit growth and subdivision. The American reader will find an account of this work in an article contributed by me to *Harper's Weekly* for July 22, 1905. I make no detailed reference to it here, though I have had the opportunity of studying Mr. Burke's results for myself, since he is about to publish a volume on the subject, and since the nature, origin, destiny, and distribution of life must engage me for a subsequent volume.

X

HEREDITY AND VARIATION[1]

HEREDITY and variation are the two facts without which organic evolution would be impossible. Since Darwin's work, which somewhat obscured the initial questions that they raise, but demonstrated their stupendous consequences, biologists have spent much labor in discussing the causes and conditions of the two facts, that like tends to beget like, but that like does not beget *exactly* like. The subject is worthy of study, for it is evident that without variation there could be no differentiation of species; while without inheritance of variations no differentiation could survive for more than one generation. Natural selection presupposes variation, and now we have ceased to doubt that natural selection is a fact, biologists are going back to the beginning and studying that factor from which attention was long diverted by the influence of Darwin's masterpiece.

Some forty years ago the Abbé Mendel took

[1] The best popular text-book on heredity with which I am acquainted is Mr. Archdall Reid's recently published *Principles of Heredity* (Chapman and Hall).

to experimenting with peas. For some thirty-five years his work was left unnoticed, but within the last lustrum it has come into its own, his essential discovery being now regarded by many, in Professor Bateson's words,[1] as "one of the lasting triumphs of the human mind."

Until the rediscoveries which have brought Mendel's work into recognition, the popular view was simply this: like produces not exactly like; this fortuitous difference between parent and child we call variation; by the operation of natural selection favorable variations are perpetuated, and unfavorable ones die out; hence, the origin of species — subsidiary factors being ignored as non-existent by the school of Weismann, and as relatively unimportant by the majority of biologists.

But natural selection *selects;* it does not originate or create. And all these decades past, while fully discussing the consequences of variation, we have ignored the fundamental question, simply accepting it as a mysterious fact hardly likely to repay investigation. Now, let me attempt to show what Mendel and his successors of this generation have accomplished, premising that the facts — if not, indeed, the interpretation of them—are no longer in dispute, and that they will be familiar to every amateur student in a decade. How satisfactory to the students of Herbert Spencer are these latest

[1] Presidential address to the section of zoology of the ish Association, Cambridge, 1904.

advances in biology, along lines which he discerned long ago, I can hardly say.

Make the Abbé Mendel's discovery simple I cannot, the facts being complex; but I must do my best. Each of the higher animals and plants is formed by the union of two cells of different sex, which are called *gametes;* and in these the problem of heredity obviously centres. The child "has his father's smile," we say; and we know that this character must have been transmitted in the paternal *gamete.* Now the first question we must ask is plainly this: How are the *gametes* formed? And we know that each *gamete*—of either sex—is formed by a series of cell-divisions, beginning in what we may call a germ mother-cell. Now the essence of Mendel's discovery is this: The germ mother-cell which is about to divide and form the *gametes* that are to reproduce any individual in his or her descendants, itself contains characters derived from both the parents of that individual. These characters exist in the germ mother-cell in opposed pairs — *e.g.*, a character corresponding to the white pigmentation of the individual's father, and another corresponding to the black pigmentation of the mother—and when the germ mother-cells divides so as to form *gametes*, these pairs are split up or segregated, the black character going to one *gamete* and the white to another. Thus the *gametes* or sex-cells of a gray individual will not be potentially gray, but either black or white. Observe the result. The individuals of the new

generation may be of three kinds in respect of any given character. Some of them will be white, since they were formed by the union of a white-bearing *gamete* from each parent, some black since formed by the union of two black-bearing *gametes*, and some gray like their gray parents, since formed by the union of a black with a white *gamete*. But the *gametes* of this new gray individual will not be gray, but black or white, as before. If this is unintelligible, I can only express my regret.

This discovery that variation—*e.g.*, the production of a black individual from gray parents—is *really a form of heredity*, proceeding according to definite laws, instead of being a sort of "bad shot" at heredity, clearly marks a new epoch in our conceptions of the subject. The above assertion of the working of the process constitutes Mendel's "law of segregation."

Let us observe some of the consequences. We now know that new species can and do arise by the operation of the laws of heredity quite apart from any slow accumulation of variations under the influence of natural selection. As Professor Bateson says: "The dread test of natural selection must be passed by every aspirant to existence, however brief"; but that expresses the totality of its power. Observe further that the scholastic dictum, *natura non facit saltum*, which has so long been believed, cannot hold. Nature *does* sometimes make leaps; and the modern belief in *discontinuous variation* is a denial of the old dogma.

There are many facts which the mutation theory explains. What, for instance, could be more puzzling than the unquestioned fact that hæmophilia, or the "bleeding-disease," is constantly transmitted by men to their sons, not to their daughters, but through their daughters to their grandsons; but not their granddaughters? In other words, the males inherit, suffer and transmit; the females inherit and transmit, but do not suffer! And now it seems that the abbé with his peas gave us the key to this forty years ago. It becomes intelligible if we conceive that certain characters are linked in the *gametes*. For instance, the bleeding character may be linked with the "maleness" character; the two are segregated together; when one appears both appear; when one is latent, as in the case of the female, so is the other.

Mendelism is in its infancy; but it is already potent for good. We could "exterminate the simpler vices" if we pleased; and Mr. Galton's *Eugenics*[1] is not a dream. Some day the race will undoubtedly realize that education in all its forms is but the "giving or withholding of opportunity," and then will face the root problem in earnest. Meanwhile, to quote Professor Bateson, "So long as, in our actual laws of breeding, superstition remains the guide of nations, rising ever fresh and unhurt from the assaults of knowledge, there is nothing to hope or to fear from these sciences."

[1] See chapter xiii.

XI

THE FACTORS OF ORGANIC EVOLUTION

THE word Darwinismus is widely used on the Continent, especially in Germany, and its English equivalent is familiar to us, but there are serious objections to its use. It cannot be taken as a synonym for organic evolution, since the origin of species by natural processes had frequently been suggested before Darwin's birth. The only other meaning the word can bear is the doctrine of the origin of species by *natural selection*, which Darwin brought into so much and so necessary prominence. This use of the term is not only illegitimate but quite unfair to Darwin, who was one of the broadest minded of men and had not a trace of the dogmatist in his composition. Darwin expressly asserted that he attributed to the inheritance of acquired characters an important share in the origin of man. He dealt with this at no length, for the excellent reasons that the principle had already been enunciated by Lamarck, and that he himself had his hands full in elucidating his own contribution to the discussion.

In considering the factors of organic evolution,

then, let us first concentrate our attention on one point, the controversy — incorrectly and unjustly named, as I have shown—between Darwinism and Lamarckism. The only possible excuse for these terms is their focussing the attention on two great names; but, as I say, they do an injustice to the younger thinker, if not the older too. Every one knows that Professor Auguste Weismann, now happily enjoying his eighth decade, has taken up the cudgels for a "Darwinism" which is more than ultra-Darwinian; and his school is a great and flourishing one. Weismann denies *in toto* the possibility that any character acquired by the parent can be transmitted to the child. To Darwin's "natural selection" he attributes far more than did Darwin himself; and the pupil's pupils have even outrun him. Here again time has vindicated Spencer—so that one begins to understand Grant Allen's remark, "the twenty-fifth century will appreciate him." The echoes of his controversy with Weismann have died down and the inner ring of the non-scientific public is becoming familiar with the dogma of non-transmissibility of acquired characters, but Weismann himself has made the most significant concessions, and biologists are now well aware that the dogma can be no longer maintained. Choose your own instances and you may make anything ridiculous—to those who have not discrimination enough to appraise your method. If the belief of Lamarck, amplified and upheld by Spencer for decades against an

overwhelming majority, be construed into an assertion that cutting off a rat's tail will make its progeny tailless, or the similarly indefensible assertion that the giraffe has its long neck as a result of the incessant stretching to which that structure has been subjected by its hungry ancestors, or the inane joke about man's loss of his tail by virtue of his ancestors sitting upon theirs—then certainly Larmarckism is sheer nonsense. But Weismannism has been reduced to just such blatant absurdity by some of its adherents, who deny that germ-cells, for instance, can be affected by the presence of alcohol in the body-fluids which circulate in the individual containing them *and by which* they are themselves nourished—or injured. Pledged to deny that any circumstance connected with the individual can in any way affect his offspring, these enthusiasts are compelled simultaneously to flout fact, logic, and probability.

The first thinker to propose the theory now known as Lamarckism was Erasmus Darwin, physician, zoologist, and poet, who was Charles Darwin's grandfather. Thus Darwinism would be perhaps the best and most accurate name for Lamarckism. Erasmus Darwin's enunciation, however, of the principle that individuals alter by reaction with their environment, and transmit the altered or acquired character to their descendants, was extremely vague. But in his *Philosophie Zoologique*, which appeared in 1809, Jean Baptiste de Lamarck, already a man of sixty-five, gave de-

tailed expression to this theory. Undoubtedly he exaggerated its importance, and it is significant that the general doctrine of organic evolution did not through it gain acceptance, but had to wait fifty years until Darwin's assertion of another factor came to its aid. At the present time, the Lamarckian principle is in low repute, despite the acceptance of it by Darwin and Spencer's long championship of it.

Nevertheless, it would be unwise to omit this principle—the inheritance of acquired characters—as a factor in organic evolution. It is assuredly of more than historic interest. In his latest book, the *Wunderleben*, Professor Haeckel declares his continued adherence to a belief in what the school of Weismann so strenuously deny; and Haeckel's discussion of the subject is heartily to be recommended to the student, for, though the veteran evolutionist of Jena is not above resort to indecency in theological controversy, and is merely ridiculous as a philosopher, he certainly disputes with Weismann the honor of being the greatest living biologist, and he has been fighting the battle for organic evolution ever since 1866.

Professor Haeckel adduces, in the book named, an unquestionable instance of the transmission of acquired characters. Every one knows that when pathogenic or disease-producing bacteria are passed through the body of a highly susceptible animal, they become possessed of a much greater degree of virulence than formerly. More accurate-

ly stated, this resolves itself into the assertion that the progeny of such bacteria, often after tens or hundreds of generations, are possessed of a character which was acquired by their ancestors during their passage through the body of the susceptible animal. This is as clear a case of the transmission of acquired characters as any one can ask for. It does not follow from this that all acquired character, in one of the higher animals or plants, can be transmitted; but it is something to have an instance, familiar and indisputable, which cannot be reconciled with the dogma of Weismann.

Certain acquired characters cannot be conceived to affect the germ-cells of an individual of one of the higher types. These cells are certainly not, as Darwin supposed, formed by pangenesis—that is to say, by contribution of representative units from all the cells of the body. On the contrary, we are now compelled to believe, with Weismann, in the doctrine of the "continuity of the germ-plasm," which asserts that the original cell from which any individual is formed divides into two portions, one of which becomes the individual and the other his own germ-cells. If this be true, acquired characters can be transmitted only when they can influence the germ-cells through the blood-stream. Certain characters, such as immunity to disease, may conceivably be thus transmitted, but there is no room for belief in the transmission of such an acquired character as baldness, any

more than of such characters as dust-laden fingernails or acquired ideas.

Turn we now to the factor of organic evolution which is known as natural selection or the survival of the fittest. The history of this idea has already been alluded to, in relation to atoms, societies, and living species. For a further discussion of it the reader may be referred to the historical sketch prefixed to the later editions of the *Origin of Species*. But though Darwin was preceded by other thinkers, in biology and other realms, in the enunciation of this idea, and though the famous paper read before the Linnæan Society in 1858 was the joint product of Darwin and Mr. Alfred Russel Wallace, yet it is beyond all question the name of Charles Robert Darwin, the greatest biologist of any age, that will ever and rightly be associated with this idea. Others had enunciated it, but he alone demonstrated its truth. We learn from an early letter[1] that he began to collect facts bearing on the question of the origin of species nearly twenty years before his masterpiece saw the light; and his great labors did not cease for more than twenty years thereafter. The idea of organic evolution had been hinted at, or definitely supported, by his grandfather, by Lamarck and Goethe and Spencer and Robert Chambers,[2] but it was not until the

[1] Published in *More Letters of Charles Darwin* (John Murray).
[2] Now known to be the author of the once famous *Vestiges of Creation*.

factor of natural selection was demonstrated by Darwin that the doctrine of special creation received its death-blow. The average man, and even the professed biologist, had not the mental fervor of Spencer, who renounced the old doctrine in 1840, when he was still an infant in the eyes of the law, and who was destined to spend many hours in trying to convince Huxley of the truth of organic evolution. Spencer accepted it at this early date not because he was unaware of the difficulties in the way, but because he saw that there was no choice save between special creation and evolution, and because he recognized the old dogma as really a "pseud-idea," in the last resort "unthinkable."

But our business here is to inquire into the status of the idea of natural selection to-day, nearly half a century after Darwin's enunciation of it. It is but eleven years since the late Marquis of Salisbury,[1] in his notorious Presidential Address delivered before the British Association at its Oxford meeting in 1894, declared that "no one had seen natural selection at work." Since then, however, we *have* seen natural selection at work in more than one instance. There is abundance of experimental evidence to support the retort of Herbert Spencer that the opposite of

[1] Among the distinguished men of the nineteenth century who rejected its main contribution to thought were Salisbury, Disraeli, Gladstone, Carlyle, Ruskin, and Newman. With these the name of Emerson may be contrasted.

the survival of the fittest—viz., the survival of the unfittest, is inconceivable.

It is impossible in a work of this scope to treat all details in such complete fashion as one might desire; and it is necessary, therefore, to refer the reader to a volume by an expert which will suffice to convince him that, in such instances as the shore-crabs near Plymouth Sound and the English sparrow introduced into North America, the action of natural selection has been demonstrated. For this purpose the reader should consult *Variation in Animals and Plants*, by Dr. H. M. Vernon, of Oxford.[1]

We may take it, then, distinguished amateurs notwithstanding, that natural selection, or the survival of the fittest, is a fact. We shall necessarily recur to it when we come to consider the ethics and the ethical forecast of the evolution theory. Meanwhile we must briefly note the conditions upon which its action depends; the primal conditions of heredity and variation being, of course, taken for granted.

Natural selection is not an inevitable and constant factor in the course of animal and vegetable life. The popular fallacy that progress is an invariable law of nature appears to depend upon the idea that natural selection is always and necessarily in operation. But its existence was suggested,

[1] This is volume LXXXVIII. of the International Scientific Series (Kegan Paul, Trench, Trübner & Co.). See especially chapter xi., "The Action of Natural Selection on Variations."

both to Darwin and Wallace, by consideration of a *special case.* This is the case discussed by Malthus in his famous essay on population, published in 1798. Malthus discussed the consequences of an increase of population in geometrical progression while the necessaries of life increased only in arithmetical progression. In other words, he discussed the case of what Wallace calls the "struggle for existence." If the means of subsistence be superabundant, natural selection can scarcely operate. It depends for any considerable sphere of action upon the occurrence of a struggle for existence. Given such a struggle, it stands to reason that the fittest must survive. That there be no struggle may perhaps be conceived as the happiest, the ideal, state of affairs; but given a struggle, it follows that the law of natural selection is a beneficent one, as Darwin clearly showed. Unfortunately, these considerations, very imperfectly thought out and uncorrected by any others, have led such writers as Nietzsche and his followers to assume that might is right, and that science has demonstrated the uprightness and expediency of the doctrine "Each man for himself, and the devil take the hindmost." In a subsequent chapter it will be shown how imperfectly and rudely the Nietzschean doctrine is in correspondence with the facts.

On that factor of organic evolution which Darwin discerned and named sexual selection we need

not dwell here; or, at any rate, we need not recount the main theses of the *Descent of Man*, for that work, like its predecessor, may now be purchased for a sum so small that no one who affects an interest in the science of life can confess that he does not possess a copy of it.[1]

My purpose, in this as in other instances, is to show that recent study has confirmed the beliefs of the evolutionists. Darwin himself, after much consideration, said, "I still strongly think . . . that sexual selection has been the main agent in forming the races of man." The Darwinian idea is based partly on the conception of *struggle*, partly on the conception of *taste*. Males with certain advantages, such as fleetness and strength, would tend to leave more offspring than their rivals; while the taste of the females would choose certain males rather than others, and so would tend to perpetuate and accentuate certain characters. The male beard, for instance, is a "secondary sexual character" so produced.

This idea of sexual selection has lately undergone a most interesting development at the hands of Professor Karl Pearson and his followers. Professor Pearson distinguishes two kinds of sexual selection. The first, which Darwin discussed, is based on the conception of taste and may be called

[1] In England the *Origin of Species* (the somewhat imperfect edition issued by the Rationalist Press Association) may be had for fourpence halfpenny, and the *Descent of Man* for half a crown.

preferential mating. It probably exists in human society at the present day, but great difficulties are encountered in the attempt to measure it. The second kind of sexual selection may be called *assortative mating.* It depends on the fact that *like tends to mate with like.* This principle of *homogamy* may indeed turn out to be that "unknown factor" in organic evolution which many have declared to be the operation of design on the part of a Creator. Homogamy may indeed have been a necessary factor in the isolation of species as we know them to-day.

In its widest sense, homogamy is, of course, an obvious fact. The bird does not mate with the mammal, nor the reptile with the insect. Furthermore, the dog does not mate save with the dog, nor the sparrow with any bird not of its own kind. These are obvious illustrations of that kind of sexual selection which Professor Pearson calls assortative mating. But what he has discovered is the extension of this principle to mating within the limits of the species; or, at any rate, he has shown it in the case of man.

Professor Pearson and his coworker, Professor Weldon, have made a most exhaustive research upon human marriage from this point of view, by studying, for instance, the tombstones of rural Oxfordshire, the dales of Yorkshire, and the London cemeteries; and by inquiries into pedigrees, such as those furnished by the Society of Friends. These studies have given them material for esti-

mating the extent to which people of strong constitutions marry their like and conversely, since longevity, as recorded on tombstones, may be taken as a criterion of general bodily vigor. In addition, thousands of married persons have been examined with regard to height, eye-color, and many other characters.

The biometricians have thus been able to show, by statistics analyzed and checked in a manner quite impossible for any but the trained mathematician and logician, that, for instance, a blue-eyed man is more likely than a brown-eyed one to marry a blue-eyed woman. People with a "strong constitution" (estimated as we have seen) tend to marry their like; short men tend to marry shorter women than do tall men—and so forth, over as many characters as have hitherto been examined. Various possible fallacies have had to be excluded, such as the effect of resemblance among local races, and the effect of exposing husband and wife to the same environment; but the essence of biometry is that it seeks all possible explanations and then proceeds systematically to test them. After so doing, the conclusion in this instance is that "there is a real selection in marriage between husband and wife on the basis of general constitutional resemblance."

Now if this be true of man, may we not reasonably expect homogamy to occur in lower forms of life? This may surely be expected, unless we agree with Darwin that sexual selection depends upon the

existence of some considerable measure of æsthetic perception. There is reason to believe, however, that homogamy is not conscious and deliberate, depending upon an exercise of "taste," but is unconscious and "instinctive." Professor Pearson has been able to find record of only one research into this subject besides his own; but this is directed to an order of living creatures so remote from man that it perhaps justifies us in drawing an inference as to the existence of homogamy in intermediate orders of life. The research is that of Professor Raymond Pearl, of the University of Michigan, on the conjugation or mating of the *paramœcium*, a unicellular animal about one-hundredth of an inch in length, which no one would accuse of possessing high perceptive or æsthetic powers. By making many thousands of careful measurements, Professor Pearl has been able to show that a paramœcium of a given size tends to mate with another of the same size.

The general significance of these recent biometric studies is very wide indeed. It is plain that homogamy, if indeed, as is probable, it acts throughout the realm of animal life,[1] must tend to split up races into endogamous groups, the individuals of which marry only within the group-limit, and

[1] It will be important and necessary, I fancy, to ascertain whether what we call homogamic unions tend to be more fertile than those between widely different individuals. If so, it is quite evident that the same principle may act in the vegetable world. Professor Pearson tells me that this question has scarcely been investigated.

which therefore tend to diverge more and more from each other in physical characters. Here I cannot doubt that we have a most important factor in organic evolution.

The factors of organic evolution hitherto named are adaptation with inheritance, natural selection, sexual selection, homogamy, and what De Vries calls mutation. Are any others yet to be discovered? The answer to this question depends on our estimate of the adequacy of these factors. Probably most biologists would say that they are completely adequate. There will long remain, however, critics who will attempt to show that these cannot be regarded as adequate for the production of the multitudinous species that exist to-day and have existed in time past, without aid from a principle of *telesis*, or *design*. One author succeeds another[1] in the attempt to show that Darwinism is a half-truth, and that without a principle of "directivity" the facts cannot be explained. But as this belief depends upon an assumption of an anthropoid Deity, we may leave it to stand or fall therewith.

[1] Such as the Rev. Professor George Henslow, in his *Popular Rationalism Critically Examined.*

XII

THE ORIGIN OF MAN[1]

MUCH important work has been done in the elucidation of the most interesting inference from the theory of organic evolution since the publication of Huxley's *Man's Place in Nature*, in 1863, and Darwin's *Descent of Man*, in 1871. The most important of the recent works on this subject have issued from the Anthropological Laboratory of the University of Cambridge, which can claim some share in Darwin, and still more in Darwin's sons.

The nearest animals to man are the chimpanzee, gorilla, orang-outang, and gibbon—the four kinds of anthropoid ape. No amount of correction will apparently destroy the popular error that man is descended from one or other of these apes. This, however, no biologist has suggested. What all biologists believe, nevertheless, is that man and certain of these apes have a common ancestor. Both Darwin and Huxley thought the chimpanzee and the gorilla to be the apes most nearly related

[1] Professor Haeckel's *Anthropogenie*, translated into English as *The Evolution of Man* (Watts & Co., 1905), is, despite the author's well-known peculiarities, the best work on this subject.

to man, and the present opinion appears to give the preference, on the whole, to the chimpanzee; while agreeing with the general conclusion of Darwin that man, the gorilla, and the chimpanzee are derived from a common ancestor now extinct. This ancestor may perhaps have more nearly resembled the gibbon than any other existing form.

The older evidence for man's relation to the anthropoid apes is familiar to all. He resembles them in physical structure to an almost incredible degree. He shares with the chimpanzee and the gorilla some three hundred structural features which are not even possessed by any of the lowest order of monkeys.[1] His earlier stages of development are quite indistinguishable from those of the anthropoid apes, about the embryology of which very little was known in the early days of evolution. But recently there have been discovered two noteworthy facts which are of theoretical interest and may prove to be of great practical importance.

In the first place, it has recently been found that there is a *whole series* of diseases which are common to man and the anthropoid apes, but which attack no lower animal. For long these were thought to be peculiar to man alone, but Metchnikoff and his fellow-workers at the Pasteur Institute have shown that certain of them can be communicated to the anthropoid ape, and that protective or cura-

[1] See *Nature*, March 9, 1905, p. 434.

tive sera can be produced in this fashion.[1] This fact clearly points to a profound resemblance in the bodily chemistry — a physiological similarity no less striking than the anatomical resemblances so familiar—of man and these creatures.

The second recent discovery points in the same direction. It has lately been shown that the blood of each species of animal differs radically from that of every other. Hitherto it has hardly been possible for the expert, summoned to give evidence in a trial for murder, let us say, to decide whether or not specimens of blood submitted to him are human or not. Mammalian blood could be distinguished from, say, the blood of birds, by means of the characteristic shape of the blood-corpuscles which is common to all mammals save the camel; but to distinguish between the blood of a man and a dog was often impossible. Now, however, it has been shown that when the blood of a given animal, say a dog, is injected into the blood-vessels of an animal of another kind, such as a cat, the red corpuscles of the cat are destroyed and disintegrated; whereas if the dog's blood be injected into another dog no such disintegration occurs. Hence, in distinguishing between the blood of a man and a dog it is only necessary to make a sterile solution

[1] The close relation of man to the anthropoid apes has lately raised in remarkable degree the market-price of these creatures. Every living specimen that reaches Europe is bid for, by letter and cable and telegram, by workers at medical problems in Paris, London, and Berlin.

of the blood stain and inject it into a dog. If "hæmolysis" occurs, the blood cannot be canine; if it does not, the blood must certainly be canine. Now the astonishing and even bizarre fact is that the blood of the anthropoid ape gives the characteristic human reaction, while the blood of the lower monkeys does not. In other words, the blood of man and of the anthropoid ape are identical when judged by this, the most subtle and delicate of all known tests.

To the evidence of anatomy in favor of man's intimate relationship with the anthropoid ape there has, therefore, been added that of comparative pathology, of embryology, and of physiological chemistry. Many more facts might be adduced, such as the recent discovery that a function hitherto thought to be characteristic of the human female is also displayed by the anthropoid ape. Henceforth he who doubts that man and the chimpanzee have a common ancestor must be congratulated on his inviolate mind. Facts have no terrors for him.

But here we may note a great reservation which, in utter defiance of logic or the evidence, but in accordance with their prepossessions, is made by some who are prepared to admit the simian origin of man's body. Chief of these is Mr. Alfred Russel Wallace, who long ago distressed Darwin by declining to accept the conclusion that man's mental or psychical characters have ascended by the same "base degrees" as his body. For their view there

is not an iota of evidence. It is not only inherently untenable, as palpably depending not on facts but on what Professor William James calls the "will to believe," but it is compelled to ignore the inseparable relation between man's mental characters and his physical structure, while it can only be held by those who are totally ignorant of the most elementary facts of comparative psychology. Nevertheless, it is plain that this doctrine of the independent and mystic origin of the human mind will continue to be supported when none but such as believe in the flatness of the earth and the like will be found to support the theory of the special creation of man's body. Thus we find the position of Wallace to be the furthest that is taken by the most enlightened theologians of to-day, and, indeed, it is evident that no theologian can possibly afford to go further. But whoso cares to consider the now undisputed origin of the human body, and the fact that the mind of each individual human being is developed in association with the development of a speck of protoplasm barely visible to the naked eye, will scarcely be found ranged among the few who keep the flag of special creation still flying in this last stronghold —a castle in the air, if ever there was one.

Given, then, that man's past is simian, what of his future? In the next chapter we must consider the possibility that "the best is yet to be."

XIII.

EUGENICS—THE FUTURE OF MAN

If this present generation suddenly became self-conscious as a whole, and asked itself how it came to be, the answer would refer its genesis to the marriage of *certain* members of the last generation. Now, among our predecessors were numbered men of character and men of none, saints and criminals, athletes and weaklings, lovers of beauty and Philistines, Cornelias and Messalinas. Of these our *amour propre* would lead us to choose some rather than others, could we decide, and this inclination may surely be regarded as evidence of a popular, if not an explicit, belief in *heredity*. We feel that we are not to be regarded as entirely independent of our ancestry. Similarly, if heredity be a fact, it is evident that all future history, that human destiny on this not yet moribund earth, is bound up with the *selection*, conscious or other, of present individuals whose blood shall visit men's sad or happy hearts in all time coming.

Now this chapter is written with the object of introducing, to the grave consideration of such persons as can induce that mental state, the study

which concerns itself with all the influences that can improve the inborn qualities, physical, intellectual, and moral, of our own or any race. But before outlining the recent history of this study, which its author, Mr. Francis Galton, has called eugenics—surely a happy term—let us inquire whether any influences are already extant which tend to such improvement. For it is now accepted by thinkers of all schools that the great thesis implicit in the masterpiece of Mr. Galton's illustrious cousin, Charles Darwin, is a proven truth. The human race, as we know it, *is* the contemporary product of æons of improvement. To this our brains, our backbones, our thumbs, our religions, our symphonies, our manners bear witness. Now, while biologists still discuss among themselves the relative importance of the factors in organic evolution, they have ceased to question the enormous influence of that factor which Darwin discovered and named natural selection. Indeed, the current question is whether natural selection is the only factor, as Weismann asserts, or merely the principal factor, as Darwin himself maintained. In brief, we may take it that, of any generation, whether of mosses or mice or men, the fittest tend to be more largely represented than the less fit in the succeeding generation. The fittest, however—as no amount of didactics will make the many understand—are not necessarily the *best*, but are merely those best adapted to the conditions of the environment. These conditions, however,

owing to the appearance of man's moral sense and higher intellectual faculties, have made the survival of the fittest to coincide with the survival of what we are pleased to consider the best. In other words, there is already at work a most potent force that has long made and is still making for the improvement of the human breed—which, indeed, owes to that force its very origin. Now by means of eugenics, as I understand it, Mr. Galton merely proposes to enlist man's conscious co-operation with and encouragement of the factor which Darwin and Wallace discovered. It is not unfitting that this great biologist should be the prophet to the twentieth century of the application of that principle which his cousin, the greatest biologist of any age, constituted the chief revelation of the nineteenth century.

We may observe the operation of the eugenic principle at this hour by studying the "expectation of life" among married and unmarried persons. As every one knows, the married live longer than the unmarried, a fact which was accepted as proving that marriage is conducive to long life, until Spencer analyzed it in his *Study of Sociology* and showed that the married are already the selected of their generation. On the average, the married man was fated to marry because of certain characters—such as physical beauty, efficiency, "attractiveness," love of domesticity, fondness for children—which make him more valuable to the race than his less fortunate fellows. Certain it is

that, whether or not Mr. Galton has his way, and despite the witty and worthless criticism of the popular critics, the eugenic principle cannot be excluded from its benevolent rôle in human affairs.

But it is evident that I have hitherto begged the fundamental question, a fault of which Mr. Galton himself has been accused by certain distinguished medical critics, such as Dr. Henry Maudsley and Dr. Charles Mercier. What is the use, they say in effect, of proposing to improve the human breed by invoking the principle of heredity when our Shakespeare, for instance, was the son of undistinguished parents, and had five utterly commonplace brothers? Now, of all the men to face with such a question, surely Mr. Galton was the last. If the critics would inquire, they would discover that his proposals are the logical outcome, in this his ninth decade, of all his previous life-work. Is not he the author of *Hereditary Genius*, who has proved up to the hilt that intellect is transmissible and is transmitted? Is not Mr. Galton himself a member of a family which would prove his case if it stood alone, as it does not? His relatives number Josiah Wedgwood, Erasmus Darwin, the forerunner of evolution, Charles Darwin, and Professor George Darwin, the president of the British Association for 1905, one of three brothers, sons of the great Charles, all of whom are fellows of the Royal Society on their own merits. After this there is little need to refer to

Thomas and Matthew Arnold, the Bach family, or the hundreds of instances which might be quoted.

But let us, in this connection, glance at the recent history of the subject. It had its beginning in Mr. Galton's mind decades ago—doubtless under the influence of Plato's discussion of the subject in the *Republic*. Mr. Galton first invented the term stirpiculture, now popular in America. But latterly the inchoate idea has developed in Mr. Galton's mind, and was the subject of his Huxley Memorial Lecture, delivered before the Anthropological Institute, London, three years ago. Now, Mr. Galton is not only the student of finger-prints whose work is now invaluable to the police, not only the author of *Hereditary Genius*, but he is the first to apply mathematics to biology, the first *exact* student of heredity. This new study his disciple, Professor Karl Pearson, has called biometrics, and it was fitting that Mr. Galton's Huxley Lecture should be followed by Professor Pearson's, which proved, by the use of the Galtonian method, that mental and moral characters are *as surely transmitted by heredity as are the physical*. But this is not all my answer to those who declare that heredity is incalculable and that we had better let well alone. Since Mr. Galton was drawn from his retirement by the Sociological Society in the summer of 1904, and read his initial paper on eugenics, he has instituted an inquiry of the utmost interest among the fel-

lows of the Royal Society.[1] Mr. Galton addressed to every fellow of the society a form containing queries concerning his relatives, which the fellow addressed was to fill in with the details requested. The inquiry has produced a mass of results which have been subjected to strict mathematical analysis, and which conclusively prove that there exist, in this country at the present day, certain families the individuals of which are of priceless value to the community and to the race at large. Even this limited inquiry has revealed the existence of at least nine families of the very first distinction, besides a large number of almost equal value, among fellows of the Royal Society alone.

Having done this piece of work, Mr. Galton saw that the time for further action had come. He therefore presented to the University of London an initial sum of £1500, to be spent within three years, for the establishment of the "Francis Galton Research Fellowship in National Eugenics." The first election to this fellowship has now taken place, and the honor has been awarded to Mr. Edgar Schuster, M.A., F.Z.S., late holder of a science scholarship at New College, Oxford. Mr. Schuster has already contributed important papers to *Biometrika*, and has studied such sub-

[1] Mr. Galton's paper on eugenics, together with a discussion to which the leading biologists and psychologists of the day contributed, and his paper on the results of this inquiry are to be found in *Sociological Papers*, a volume recently published by Messrs. Macmillan for the Sociological Society.

jects as heredity in mice and the characters of the ancient British skulls in the Oxford collection. He is now well established in University College, with the engaging legend "Eugenic Record Office" inscribed over his door. Mr. Galton, the University of London, and the eugenic cause are to be congratulated on obtaining the services of a student so enthusiastic and skilled. Perhaps Mr. Schuster, to whom I am personally unknown, will forgive me for instancing him, as I have already instanced Mr. Galton, in illustration of the contention that heredity is a fact not only in matters of cranial form, let us say, but also in matters of intra-cranial product. He is a nephew of Professor Arthur Schuster, of Manchester, and Mr. Felix Schuster; son of a distinguished specialist in international law, Dr. Ernest Schuster; and grandson of Sir Hermann Weber, M.D. Like Mr. Galton himself, he has every reason to believe in eugenics.

It is stated by the university, in preliminary terms, that "Mr. Schuster will, in particular, carry out investigations into the history of classes and families, and deliver lectures and publish memoirs on the subjects of his investigations." Let me here briefly indicate what Mr. Galton conceives to be the most immediate demands which eugenics makes of this, its first authorized student. We want a biographical index of gifted families, modern and recent—an Occidental and scientific adaptation of the Golden Book of the Chinese. This

index, together with the biographies of capable, though hardly gifted, families, may be published. Not for publication will be a collection of biographies of families distinctly below the average in health, mind, or physique. To this end the records of asylums, hospitals, and prisons must be consulted. Then we must utilize all the invaluable aid to be afforded by the data of insurance offices. Most important, also, is it to study what I may call the *social circulation*. We must know the birth-rates of every class in the community, and must determine how far each class is derived from and contributes to its own and the other classes. It is known, in general, that society is an organism which perpetually renews itself *from below*, but the particular strata which are foremost in reproduction are not known. The highest and lowest strata are constantly replenished from some intermediate levels. Further, Mr. Schuster will endeavor to collect and catalogue the enormous amount of literature already extant which bears on the subject of eugenics, not forgetting to avail himself of the experience of horticulturists and breeders of stock.

Then, again, there is almost endless work yet to be done in the field of heredity. Notably do we want to know the effect on the offspring of differences in the parental qualities. Mr. Galton also considers desirable a study of Eurasians (the descendants of English and Hindoo parents), both as a topic of national importance to Britons

and in relation to the theory of heredity which we owe to the long-neglected work of the Austrian abbot Gregor Mendel.

The eugenic proposal is that it will be well if the best of each generation contribute more—much more—than their share to the making of the next. It is obvious that there are positive and negative aspects to this intention. Let us for a moment look at the latter.

Objectors declare that love, which notoriously "makes the world go round," will laugh at eugenics as at locksmiths; we need not fancy that people will tolerate any interference with their matrimonial intentions. Mr. Galton has made an extended answer to this objection in a recent paper which must be summarized here. Already we know that, in our own day, public opinion is a potent restriction upon marriages between, for instance, first cousins, and persons very disparate in social status. If it can control these, why not also the marriage of the epileptic, the "borderland" insane, the consumptive, and the criminal? But Mr. Galton has invoked history and anthropology in this paper, most inappropriately read before the Sociological Society on St. Valentine's day. Already man, who is not a monogamous animal by nature, has submitted to the monogamic restriction. The Greeks, the Romans, and the modern Hindu have submitted to the custom of endogamy, which forbids marriage outside the caste or tribe or the patrician or Hellenic group.

Endogamy has been sanctioned by religion and enforced by law in all ages and in all parts of the world. Similarly exogamy—the duty enforced by custom, religion, and law of marrying *outside* one's own tribe—is, or has been, as widely spread as the opposite rule of endogamy. The primitive Australian, again, submits to marriage restrictions still more grievous. The tyranny of taboo need only be mentioned. Then, again, every one, in all times, has submitted to the restriction of prohibited degrees in matrimony. The Roman Catholic may not even marry a third cousin, and marriages of first cousins are discouraged, though the evidence that they tend to racial deterioration is practically *nil*. Custom, also, is the main factor in producing our objection to incest. In truth, this supposed irresistible, incoercible, all-devouring passion of love can scarcely arise when religion or custom or law, or all three combined, tend to render its consummation by marriage impracticable. Lastly, we have the dictates of religion as to celibacy. When eugenics is incorporated into the national conscience and has become, as well it may, an integral part of our religion, the duty of celibacy may well be enforced upon those whose progeny are palpably likely to be a burden to themselves and the community.

At any rate, if ever an objection was widely and finally disposed of, it is so with the objection that eugenics is impracticable because no one will tolerate any interference with his or her matri-

monial intentions. Mr. Galton has conclusively disintegrated that criticism by his brief discussion of the facts of monogamy, endogamy, exogamy, Australian marriages, taboo, prohibited degrees, and celibacy. Persons, as he says, who are born under these various rules live under them without any objection; they are unconscious of their restrictions as we are unaware of the atmospheric pressure.

We may observe, then, that the negative part of Mr. Galton's proposals is one which has long been bruited, is unquestionably practicable, and, in the case of the insane, is applauded by all. In this, its struggling infancy, eugenics does not propose to tamper with marriage, nor to outrage public sentiment, both of which its protagonists respect. Nor do I for one moment believe that when eugenics is everywhere recognized, and its name is as familiar as, let us say, politics, it will propose any injury to or detraction from the dignity of the central and fundamental institution of society; on the contrary.

Surely even less objection than to the negative part of the eugenic proposals can be taken to the positive. These will readily suggest themselves to all who appreciate the eugenic idea; and when, haply, the object of ennobling our race is enthroned among men's ambitions, the positive proposals of eugenics will need no enumeration or academic support. It used to be stated that each man's duty to the state included the begetting and up-

bringing of as many children as possible. If this were so, the current fall in the birth-rate, common to us with all other civilized countries save Russia, would attest to a grave and wide-spread dereliction of civic duty. But the somewhat uncritical advice of President Roosevelt is sublimated and exalted when the eugenic idea is applied to it. As Sir Francis Younghusband said at Mr. Mackinder's lecture in London on "Man-power as a Source of National Strength": "For the maintenance of empire we want not merely large numbers of men, but men of character and ability—we want not only quantity but quality. . . . What we have to do, as a people, is to try and maintain the high qualities of our race." Had Sir Francis said "maintain and enhance," he would have precisely expressed the eugenic ideal. When this is common property, and when we have a national roll of distinguished families, men will be as proud of being inscribed and of having their children inscribed on that roll as of having had an ancestor, probably worthless, who came over with the Conqueror. The man who is conscious of worth of any kind will make many personal sacrifices in order that he may leave as many children as possible to perpetuate it. In seeking a partner, he will learn to attach a greater value than heretofore to fine qualities, moral or intellectual, in the woman of his choice; for he desires to be written in the Golden Book, and he knows that his children will be the more likely to earn enrolment there if

their mother be "a perfect woman, nobly planned." Similarly your true altruist, conscious of some grave physical flaw likely to be perpetuated, will renounce any possibility of satisfying even the noble desire of parenthood.

Certain objectors seem to imagine, despite the unequivocal language of Mr. Galton, that he wishes to turn out all men on one pattern; in short, that this foremost student of heredity does not know the value of variation! Further, they say that no one is agreed as to what is best; some would wish all men to be scientists, others long for an elevation of æsthetic culture alone. Mr. Wells objects that the average criminal is probably superior in racially valuable qualities to the average judge; and since no one is agreed as to what we want, we need waste no time in trying to obtain it.

But hear Mr. Galton: "Postulating existing social groups [artist, financier, biologist, journalist, and what not], and existing moral criteria, eugenics aims at the reproduction of the best specimens of individuals—in *each* of those groups in which the characteristic activity is not demonstrably antisocial, as in criminals." We want as much variety as ever, but we want the best possible of each variety. The practice of eugenics would thus raise the average quality of a nation to that of its better moiety of the present day: men of an order of ability (in a thousand spheres) which is now rare would become more frequent, because the

level out of which they rose would itself have risen. We should still have demagogues, no doubt, and a gallery for them to play to; but the gallery would be a whit more discerning than the many-headed of to-day.

The first great need is that the thinker and the student shall accept eugenics as a study worthy of prosecution. Thereafter we must work at it with diligence and patience; and then, but not till then, it must be "introduced into the national conscience, like a new religion."

To oppose eugenics with success, it must first be demonstrated that the alleged facts of heredity are not facts. If, however, they be admitted, it inevitably follows that an improvement of the human race, in accordance with certain ideals which we all accept, is theoretically possible. Here other objectors may add, "but, as a matter of fact, impracticable." But no one will say, however high he rate the potency of love and its refusal to brook interference, that the marriage of the insane and the criminal cannot be prevented; yet this would palpably be a eugenic measure. Nor do I, for one, think so poorly of my fellows as to disbelieve that no small number of them, when the eugenic ideal has been fairly presented, will be willing even to "strive and agonize" for an object the superior or the peer of which has yet to be named—the intellectual and moral ennoblement of our kind.

XIV

SPENCER'S CONTRIBUTIONS TO BIOLOGY

SEVEN years before the publication of the *Origin of Species*, Spencer published two biological essays, in one of which, *The Development Hypothesis*, he supported the theory of organic evolution, and in the other, *The Law of Population*, expressed his discovery of the missing half of the truth announced by Malthus in 1798. The *Principles of Biology*, the second instalment of the synthetic philosophy, appeared in the years 1864–1867. In this chapter I desire to note those particular views of Spencer, the philosophic biologist, which are accepted as part of biological theory to-day. His *Law of Population*, however, is so important from a higher than the purely biological point of view that it will not be discussed here.[1]

The *Principles of Biology* is a very long, very solid, and very expensive work, and we may guess that the publishers, who have now begun to issue the volumes of the synthetic philosophy in cheaper form, will defer these volumes to the last. Never-

[1] See chapter, "The Grounds of Rational Optimism."

theless, they must always constitute a classic in the history of our knowledge of life, not merely because of the special points on which they illuminate the study of biology, but also as the first and most complete exposition of the theory of organic evolution, including the evolution of life. Spencer was wise to know that he could not afford to do without the assurance of experts, and so his pages were read and criticised in proof by Huxley and Sir Joseph Hooker, whose expert knowledge of zoology and botany were thus marshalled in aid of Spencer's general and philosophical treatment of the problems involved. A further advantage of the *Principles of Biology* is conspicuous to-day. It is that the work is an exposition of organic evolution which is independent of the truth of any particular explanation or series of explanations of its factors. In support of this contention we may read the words of Huxley when seconding the vote of thanks to Lord Salisbury after his address to the British Association in 1894: "If all the conceptions promulgated in the *Origin of Species* which are peculiarly Darwinian were swept away, the theory of the evolution of animals and plants would not be in the slightest degree shaken." In this connection one may also quote the words of Dr. Merz:[1] "In fact, the general principles of mechanical evolution, as first systematized by Mr. Spencer, received recognition

[1] *History of European Thought in the Nineteenth Century*, II., 347.

only through a special formula [that of natural selection], but may, after all, survive that special doctrine." What is daily becoming more evident, but was unrecognized by Lord Salisbury, is that if the *Origin of Species* were consigned to oblivion the creationists would not have begun to touch the foundations or the superstructure of the *Principles of Biology*, which was planned and partly written before the great work of Darwin appeared. As a matter of fact, the years bring naught but added strength to each of these corner-stones of biological science.

In the *Principles of Biology* we find, in the first place, what is nowhere to be found in the writings of either Darwin or Huxley—a systematic attempt to grapple with the central question of biology, the nature of life. Spencer's definition of life, which, in its shortest form, is, "The adjustment of inner to outer relations," is certainly the only definition which has stood the test of time, and notably the discovery of radium and radio-activity, which form so interesting a comment on Thomas Aquinas's definition of life as "self-movement." But Spencer was not the man to cheat himself with words, and he fully realized that, in the last resort, the nature of life is incomprehensible: "It needs but to observe how simple forms of existence are in their ultimate nature incomprehensible, to see that this most complex form of existence is, in a sense, doubly incomprehensible; . . . only the manifestations of life come within the range of

our intelligence, while that which is manifested lies beyond it." Subsequent study affords no indication that the mystery will ever be solved. The production of life in the laboratory, which is yet a very long way off, would not in the smallest degree serve to reveal to us the essential nature of life, whose "phenomena are accessible to thought, but the implied noumenon is inaccessible." [1] Nevertheless, for the fullest philosophic consideration of the problem of life, philosophic in the sense of being broad, not of being verbal and in the last resort no more, the student must consult these pages.

Let us next note another little-known but important contribution to general evolutionary theory which we owe to Spencer the biologist. Every living organism begins as a single cell; but there invariably comes a time when, if the cell reaches a certain size, it begins to divide. It is this division that conditions the development of the heterogeneous multicellular individual from the homogeneous unicellular creature which, whatever the size to which it grew, could never be other than a lowly and primitive object. Now, Spencer's law of limit of growth teaches that, as a cell enlarges, its *volume* increases at a greater rate than its *surface*, as is evident. Now it is by its surface that the cell maintains its relations with its environment and absorbs nutriment. The limit of cell-size is therefore a mechanical problem. When the

[1] Latest edition of the *Biology*, I., 120.

cell-size is such that its surface ceases to bear a high enough ratio to its volume, it must starve or divide. Hence the facts of cell-division and the observed limits of cell-size.

But this is very much less important than another result of Spencer's study of the cell in its relation to heredity. We commonly call the cell the unit of life; but this is to ignore the fact that in such cells as those by which individuals of the higher species are reproduced there must be an enormous number of smaller living units. On no other hypothesis can we begin to form any mental picture of the familiar facts of heredity. Spencer's study of the facts led to what Grant Allen, in his monograph on Darwin, calls the "magnificent all-sided conception of physiological units." The vast importance and the amazing adequacy of this conception, reached by the sheer intellectual power of one who was, in the literal sense, merely an amateur of biology, are attested in many ways. An indefinite number of leading biologists have followed in Spencer's track, each reproducing the "physiological unit"[1] in different language but with some lack of its completeness. Imperfect subsequent expressions of it are the micellæ of Nägeli, the idioplasm of Weismann, the compound organic molecule of Pflüger, the plastidule of Haeckel, and half a score more. For an estimate

[1] The essence of the idea is that of a living unit intermediate between the morphological unit, which is the cell, and the chemical unit, which is the molecule, *e.g.*, of albumin.

of the importance of this idea the reader may consult such a standard work as that of M. Yves Delage on *L'Hérédité*. But since that work was written there has come into prominence the long-forgotten research of Mendel, to which reference has been made in a previous chapter. Comparison of the views of Mendel's contemporary followers, such as De Vries and Bateson, will show that the "physiological unit" of Spencer is the logical foundation of the modern theory of heredity, which has come into its own within the last decade. In this relation especial interest appears to me to attach to the recent development of the microscope by Gordon and others. It is now possible to study the cell under a power of ten thousand diameters; and calculation of molecular size by Lord Rayleigh, Lord Kelvin, and others appears to show that the real unit of life may prove to be actually visible, if not now, at any rate in the not very remote future.

On the border-line between biology and psychology, but legitimately to be treated here, is the question of the evolution of the nervous system and the differentiation of the senses of man. This I have already discussed in a previous volume,[1] and here I would rather refer to the inference which may be drawn from the fact, broadly stated, that the human brain and central nervous system

[1] See the essay entitled "The Evolution of Sense," in *The Cycle of Life*, or, much better, Tyndall's memorable "Belfast Address," delivered before the British Association in 1874.

generally are developed, both in the individual and in the race, from the outermost or cutaneous layer of the body. The inference is that our nervous systems are essentially means for appreciation of and response to our environments. Hence the human intellect, as Spencer says, has been developed "by and for converse with phenomena." The evolutionary or genetic manner of looking at man's brain suggests to us the biological or anatomical explanation of the conclusion reached by many other avenues of inquiry, that human knowledge can never be more than *phenomenal* (*i. e.*, of phenomena or appearances); that self-consciousness and the whole realm of the inner world are distinct super-additions to the primitive and primary functions of the nervous system; and that "innate ideas," as Locke proved in 1689, are non-existent. In other words, the facts of nervous development consort with the agnostic dogma of modern scientific philosophy, if I may use this term to distinguish between the most general conclusions of scientific thought and those of the academic philosophers or metaphysicians.

With this conclusion we may pass to the consideration of superorganic evolution, and, in the first place, the evolution of mind.

PART IV

SUPERORGANIC EVOLUTION

SECTION I

IN MIND

XV

THE EVOLUTION OF MIND

When we come to look at the matter philosophically it is evident that, if indeed any finality be possible to human knowledge, it cannot be attained without a study of *mind*. If we examine the philosophic failures of the past, and inquire whether there be any common factor in their instability, it is found that each was built upon an erroneous theory of mind. From this it must not be inferred that we can regard any theory of mind as adequate; could we do so, philosophy in the highest sense — a knowledge of reality — would assuredly be possible. These philosophies failed exactly because their makers took for granted some root assumption or other which was without any warrant in actuality. Indeed, it was not until the time of Hume and his successor, Kant, that any systematic inquiry was made into the nature of knowledge — a fact which furnishes a most radical criticism upon the methods of their many predecessors.

In a very real sense, therefore, the study of mind must occupy a primal place in the thoughts of any

one who proposes to write a natural history of all things. Mind, indeed—his own mind—is all that any man immediately and indisputably, though not completely,[1] knows, which is another excellent reason for regarding psychology as logically the first of the sciences.

This was, indeed, dimly recognized by the many metaphysicians, from Plato onward, who have left mankind a heritage of concatenated words.[2] It was recognized that psychology, which we now regard as one of the natural sciences, was merged in — had not yet emerged from — metaphysics, or theories as to reality. The metaphysicians realized that psychology was the initial science—in order of logic—and concluded that if they looked within their own minds the secret of being might be found therein; but their failure was due to the fact that, though the study of mind is first in *logical* order, nothing but unsuccess can follow its *practical* treatment as initial. Only by study of the external world by and for converse with which the mind has been evolved can we successfully approach the study of mind itself. The first thinker to see and utilize this truth was Herbert Spencer.

Until his time every psychologist and philosopher, without exception, had treated mind as he knew it—his own mind—as a thing without antecedents,

[1] See chapter, "On Mind as Unknowable."

[2] This is not to say that when Plato and Hegel discussed other matters they did not leave us more than mere words.

called into being and indelibly minted by the hand of the Creator. We may perhaps think that this was only natural, since the theory of special creation was generally accepted. Yet it remains almost incredible that it should never have occurred to any thinker that it might be worth while to compare one mind with another. Even if we appreciate the influence of the belief that no animal possessed what could be regarded as a mind; even if we try to appreciate the point of view of the philosophers who regarded savages as degenerate beings, and the savage mind as merely a disfigured specimen of the human mind as it was originally created, it remains inexplicable that practically no one before Herbert Spencer should have thought it worth his while to study the mind of the child. But the fact is recorded—inexplicable or not—that the sole object of study of every psychological treatise—with one insignificant exception—until the year 1855 was the adult Caucasian mind, as illustrated in its own students. The first man to conceive—or, at any rate, to leave any record of the conception—that mind has a history was Herbert Spencer. It is, therefore, not surprising that the circumstances in which his pioneer treatise was produced are themselves unique. We must remember that Spencer was without a university education, and never underwent any formal teaching in metaphysics or psychology. The scientific interests of his father lay mostly in physics, and his own chosen profession

was that of a railway engineer. These facts are worth remembrance in their bearing on Spencer's status as a psychologist. He made contributions to every branch of science, and laid all under contribution for his philosophic system; but he certainly followed the advice to know a little of everything and everything of something, for in psychology he was not only a pioneer by reason of one great idea, but was also a specialist—a master alike of principles and details, to quote the authoritative obituary notice in *Nature*.

Yet though Locke's immortal essay lay upon his father's shelves, Spencer did not acquire enough interest in the science of mind even to impel him to the opening of any work that dealt with it until his meeting with Lewes, in his thirty-first year, led him to read that *Biographical History of Philosophy* which has opened a door into a new world for so many of us before even emerging from our teens.

But when at length Spencer did awake to the fascinations of psychology, he forthright proceeded, with the audacity of genius, to plan a book of at least two volumes which was to deal with the whole subject. We need not wonder that the project languished until there came to him a simple but important idea which was capable of comparatively brief treatment, and gave him the needed start. He began to write the *Principles of Psychology* when he was thirty-four, three years after his introduction to the subject through a

work written for the unskilled reader. The book was mainly written in the open air, near Dieppe and in Wales, without works of reference. If the adjective original can fairly be applied to any philosophical work, it is to this invaluable book in which was founded the study of psychogenesis, or the origin of mind. When one reads of Spencer's plan for two volumes, and his intention to deal with the whole subject, ere he had devoted any systematic study whatever to any of his predecessors, and at a time when he must have been ignorant of even the accepted terminology, one is inclined to ask, "What on earth did he think he had to say?" But to that question there is an abiding answer. He had accepted the theory of organic evolution in 1840—very shortly after Darwin had opened his first note-book for facts bearing on the origin of species—and it was his destiny to apply the leading idea of universal and ordered change to the highest entity of which we have any knowledge.

I do not here propose to discuss in detail, or, indeed, with any measure of completeness, the general or special doctrines of the evolutionary psychology; but, in accordance with the design of the present volume, I must consider three topics which may serve to justify the contention that evolution is the master-key, and which may serve to show that its revelations are as vital and real in this present year as they were half a century ago, when the first instalment of the synthetic

philosophy saw—and brought—the light. But it is necessary, ere treating of the three topics chosen, which are the test of truth, the controversy regarding the origin of our ideas, and the human will, that we should attempt clearly to review the main contention of the evolutionary psychology.

Whatever its limitations and its capacity for error, however far it be from what it may yet become, and whatsoever criticisms we may pass upon the doctrine of Protagoras that "man is the measure of all things," the human mind is, nevertheless, the only veritable wonder of the world; a fact which neither the idealist nor the realist, neither the sceptic nor the dogmatist, will question. Practically, it *is* the measure of all things; and even while we recognize that it is perhaps not the best judge of itself, its highest achievements may well excuse us for regarding it as unique, *sui generis*, unexampled, incomparable. To seek its origin in anything less than itself, in anything but a Divine Mind, would seem futile impertinence. Yet, as it is an indisputable fact that the body of man, with its amazing mechanisms and capacities, is directly developed from a morsel of living matter —about one-hundred-and-twentieth of an inch in diameter—which can easily be hidden by the point of a pencil, so it must now be believed that the mind of man has an origin as humble and insignificant. The inference, however, may be not that it is itself, for all its pretensions, humble and insignificant, but that that which we think so is,

such being its potentialities, as glorious as its product.

And, indeed, we may prepare ourselves for the main assertion of the evolutionary psychology by considering the history of the individual mind. Undue importance was formerly attached to that particular stage in the history of an individual which we call his birth. Even now many legal pronouncements assume that the life of a human being begins with his birth, and it is a doctrine of the Jesuits, we are commonly told, that at the moment of birth a newly created soul is implanted in each human being. Presumably, if a child dies five minutes before the accident of birth, there is an end of it; but if five minutes after, there remains an entity which passes all eternity in Paradise or in limbo, according as whether or not it was baptized during those fateful moments. This doctrine, however, has only to be stated to be recognized as arrant nonsense, and does not need the experience of the obstetrician, who has seen children die during birth, and has performed the operation of Cæsarean section on mothers of children who would otherwise have attained separate existence several weeks later, to be appreciated as a mere expression of the worst kind of ignorance — that which is ignorant even of its own nature. The cynic who remarked that man alone has the power to make himself ridiculous must have had this case in his mind.

In considering, therefore, merely the history of

the individual mind, we are forced back, by logic which none can now dispute, to the moment at which the sex-elements of the two parents fuse within the body of the mother. If it be said that no one can pretend to discern any characteristics of mind in the aboriginal cell even of a future Shakespeare or Aristotle, the objector may be asked to indicate the stage at which he conceives the mental history to begin; and when he has been warned, by fact and evidence, against indicating the (purely accidental and often arbitrary) moment of birth, he will probably be left wondering. Furthermore, it may be observed that the new cell which is to give rise to a new individual and in which are contained the potentialities of that individual's mind, is itself the product of two other cells, each of which was as certainly alive as it is, and was, beyond dispute, the bearer of the mental characters which every one knows and admits to be transmitted from parent to child. In any adequate measure to reflect upon the history of the individual mind is to encounter indisputable facts at least as amazing as—indeed, by the rapidity of the development, much more amazing than—the disputed facts of the evolution of the racial mind. In other words, the evolutionary assertion as to the history of the mind of man is no whit more incredible than the known facts as to the history of the individual minds of individual men.

Thus prepared by contemplation of the daily marvel which is familiar to every parent, the evolu-

tion of the individual mind, we need not fear to let go the doctrine that the human mind is a special creation, lest we should be asked to believe the incredible. And we soon find that the new doctrine consorts with a whole host of apparently unrelated facts: the phenomena of insanity become intelligible; the cruelty of the boy; the baby's fear of a gruff voice or a forbidding face; even the astonishing facts of multiple personality are seen to be capable of rational explanation on the evolutionary hypothesis. But to this subject, and that of unconscious mind — each of which is as unfamiliar to many as it is full of significance—I must devote a few paragraphs.

It is now known, by observation of very many quite unquestionable cases in all parts of the world, that one human body may appear to be tenanted, at different times, by two, three, four—even eleven—different personalities. The believer in spirits has an easy explanation of these cases, and Mr. W. T. Stead has triumphantly hailed a recent American treatise on the subject as affording conclusive proof of the theory of spirit possession. One personality may be a linguist, another illiterate; one, savage, sulky, homicidal; another, gentle, cheerful, timid. Instances could be multiplied without limit. With the current theory of human personality the facts are entirely unintelligible. But if we regard the human mind as a complex structure, containing elements derived from millions of ancestral minds, they are susceptible of

explanation. Indeed, scientific psychology — as distinguished from the academic verbiage sometimes indicated by that term — is less concerned to explain the facts of multiple personality than to explain the opposite fact of the unity of consciousness, which those who have never thought about it would regard as needless of explanation. For if the human mind be a composite structure, built out of innumerable units of various derivation, how are we to explain the fact that the thousands of millions of nerve-cells in the cortex, or gray matter, of the brain do commonly act and speak with one voice? For myself, I believe that the key to this—the really remarkable—fact is to be found in Professor Sherrington's researches on reflex action, which fall to be discussed when we consider the human will.

Then, as regards subconsciousness—the "buried temple," as M. Maeterlinck calls it. We have lately learned that *mind* and *consciousness* are by no means synonymous terms. Consciousness, indeed, is to be regarded as the efflorescence of mind, which is a far more extensive and fundamental fact. During sleep consciousness is non-existent; but mind is by no means so. The existence of the mind is as continuous as is that of its organ, the brain. The musician or poet has often composed musical phrases or verses during the period of unconsciousness or sleep, and has risen in the night to record them—to his utter surprise in the morning. You are at your wits' ends to remember

a name. A wise friend advises you not to worry about it; "it will come to you in a little while." And so it does. You have set the unconscious mind a little task, and, on its conclusion, your consciousness is presented with the product. If your friend were a psychologist, he would say, "Don't worry about it; leave it to your subconsciousness."

Now it seems to me that evolution, the master-key, furnishes an explanation of these facts as of those of multiple personality. I have often been asked whether a baby is ever conscious before birth, or whether it is asleep all the time. (A curious feat, that of "sleeping" on one's head for months together, yet we have all done it in our time!) I am not prepared to answer the question; but I am quite certain that I cannot conceive of the earliest stages of the baby—the pencil-point stage, for instance—as conscious. Yet I am compelled to believe that mind is present there—mind in embryo associated with body in embryo.

Now it has already been argued that life is potential in matter; that life-energy is not a thing unique and created at a particular time in the past. If evolution be true, living matter has been evolved by natural processes from matter which is, apparently, not alive. As long as the argument is confined to the production of a bacillus or an amœba, no concern will be felt by the alarmed supernaturalist—as if nature were not the garb of supernature!—but if life is potential in matter,

it is a thousand times more evident that mind is potential in life.[1] To dispute this is to deny the existence of consciousness in a dog. The evolutionist is therefore impelled to believe — shall I say? *that mind is potential in matter.* I adopt that form of words for the moment, but not without future criticism. The student knows that the microscopic cell, a minute speck of matter, that is to become a man, has in it the promise and the germ of mind. If this be questioned for man, it will not be questioned for a dog; and the substitution does not affect the argument. Must we then draw the inference that the elements of mind are present in those chemical elements—carbon, oxygen, hydrogen, nitrogen, sulphur, phosphorus, sodium, potassium, chlorine — that are found in the brain of a dog? Not only must we do so, but we must go further, since we know that each of these "elements," and every other, is built out of one invariable unit, the electron; and we must therefore assert, in still more definite terms than those already employed, that mind is potential in the unit of matter, the electron itself.

Here the critic who attaches importance to names will certainly say that this is to assert the doctrine of materialism, previously repudiated in these pages. "Why do you not," he may say,

[1] "Life is a continuous adjustment of inner relations to outer relations, and mind emerges from it as fast as the adjustment becomes more extended, more involved, and more complete." —*Autobiography*, I., 471.

"frankly acknowledge that you believe mind to be a function of matter, and therefore that materialism is the truth and the whole truth? Or, since you have resolved matter into a manifestation of energy or power, that mind is a function of energy, and therefore that energism is the truth and the whole truth?"

If we withhold all analysis and content ourselves with words, it would indeed appear that to associate the elements of mind with the elements of matter is to commit one's self to materialism. But it is assuredly not so. To assert that mind and matter are correlative and complementary is to assert that they are the two sides of Reality, as seen by us. It is to assert the sublime truth, first perceived by Spinoza, that mind and matter are the warp and the woof of what the earth-spirit in "Faust" calls the "living garment of God."

Indeed, if language were not essentially and incoercibly materialistic, and if human thought were not essentially materialistic, so that no one can conceive of spirit save in materialistic terms —no, not though he be an idealist of the most uncompromising—we should see that it would be exactly as accurate to describe matter as a function of mind—which is indeed the idealist assertion—as to describe mind as a function of matter, which is regarded as a materialist assertion. Neither is true, because no statement that attempts to explain the one in terms of the other can be aught

but a denial of the truth that they are strictly peers, that neither is knowable, and that they are the complementary expressions of the unknowable Reality which underlies both.[1]

In the present volume space does not avail for more than the briefest mention of the new studies to which the principle of evolution has given meaning and worth. Now that we know the relation of the savage to the civilized[2] mind, anthropology has become a science instead of a fad. This, too, only just in time. The Tasmanian was obliterated ere we learned from him the lessons which he had to teach us; but the psychology of the Australian aboriginal has remained just long enough for us to study and record. And though the lowest savage mind we know is far higher than, from the point of view of scientific inquiry, might be desirable, yet it is invaluable as representing or corresponding to one of the base degrees by which we did ascend. Similarly the evolutionary idea has given meaning and value to comparative psychology, which studies the mental characters of animals. Not only has this thrown light on the study of the human mind, but it has taught us that there are mental characters, of which we should be proud

[1] See an essay by the author, "The Problems of Consciousness," in *Harper's Magazine*, June, 1905.

[2] We have lately learned that civilized, in its usual acceptation, is simply an impudent word. But literally, of course, it merely means city-fied; and considering what the modern city means and is, civilization may fairly be regarded as a term of humiliation and decent self-depreciation.

did we possess them, that belong to "lowly" creatures which have not even a backbone—such as the ant and the bee. It has apparently been shown, for instance, that the "homing" power of the bee is independent both of sight and sound. Such discoveries of unnameable and indescribable senses bear not only upon the problems of psychology, but upon the highest quest of philosophy, and also raise interesting questions as to future human possibilities.

The attention which the evolutionary psychology has directed to the child has not only added a new interest to the possession of a baby, and thrown much light on psychology in general, but it has utterly destroyed ancient conceptions of the methods of education, has taught the teacher that the child is not a "little man," but a *child*, and that his first duty is to consider the manner in which the child's mind acquires knowledge. Further, it has inaugurated a reign of humanity and sanity in the moral education of children and in the moral judgments which we pass upon them. Instead of seeing "that old serpent the devil" in the greed and selfishness of a child, or cowardice in its fear of darkness, we can adduce, for these and similar facts, explanations as satisfying as they are instructive.

Further, the evolutionary psychology has served to elucidate and explain the mental differences between man and woman in a fashion which previous theories have never been able to emulate.

But the most signal achievement of the evolutionary psychology is its total dismemberment and annihilation of the accursed lie that human nature is tainted with a burden of "original sin," and its corollary that "human nature is the same in all ages." The relation of the evolutionary philosophy to the problems of evil and of "sin" must subsequently be discussed; but the dogma of the immutability of human nature, which is based on a contemplation of that brief moment which, in our conceit, we call the "history of the world," may here be considered. If we realize, as none are too foolish to realize when it is pointed out to them, that it is human nature which produces the weary weight of all this unintelligible world, and that no *real* improvement is conceivable in the lot of mankind save such as there is in an amelioration of human nature, we shall see that the dogma of its immutability is the central pillar of pessimism and a denial of the possibility of anything worthy to be called progress. If, on the other hand, we contemplate the evolution of humanity and draw the magnificent inference therefrom—not acting like one who starts to tell a good story but *misses the point*, as some one has well said —then we shall find in evolution the central pillar of a sane and rational optimism, as superior to that which is notoriously bred of a good digestion as is Christianity to fetichism. But of all this more anon.

XVI

THE TEST OF TRUTH

THE first of the three subjects dealt with in the *Principles of Psychology* that I propose to discuss at some length is an idea to which expression was first given in *The Westminster Review*, in an essay called "The Universal Postulate." I choose this particular idea for discussion here, not only because of its influence in the production of Spencer's second book, but also because of its profound importance. Not that this idea has in any way influenced subsequent psychology, as have such conceptions as that which refers the origin of will to reflex action; but the philosophic importance of the question greatly transcends that of any department in psychology proper, and notably it bears upon the proposition of the conservation of energy, upon which the evolutionary philosophy is based.

Spencer asked himself this question: By what criterion, in the last resort, can we judge of the truth of any proposition? Since his answer no other has been given, though destructive criticism has of course been essayed. Yet few will dispute the following:

"One might have supposed that as a needful preliminary to a systematic discussion—especially a discussion concerning the nature of things — the disputants would agree on some method of distinguishing propositions which must be accepted from propositions which it is possible to deny. May not one fairly say that those who decline to accept a test proposed, and also decline to furnish a test of their own, do so because they are half conscious that their opinions will not bear testing?"

What, then, is Spencer's ultimate criterion of belief? It is simply that "*in the last resort we must accept as true a proposition of which the negation is inconceivable.*" The inconceivability of its negation is our ultimate criterion[1] of a certainty. Now we must consider what Spencer means by the word *inconceivable*. One academic critic, whose helplessness almost excites sympathy, feeling himself bound to offer what opposition he may to any Spencerian dictum, can find nothing more to say than that Spencer fails to distinguish between inconceivable and unimaginable. But Spencer does distinguish; and the distinction is to be found enforced not once but often in his writings. It is true that he does not use the confusing and question-begging term unimaginable; but no one was ever clearer than he is in condemning what he calls a pseud-idea. And the unimaginable is distinct from the inconceivable only when a pseud-idea, as that of a moral fluid, is involved. Let us take an instance.

[1] "*Our ultimate criterion*"—not, alas, an absolute or infallible criterion.

The primary axiom that a thing cannot both be and not be at the same time—known as the principle of contradiction or, as Sir William Hamilton preferred, of non-contradiction—is a truth of the highest certainty, because one cannot *conceive* its negation. Thus the philosophy of Hegel is founded upon a proposition — that being and not-being are the same—which it is impossible to conceive. But if one cannot conceive it, can one imagine it? I trow not. That two and two are four is similarly—despite the dictum of Mill—a truth of the highest certainty, because one cannot conceive its negation. The objector might answer with a case within my own experience, of a man who believed that two and two are four and a quarter, and whom no arguments could convince of his error. But would I be entitled to say that my friend could *conceive* the negation of the proposition that two and two are four? Surely I was right in thinking that he was obsessed by a pseud-idea — an idea of which the elements, as Spencer says, "cannot be combined in consciqusness." And I maintain the truth of my judgment by observing that my friend never did really *combine* the ideas of two and two so as to make them four and a quarter. His idea was thus *imaginable*—if we are to use that word—but not *conceivable:* any more than the idea of a moral fluid or a square idea is a conception. And, as a matter of fact, I made my friend's acquaintance in a lunatic asylum. This, curiously enough, was his one delusion.

Let me recommend to the reader, as an interesting exercise, the application of this criterion to his own beliefs. So one may discover the very grave significance of that phrase, "The highest certainty." Thus judged, your belief in, let us say, the law of gravitation, is at once seen not to be possessed of the highest validity. You *can* conceive the negation of the Newtonian law. Our belief in universal gravitation is no more than a matter of faith. Despite the common antithesis, there is such a thing as *rational faith* — as distinguished from the irrational, or extrarational, or, as some will maintain, suprarational, kind. But Spencer has shown that our belief in the law of the conservation of energy is of quite another order. You cannot conceive of the creation of a new iota of energy, out of nothing, nor of the annihilation of an iota of energy, any more than you can conceive of the creation of the universe out of nothing. You can, indeed, *imagine* both, but that merely by cozening yourself with a pseudo-conception the elements of which you cannot combine. This any one may observe for himself by attempting to conceive of creation—not remaining content to accept words without translating them into the ideas for which they stand. The special-creation theory is, indeed, a mere formulation of ignorance into the semblance of knowledge.

Now, if a proposition the negation of which cannot be rationally conceived is possessed of the highest certainty, what measure of certainty

shall we attribute to such propositions as cannot themselves be conceived? Let us illustrate the matter by a quotation from Cardinal Newman's *Grammar of Assent*, where he says, "A mystery is a proposition conveying incompatible notions, or is a statement of the inconceivable." No one can call to mind any of the familiar dogmas of theology without appreciating the adequacy and accuracy of Newman's definition. The belief in an omnipotent Deity whom a man may defy (the quibble about the delegation of power from the Creator to the creature is not worth noticing); the belief in an omnipotent and benevolent Deity; the dogma of the Trinity—such are some theological mysteries, or "statements of the inconceivable." Now an inconceivable statement is one the negation of which is conceivable; but it is more, *it is a statement the negation of which is a truth of the highest certainty, since* ITS *negation is inconceivable.* Let us take an instance. The dogma that there is one personal God, but that He is three persons, is a "mystery"—"a statement of the inconceivable." Its negation—*i. e.*, the denial of it, is a truth of the highest certainty, since *its* negation—*i. e.*, the assertion of the dogma, is inconceivable. A theological mystery is, therefore, a statement the denial or untruth of which is a truth of the highest certainty.

There is no rational escape from this; but there is the familiar argument that these mysteries are not for the reason, but must be accepted by faith.

It is the faith of Tertullian: "Credo quia impossibile"—I believe it because it is impossible. If there be such a thing as truth, what relation does such faith bear to it?

XVII

THE HUMAN WILL

a. Introductory

THE human will is a subject which, by reason of its overwhelming theoretical and practical importance, must be treated at length in such a volume as this. It is only within the last half-century that we have had any scientific treatment of the will. Philosophers have discussed it in all ages, but always from a point of view of their own, involving either the results of introspection, an inquiry into their own experience, or else a mere logomachy, full of sound but signifying nothing—*vox et præterea nihil.*

The human will is now recognized by impartial thinkers as a fit and proper subject for scientific study. The theologians may continue to speak as if psychology had stood still since the publication of Kant's *Critique of Practical Reason*, more than a century ago; but, as Mr. Thomas Hardy has lately observed, the determinist conception—which, we may note, is really as old as Buddhism—is steadily percolating into the popular mind, while

the moral anarchy which is supposed to be a necessary consequence of its acceptance, has yet to be observed.

Furthermore, it is emphatically the evolutionary treatment of the will, and the searching light it has thrown on the springs of conduct, that has rescued the whole subject from the verbal morass of so many generations and has placed it upon the rock of positive facts.

Let us now look at some of the questions involved.

In the first place, the post-Spencerian writer cannot treat of man's will as if it had sprung, like Minerva, fully armed from the head of Jove. For now exactly half a century such a method of treatment has been obsolete. Neither will nor any other aspect of mind can be treated as if the adult Caucasian consciousness were an immediate creation, of whose genesis the first and last word has been said in a reference to a Creator or a First Cause. Your will and mine are evolved in us as individuals from the will of the child, from the springs of action in infancy and before it. Furthermore, your will is a product of racial as well as of individual evolution. It does not now suffice to declare, with Descartes, that the lower animals are automata: else the qualifying word "human" in the title of this chapter were superfluous. The "ape and tiger," not yet dead in us, had consciousness and volition; nor can ours be explained without reference to theirs. Thus, whereas prior to the

publication of the *Principles of Psychology* in 1855, wherein attention was for the first time directed to the will of children, savages, and the lower animals, will was treated as a prime fact, one cannot now plunge *in medias res*, but must devote the most serious initial consideration to the genesis of will — all our conclusions being thereby affected.

Nor can we go far, it may be found, without impinging upon one of the great outstanding controversies of biology — the inheritance or non-inheritance of acquired characters. If I become a drunkard and thereafter a father, is my child more likely than he would have been to follow my ill-guided steps? And if he is thus doomed, is it because I have acquired a character which enslaves him, or is it rather that he inherits a tendency which, *apparently* acquired, was in reality innate in me? And if innate in me, can it be traced to the indulgence of one of my ancestors — have *I* inherited an acquired character—or would I have fallen in any case, whether my ancestor had yielded to temptation or not?

Then, again, what of the distinction between instinctive and rational action? Is it true that the lower animals act *only* by instinct, whereas man is a rational animal? And was Spencer right in declaring instinct to be "compound reflex action"? Must I, in discussing the human will, define reflex action; and what answer can I then make to the critic who may assert that, under a

psychological title, I am discussing mere physiology?

Nor can one consider the human will without invasion of or alliance with the theological camp. Are we *free?* Is our consciousness of freedom an illusion or not? And when we talk of free-will do we all mean exactly the same thing? If not, we are unlikely to make much headway with this question or with others much less abstruse. You may mean by the assertion of free-will that human volition is uncaused or self-caused, or is, indeed, a little First Cause, which may defy, an it please, the great First Cause which some regard as omnipotent. You mean that the will can give place to the less cogent of two warring motives. What did Tennyson mean when he spoke of "power on thine own act and on the world"? Many mean by free-will not to assert that each human will is a little First Cause, but simply that man can, if he will, follow the dictates of his higher as against those of his lower nature, when there is that war in one's members which St. Paul described. Others mean merely to assert that man is a rational animal; yet it is beyond question that no rational process or concept can be in itself a *motive*—language is right: *motive* is always *emotion.*

Nor is this by any means all. The human will is not a merely academic topic; but, like those discussed in the first academy, bears vitally upon practice. I shall shortly avow myself, for instance, a determinist, along with perhaps the greatest of

the fathers and, I suppose, every physiologist and scientific psychologist of the present day. But if I am a determinist, can I in consistency, and in point of fact do I, ever praise or blame any one? Do I, to begin at home, regard myself as a responsible person? Do I, as it might appear I should, regard praise and blame as absurdities, the sense of moral responsibility as an illusion? If so, do I defend the laws which hang one murderer and detain another "at his Majesty's pleasure"? Surely (it may be said), on the scientific theory of determinism, which declares that each of us is what heredity and environment have made him, I have no business to punish or acquiesce in the punishment of anybody—my dog or my servant. Nor can I consistently praise or reward. There cannot be degrees of irresponsibility. If no one can help doing anything, must I not regard with impartial eye and equal lack of favor or disfavor the sage and the fool, the saint and the criminal, the sane and the insane? And if science and determinism deny the validity of universal instincts, declare that praise and blame are absurd, resolve conscience into superstition or indigestion, and make no distinction between deliberate crime, impulsive crime, and maniacal crime, is not determinism stultified by the *reductio ad absurdum?* Must there not be but a foundation of shifting sand for the premises that lead to such conclusions?

Such are some of the questions which we must attempt to answer.

b. Reflex Action

The amœba, like the human germ, is a single cell, complete in itself. When it withdraws from a dangerous object it performs the functions of the sensory nerve, the nerve-centres, the motor nerve, and the muscles which enable you to perceive and avoid an imminent vehicle. In each case the action is essentially reflex; but in order to understand what is meant by this term we must know what is meant by a *reflex arc*. This typically consists of a sensory nerve-fibre, such as, let us say, the optic nerve; a sensory cell, such as those from which the fibres of the optic nerve are derived; and a motor cell and fibre, such as those which control the muscular tissues of the iris. When a beam of light enters the eye, the reflex arc is called into action, the iris is stimulated and the pupil contracts. This is one of the hundreds of reflex actions which are constantly taking place in us. It is entirely independent of consciousness, the centre for visual consciousness, at the back of the brain, not being concerned in the process. Now from a pure reflex action such as this we may go a stage further. Consciousness of an approaching fist may be aroused by the beam of light, and in this case the reflex arc will be slightly different. The sensory half of the arc will be similar, but the motor half will consist of the nerve that runs to the eyelid, and you will blink or wink. Yet though your consciousness is involved, the action

is so far from being voluntary that a considerable effort of will is necessary to prevent it from taking place.

It is to the illustrious Descartes, renowned alike as mathematician and metaphysician, that we owe the discovery of reflex action, which is now known to play such a part in physiology and psychology.

When we come to examine the nervous system of one of the higher animals or of man we find that it may be regarded as an infinitely complex congeries of reflex arcs, to be numbered by at least thousands of millions. But each sensory nerve-fibre that constitutes the ingoing half of each of these reflex arcs may convey a stimulus that will issue in action in any one or any group of the voluntary or involuntary muscles of the body. Under varying conditions, a blow on a given area of your leg may cause you to advance it by way of offence, to withdraw it by way of defence, to start running in one of many directions, to use your arms pugnaciously or to grasp some supporting object with them, to scream or to laugh, to curse or to pray — the outgoing or motor half of the reflex arc may thus vary. Yet, in health, the "will" is not divided; you will definitely do one of these things and not another; you will not simultaneously attempt half a dozen incompatible acts. Let us take a simple but most significant instance. Two objects are simultaneously presented to your vision. Each of them sends an impulse from the part of the retina struck by the rays of light that make it

visible, each demanding that the eyeball be so moved that the most sensitive part of the retina be directed towards the object, so that it may be the more clearly defined. Now if these two stimuli were added together, so to speak, the eyeball would be swung too far round, and neither object would be clearly seen. On the other hand, if an average or mean were struck between the two stimuli the eyeball would swing round not far enough for clear vision of the one object, but too far for clear vision of the other. Neither of these results is observed. On the contrary, one of the stimuli definitely inhibits or arrests the action of the other, and the eyeball is swung just so far as will make the image of one of the two objects fall exactly on the most sensitive spot of the retina.

This discovery, typical of all action, we owe to Professor Sherrington, who discussed his years of work upon this subject in his Presidential Address to the section of Physiology at the meeting of the British Association at Cambridge in 1904. By discovering that reflexes inhibit one another he has not only explained how it is that this amazingly complex nervous system of ours acts as a unity, but he has gone very far to explain that phenomenon which most strikingly illustrates this unity—namely, the phenomenon of *attention*. When we *attend*, one series of sensory fibres—such as those of the auditory nerve when we listen with individual attention to a sermon or a song—has taken possession of what Professor Sherrington calls the

common path, and has inhibited the action of all other sensory impulses. We do not want to cough, because that reflex is inhibited; but if the sermon be dull, the whole congregation will soon be a-coughing. The *common path* is like the trunk-line of the telephone: when one subscriber has gained possession of it, all the others must wait. Professor Sherrington's work is the most important advance in our knowledge of volition since Spencer discovered its genesis in reflex action half a century ago.

Ere I conclude I must note what has doubtless occurred to the reader. While will emerges from reflex action, to reflex action will can return. You remember your early strivings, with intent will, at the piano or the cricket-nets or in learning good manners? Yet now you can play or bat or be courteous with an ease which is hardly distinguishable from automatism. Practice makes perfect—that is to say, practice cultivates the power of one set of reflex arcs until they can always be relied upon, without effort, to inhibit their antagonists. You positively cannot help playing a straight bat or "doing the correct thing."

Will, indeed, is the expression of imperfection. The perfect batsman "times the ball" so well, the perfect saint does the saintly thing, without any consciousness of effort—that is, of will. It "comes natural" to him.

This fact, that will may give place to reflex action, has been urged as one of the arguments against

Spencer's theory that will is derived, in the individual and the race, *from* reflex action. But it need hardly be said that Spencer recognized and considered the facts of the change from volitional to unconscious and reflex action. These facts do not in the slightest degree invalidate his contention. The only alternative to the view of the founder of psychogenesis is that all action is primarily volitional and that all reflex action is a development from volitional action. This view, which, indeed, is favored by Wilhelm Wandt, of Leipsic, the greatest of living psychologists, is beset with the most insuperable difficulties, and leads to the most difficult of conclusions, as any one can see on a moment's consideration.

c. The Will-not-to

To our consideration of reflex action must now be added that of inhibition, the remarkable function of the nervous system which is superadded to reflex action, as this leads, in racial and individual development, to volition itself.

The nervous system, as I have said, may be regarded as an infinitely complex congeries of reflex arcs. But it may also be regarded as comparable to the military or legislative system, wherein are officers and officials of numerous grades, each with authority over his inferiors, and each, save the supreme head, in his turn under the control of his superiors. It is to Dr. Hughlings Jackson, one of the makers of neurology, that we owe this illumi-

nating conception of the different "levels" in the nervous system. Thus at the level of the lower end of the spinal cord are certain centres which can (and, in the infant, do) act reflexly, setting certain muscles in motion in response to certain stimuli. At a higher level in the nervous system are other centres which can control these and prevent or inhibit the customary reflexes. Just above the upper end of the spinal cord, again, is the *punctum vitale*, or respiratory centre, the cells of which, in response to certain stimuli from the lungs and elsewhere, never fail, day and night, from the cradle to the grave, to stimulate certain muscles which cause air to enter the lungs. This centre, however, is also under the command of centres at higher levels, the activity of which can automatically hurry or make irregular or retard the act of breathing; while the highest centres of all permit us consciously to affect the respiratory act in any way we please.

Now this power of inhibition is the ultimate expression of nearly all that is most admirable in man. In it is the germ of self-control, of restraint, of the power to say "no," of the power to "look after," preferring distant but enduring gain to immediate but transitory, scorning the apples by the way for what may never be more than an ideal goal. Inhibition, then, when developed into the *will-not-to*, is at once the antithesis of volition, as commonly understood, and its highest expression. We must study it with care.

If you cross one leg over the other and sharply tap, with the edge of your hand, the superjacent knee, just below the knee-cap, the leg will be jerked forward. Much more markedly will it jerk if the stimulus be applied by a friend when you are thinking of something else, and especially if you have interlocked your fingers and are striving to pull your hands apart. Now this "knee-jerk" may be regarded as a typical reflex action; but we have already observed that it varies (inversely) with the amount of attention which the subject gives to it. The centre for this reflex is in the spinal cord, and to the centre there run the volitional motor fibres from the leg-centre on the surface of the brain. Now, if anything has happened to break or press upon these motor fibres in their course from the brain to the cord, or if the cells from which they start have been destroyed, it is found that the involuntary knee-jerk is greatly exaggerated; while, of course, any *voluntary* jerking of the leg is impossible. If, on the other hand, the motor cells in the brain, or their fibres, are irritated—that is, stimulated—by anything, the knee-jerk is greatly diminished. It is obvious, then, that the brain-cells, in health, are constantly exerting an inhibitory or restraining action upon the cells in the spinal cord. What is true of this reflex is true of dozens more; and in many cases the inhibitory action of the upper centre is so powerful that no reflex action occurs save when the upper centre or its conducting fibres are weakened and

unable to prevent the lower centre from discharging the reflex action which it is there to perform, the higher authorities permitting.

But now that we understand what is meant by inhibition, let us contemplate this remarkable fact, the significance of which, if I am correct in my interpretation of it, has escaped previous students of this subject. The path of volition is identical with that of inhibition. The same nerve cells and fibres discharge the function both of restraining the knee-jerk and, when you please, of making the knee-jerk. Yet we have always believed that all nerve impulses are identical, varying only in intensity; and to the student of the nervous system it is almost incredible that the same nerve-fibres can convey messages so different that one issues in action and the other in repression. I incline strongly to the belief that the original and primary function of the brain-centre is to control or inhibit the lower centre in the spinal cord; and that, at any rate at first, when the brain-centre came to *command* the spinal centre to act, all it really did was to refrain from the customary restraint—it did not *command* so much as *permit*.

In other words, I believe that the human will, volition as we are conscious of it, is essentially not a positive but a negative thing, in the sense that a command is positive, but permission negative. Action, on this view, is the result of permission given for a certain complex of what are really reflexes; in other words, action is the result of

a cessation or inaction of inhibition on the part of the highest centres. They cease to restrain, and the result is action. On the other hand, *inaction* (I do not mean inertia, but the power to sit still, to hold tight when the horse runs away, to "bide your time," to be a still man in a blatant land) is the really active and truly volitional process, since it depends on the active and positive power of inhibition or control exerted by the higher centres upon the lower. And this I know, that inhibition is far older and far more essential to successful nervous action than is conscious volition or realization of the self, as an academic psychologist would say; for inhibition is known as a nervous fact in the history of life many æons before the development of self-consciousness in man.

I am aware that this subject is by no means easy, and it is not every reader who will have sufficient power of inhibition to enable him to arrest the natural reflex of going on to the next chapter without bothering to see whether there may not be something intelligible in this. But I find much satisfaction in a theory which lays emphasis on self-control in an age when the older virtues are being decried as "bourgeois" and "undistinguished"; besides which I believe the theory of the genesis of what we call will in the will-not-to, at first subconscious, to be true and significant; not that any father is a good judge of his own baby.

d. The Function of Reason

When we speak of man as a "rational animal," or of the "dictates of reason," we must beware of confused thought. Perhaps we may most clearly observe the influence of the reason on the will when we clearly see its limitations.

There is significance and leading in the titles of those great works by which Alexander Bain helped to distinguish the sixth decade of last century—the decade that saw his great application of physiology to psychology, the publication of *The Origin of Species* and of the *Principles of Psychology*. Those works were called *The Senses and the Intellect* and *The Emotions and the Will*. It is the emotional part of our nature, and that alone, which furnishes the force of all volition whatsoever. Every act of will is determined by the prepotent motive; and it is self-evident that no intellectual percept or concept is a motive as such. This, as I see it, is the objection—a very grave objection—to Professor William James's term *ideomotor*, which unequivocally suggests that ideas have motor powers. It is not so. In aiming the arrow you undoubtedly influence its course, but though you aimed for an æon it would go not whither until the bow was released. The mainspring of willing is wishing, is desire. We act because we *want*, and our reason is not the driving-shaft, but the rudder. Reason, to vary the image, is not the breeze, but the pilot.

Admitting this, it is possible to explain what appears to be a difficulty of determinism. In argument the other day a friend insisted upon the fact that, though men of science deny the freedom of the will, yet they admit the existence of a something which they see to vary in different individuals. A lunatic has volition; in a lucid interval he has volition, but when he is insane we recognize that his actions are "impulsive," while during sanity they are rational. Insane, he is enslaved; sane, is he not free? If, then, there is a power of choice which varies in different persons or in the same person at different times, how can we defend determinism?

The difficulty vanishes when we appreciate the conception of reason as the pilot. Sane and insane alike are subject to the gusts of passion—gusts which no pilot reason can abate; they do not own his jurisdiction. The reason does not furnish motives. But the rational man has a remote objective for which he steers; and, though his reason cannot *drive* him thither, it can direct the forces that do drive him. The image is not perfect, but it may serve to illustrate the point that the function of reason is directive and not motor. The dictates of reason are not dictates in the sense that a gale is dictator; they are dictates as to the way in which to ride the gale. In any case I want happiness—whether by self-seeking or serving others matters not—and my reason, which does not furnish my desire for happiness, fulfils the

function of telling me how best to achieve my end; the pilot is neither the breeze nor the chooser of the port, but he suggests how best to use the one in order to gain the other. This is the function of reason.

The common delusion, however, is that men are determined by their reason. It is thought that you have only to instil rational considerations into people and they will act rationally. When they do not, we say indignantly that man is not a rational animal—not understanding what to expect of the reason. We conduct education on this principle. We take no heed for the emotional nature, the main-spring of action, but spend all our energies on the development of the intellect, as if to know the right were to follow it. Nor do we learn by our mistakes. We teach a boy that it is wrong to steal. He fully appreciates this concept, but nevertheless he steals; whereat we are disappointed, and descant upon the anomalous fashion in which our instruction has miscarried. When the elements of psychology are common knowledge, current even in our legislature, we may direct our primary educational efforts to the emotions and not to the reason, it being better to steer an unskilful course to a worthy goal than to take the shortest and quickest road to perdition. The reason is absolutely neutral, absolutely non-moral. Supposing that education of the reason could endow every one with the intellectual capacity of a Napoleon, who would be the happier or better

if there were none other than emotional natures such as his for the reason to direct? When a man is a knave at heart it is well for his neighbors if he be a fool to boot. What this age, like every other, requires is not men of brilliant intellect, but "men of good will," as the correct version of the herald angel's message has it. Is it not plain that here "good will" means good motives? It seems to me that it would be well if society, recognizing that reason is only the guide of the will to its own ends, could easily discriminate between those whose faces are set towards the light and those who are in league with the Prince of the Power of Darkness; and could insure that knowledge, or the trained reason, should be bestowed only upon those whom it would guide to a goal worth gaining. But as society cannot do this, it must rather—and this is even better than the other would be—set itself to the training of the emotional nature—of what we call *character*—as the prime end of education and legislation. The importance of character-making is that character and not intellect determines conduct.

e. Freedom and Determinism[1]

The word free-will is used in at least three different senses—whereby confusion is worse confounded.

[1] The term *determinism* is quite immeasurably preferable to the term *necessity*, which I have nowhere used. For a discussion of this point the reader should consult the short but

In its completest sense the term is used to signify the doctrine that the human will acts independently of prior causes, and is undetermined by any exterior or interior facts whatsoever, so that, if he will, a man can act against the stronger of two warring motives. Contradicted alike by universal experience, common speech, and every relevant fact and generalization of philosophy, this theory will not here be discussed.

Then, again, the term is sometimes misapplied —as I see it—to indicate that man can act by the light of reason, preferring immediate to remoter ends; that he is a rational animal, whereas the lower animals are instinctive. Against this doctrine, with the reservation that reason can be discerned in the lower animals, scientific psychology enters no demurrer.

Closely allied to this last is the connotation that man can obey the dictates of his higher nature when the lower would assert itself. This I assuredly do not dispute.

To-day, however, we find many theologians prepared to assert that by free-will they mean to indicate only that man is conscious of a *power of*

masterly chapter in Mill's *System of Logic*. Mill shows that the term *necessity* is so misleading "as almost to amount to a play upon words"; and he declares that little if any progress can be looked for in the understanding of this subject until a term so misleading, if not positively incorrect, is dropped. He also shows how complete is the distinction between the philosophic doctrine of determinism and the Oriental doctrine of fatalism, with which it is constantly confused.

choice. To some of us it may appear that the use of the term free-will to indicate this consciousness of choice is an abuse of language; but this opinion does not relieve us from the necessity of examining and attempting to analyze this fact of choice—anti-dogmatic dogmas, like all others, being always at the mercy of facts.

When we deny the *freedom* of the will, be it observed, we do not deny the existence of will itself. Without choice there could surely be no volition. To assert that we can choose, then, is no more than to assert that we can will, which determinism is not so insane as to dispute. Libertarianism, however, takes this indisputable fact as the fundamental proof of its position; and there certainly is no argument for freedom like that which is given in the immediate testimony of consciousness. At this moment I *know*, as a fact which laughs at all theories, that I can finish this chapter to-night or leave it till to-morrow morning —which would be quite soon enough—and spend the next hour with Wordsworth, which I please. I am *free* to do either, surely. This is immediately given in consciousness. What is not immediately given, however, but can be readily discerned by reflection, is that my decision, when made, will have been determined by circumstances within or without me. I may be interrupted to-morrow. On the other hand, interruption is improbable, and at worst there remains the afternoon. If I say that I continue "just because I want to," thereby

demonstrating that my will is free, I am simply returning the (alleged) woman's reason for doing a thing, "Just because," which is no answer in her case or mine.

But without admitting that this case, as it stands, involves no moral considerations, let us take an obviously moral issue, since that is the sphere in which the free-will question is supposed to be of importance. Let us suppose that I have promised my wife to finish this chapter to-night, and so I feel that I *ought* to do so. If I keep my word, despite the temptation to be lazy, and despite the perfect feasibility of deceiving my wife, why do I? Here it looks as if I were free, because the determining cause is not external, but within myself. The case is a subtler one. But I think Schopenhauer has fairly explained it. If I keep my word, it might well be hazarded by a looker-on that I have frequently kept my word before. I have a self-observed *norm*, at which I endeavor to maintain myself. My experience of myself is that I usually keep my promises, and I do not mean to fall below my own level now. In such a case a man is indeed self-determined, to use the libertarian term; but it is obvious that we must now inquire what has gone to the making of the self or norm which I take as my standard. Nor does it need much consideration to show that my habit of promise-keeping, in such a case, could certainly be referred either to heredity or environment or both.

Perhaps this instance may serve to show that

when the determinist refers the issue of all volition to the influence of heredity and environment, this latter term has a far wider meaning than is often given it. Environment includes more than material circumstances, such as the satisfactoriness or otherwise with which my fountain-pen happens to be working to-night, though that might well determine my action. Every content of my consciousness, every memory of my past behavior in such circumstances, every subconscious memory somewhere recorded—ingrained—in my brain-cells (in other words, every ingrained *habit*) is part of the environment which helps to determine my action to-night. Thus properly interpreted, to heredity and environment may be referred all the motives, all the *pros* and *cons*, which compete within me until one or other, or the sum of several, finally determines me to work or refreshment.

The libertarian will not dispute that my character will decide my action in regard to promise-keeping. If he knows a man's character, he "cannot imagine him doing such and such a thing in given circumstances." There are men—I suppose—whose character is such that they *cannot* steal, even from a railway company or the state. They are not *free* to steal, though doubtless many such utterly honest persons would be the first to attack determinism. They cannot steal because their whole nature—their character—forbids them. They do not see that if it is possible to form character—that is, to cause character—it is proportionately

possible to cause the volitional acts which character determines. And to assert determinism is merely to assert that the human will is caused.

f. Education and Determinism

To the consistent advocate of free-will—if such there were—the word education would perhaps simply convey the every-day, vulgar, purblind meaning. Or he might include physical as well as intellectual education; and to these might add that form of intellectual—not moral—education which consists in teaching what is right and wrong in given circumstances, it being assumed, with Tennyson, that we "needs must love the highest when we see it." But the libertarian, who denies that the will is caused, cannot consistently see any reason to hope that education may influence character and, therefore, action.

The determinist, however—and, of course, we are all determinists in practice—will have a larger hope of education. From biology, to begin with, he will borrow a term which gives him what I venture to regard as the best definition of education—the *provision of an environment.* The boy's heredity is unalterable; but his environment can be modified—he can be educated. And the least important part of his education is the intellectual, of course the word education, in accordance with the law of verbal degradation, being commonly used and understood in its lowest meaning. But

the determinist, who knows that the will is caused, and that man's character is his destiny, will attach supreme importance to moral education, and not least to the development of the *sense of responsibility*.

Here, you will say, is a glaring absurdity. Is it not the advocate of free-will who swears by the sense of responsibility? Is it not the determinist who, by denying the freedom of the will, denies that we are responsible? Yet, in the face of the arguments which I advanced at the beginning of this chapter, I dare maintain that the determinist will devote his most earnest educational efforts to the development of that sense of responsibility which he is told that his creed repudiates.

And assuredly one of the forces which he will bring to bear—at the risk of being called inconsistent—is punishment. Perhaps, if we call punishment by a slightly different name, *consequence*, the charge of inconsistency will be withdrawn. If I sin against a law of nature, I suffer; and that is natural consequence. If I sin against a law of society, I suffer; and that—society, like its components, being a natural product—is also natural consequence. My action is thus restrained, modified, determined, by public opinion, or, to use Schopenhauer's phrase in his famous analysis of conscience, by fear of men. The Church, which had to invent the doctrine of free-will to square with its naïve theory of things, has yielded to none in recognition of the fact that the will is not free, but

determined; and its invention of hell is a palpable instance of the use of the fear of consequence as a means of affecting human volition; nor am I prepared to say that this device "to haud the wretch in order" has been without use in time past. The law that threatens penal servitude for this mortal life and the Church that threatens penal misery for eternal life, both recognize and utilize the fact of determinism.

The doctrine that "the voice of conscience is the voice of God" involves the blasphemy that the voice of God may command matricide on one side of a mountain-range and forbid it on the other. It was possible for Kant to admire "the starry heavens above and the moral law within" because the moral law within himself was admirable; but the dictates of one man's conscience may be an abomination to another. We have, therefore, to regard conscience, or the moral character which determines volition, as a product of the action of environment upon a given inheritance; whether the conscience be displayed in a man or a dog matters not. On first hearing Schopenhauer's analysis of conscience as consisting, in equal parts, of superstition, fear of man, vanity, custom, and prejudice, one may bewail or deride it; but it withstands some criticism. You are probably not much moved by sheer selfishness directed by orthodox teaching as to the hereafter, even if you accept such teaching, for men are usually much better than their creeds. This possible motive aside, for vanity read self-

respect, make fear of man include love of approbation, and ask yourself whether *respect for public opinion* (which may include the opinion of those you love), *self-respect*, and *custom* are not the main factors of your volition in matters of morals. They certainly are of mine.

If we accept this, we are on the way to formulating the principles of moral education on determinist lines. We shall seek to bring a healthy public opinion to bear on the subject of our efforts—the public opinion of the home circle, of the school, of the market-place. When public opinion ranks collective theft, "all uncharitableness," and malicious gossip beside incest and burglary, the young generation will be receiving a better education than hitherto. Vanity, "proper pride," if Schopenhauer be right, will be recognized as closely allied to self-respect; and we shall regard it as a great part of education to teach a child to have a "guid conceit of himself," not of his head, but of his heart. And as to custom, what free-will theologian but corroborates Schopenhauer by insistence on the importance of forming good habits and avoiding the formation of bad ones?

And when we have spoken of self-respect, public respect, and custom, have we not analyzed the "sense of responsibility," and shown that the determinist believes in and prizes it, even though he regards it as no halting and contradictory Vox Dei, but as a natural product of life as we live it?

XVIII

THE ORIGIN OF OUR IDEAS

THE ideas of gravitation, of "art for art's sake," of the rights of a minority—to choose the first examples that suggest themselves—are obviously acquired. Most of us can remember when first these and a myriad other complex ideas were first learned or presented to us. We may not similarly be able to remember our acquirement of the idea of God, which was early instilled; but some of us may remember instilling this idea into a child, and would not question that the child acquired the idea, and was not born with it, or with any innate necessity to form it. Yet it has been maintained that this is a necessary and, essentially, an innate idea.

If we take, however, the acquired idea of gravitation, and proceed to analyze it, we immediately discover therein certain elements the origin of which is by no means so evident. Such ideas, implicit in that of gravitation, and necessary antecedents of it, are those of *number*, *space*, *motion*, and *time*. None of us remembers an occasion on which these ideas were acquired, or on which we

instilled them into others. Further consideration shows that all our ideas, save very few, can be shown to involve some one or more members of that scanty category. These ideas, of which that of space may be taken as the most characteristic, cannot be traced to experience, but seem to underlie all experiences—to be, in fact, as Kant declared them, *forms of the mind*, necessary methods or means or apparatus by which and in terms of which we think. It would appear, then, that certain fundamental ideas, which are themselves incapable of analysis, and which all our acquired ideas presuppose, must be innate, or inborn—part of the original structure with which the young mind is furnished before it has undergone any experience whatever.

But it was proved by John Locke, of Oxford,[1] in his *Essay concerning the Human Understanding*, that we are possessed of no innate ideas whatsoever, but that even the idea of space is derived by experience. According to the father of scientific psychology, the mind of the new-born infant is a *tabula rasa*, a blank sheet of paper, without structure or prepossessions, merely capable of receiving, with complete indifference, and without any contribution or prejudices of its own, whatever ideas experience may impress upon it.

But it is evident that, though the doctrine of innate ideas is untenable, yet it is impossible to

[1] It need hardly be said that the university of which he is now the chief glory forbade his works to be printed or read.

regard the mind of the new-born child as a sheet of blank, smooth, unruled paper, destitute of even grain or watermark. I do not propose here to rehearse Locke's demonstration that there are no innate ideas, for his book may be had for a shilling or two anywhere, and its dignified and lucid style, such as no mere artist in words has ever surpassed, makes it a permanent delight even to those who might fancy that its matter includes nothing with which they are unacquainted. But we may contemplate the doctrine of innate ideas in the light of modern embryology, of which Locke, of course, knew nothing. Every human being begins as a single microscopic cell, and whoso can conceive that such a cell is possessed of even one simple idea need fear no intellectual problem—the inconceivable does not exist for him.

Yet we have said that it is impossible to refer to individual experience the origin of our fundamental ideas. This has been shown beyond dispute by many lines of argument which this is not the place to rehearse; but, for myself, I am even content to justify this contention by what I conceive to be a *reductio ad absurdum* of the *tabula rasa* theory. If the mind be nothing but a structureless sheet of white paper, pray what difference is there between the mind of a Shakespeare, an idiot, a baby, and a cat? "One thing happeneth to them all"—each experiences the phenomena which we express in terms of space and time and motion and number; why are not the results iden-

tical in each case? On the *tabula rasa* theory, *all minds*, adult or infantine, human or subhuman, should yield the same mental products when exposed each to the same environment. The only conceivable difference between one mind and another, if each be a *tabula rasa*, is that one is bigger than another, and the products should differ only in as far as more can be written on a large sheet of paper than on a small one.

Thus we can neither accept the theory of innate ideas, which is not only disproved by argument, but which an elementary knowledge of embryology makes more than incredible; nor the theory that all minds start alike, having inherited nothing and being without any innate predispositions.

This dilemma has been abolished by Herbert Spencer; but ere we consider how, one may perhaps be forgiven for a small digression on the subject of such dilemmas in general. There are many instances of them, such as the "unanswerable" evidence against the freedom of the will, and the "unanswerable" testimony of self-consciousness that the will *is* free. Similarly "science" and "religion" are supposed to have reached various conclusions, mutually exclusive, yet not to be overthrown by the efforts of the other party. In philosophical language, these are called *antinomies*, or *laws against laws*. We owe the doctrine of antinomies to Kant. The "pure reason" comes to one conclusion, the "practical reason" to the opposite conclusion. We must, therefore, it

is said, accept both without making the futile attempt to reconcile them. In theology we have an example of antinomy in the doctrines of free-will and God's foreknowledge of our actions. Mr. Mallock has popularized the notion of antinomies, and expresses the conclusion to which—as is said—we are forced, in the phrase "a practical synthesis of contradictories." Similarly we are told that the best way of treating the contradictory assertions of "science" and "religion" is to do as Faraday said he did—keep them in separate pockets; for "science and religion proceed from different centres and cannot and need not be reconciled."

In other and plain words, then, we are asked simultaneously to believe that black is black and also that black is white. To which the plain man—more power to his elbow—will reply that there must be "something wrong somewhere"; or, in the familiar phrase, "You must have it one way or the other." But these "reconcilers of science and religion" and exponents of the pure and practical reason keep on asserting that which logic and experience assure us to be impossible—that one can both eat one's cake and have it. The honest thinker, who cares to be true to the laws of his own mind, and who knows the difference between paying his debts and not paying his debts, will angrily silence these sophists who propose to cheat Truth with vacuous words, and will reply that, until he has proof to the contrary,

he would rather believe nothing than that any fact or law of this cosmos is inconsistent or incompatible with any other fact or law. Else why not call a spade a spade, and this house divided against itself not a cosmos or universe, but a chaos or higgledy-piggledy? When we are faced with such apparent contradictions it is our duty to suspend judgment—that foremost sign of the trained mind—until there shall be discovered some higher truth, in the light of which contradiction is seen to be not contradiction, but confirmation and complement.

If we examine the history of knowledge we shall discover an additional reason for hating facile formulas — such as the "practical synthesis of contradictories"[1]—in that empty words are unsurpassed as building material for barriers to close the avenues to truth. To accept these antinomies is to darken the mind's eye and to manacle its feet.

Convinced, then, that the higgledy-piggledy theory of all things is a lie, and discontented with half-truths, let us see how Spencer abolished the "antinomy" that ideas cannot be innate and yet that there are ideas before experience. It is evo-

[1] Mill would be distressed, and would be entitled to astonishment, at the persistence of the ridiculous fallacy which he exposed, that practice and theory are antithetic or opposed—as if any practice were other than the expression of a theory. If the inventor's theory is wrong, his machine will not work. If the machine works, in spite of the handsomest theory, the theory is a lie—practically and theoretically.

lution, the master-key, that has revealed the solution. Spencer examined the history of the individual mind in the light of the history of the racial mind. It is, indeed, true that we have no innate ideas, but it is untrue that the mind is a *tabula rasa;* for it is a general biological truth that "function makes structure," and the experience of our countless ancestors has registered itself in the anatomical configuration of the human brain, each new specimen of which is thus neither a storehouse of innate ideas nor a blank sheet of sensitive paper, but a structure which is preformed for the reception of certain ideas and can express them so soon as its converse with phenomena begins.[1]

The best instance of what I conceive to be the true reading of the Spencerian explanation is afforded by the idea of space as having three dimensions. I have elsewhere advanced the theory that the structure of the semicircular canals of the internal ear, which are arranged, on each side of the head, in a set of three that correspond to the three dimensions of space, as we conceive it, is an argument in favor of the objective truth of our conception. Evolution has unquestion-

[1] I have to confess that, in a previous volume, I have ventured to describe this conception of Spencer's as only a half-truth. What I now believe to be an unjustifiable criticism was due, as are so many criticisms on Spencer, to my having paid undue attention to his critics and *soi-disant* exponents and too little to his own words. This is offered as an explanation, not as an excuse.

ably produced these canals and their arrangement, and this is a result of our ancestors' converse with phenomena. Function has produced structure, and though we are not born with any innate idea of space, yet we are endowed with these canals, the products of ancestral experience, and in this regard our percipient apparatus is thus very far from being a *tabula rasa*—a blank sheet of paper—but has within it, potentially or implicitly, so to speak, not the idea of space, but the materials with which that idea may be attained so soon as experience begins.

This theory that each of us is indebted for his mental configuration and aptitudes to the manifold experiences of millions of ancestors has a direct bearing on what I have called, in a previous chapter, "the test of truth." As we have seen, a truth of the highest certainty is one the negation of which is inconceivable. But the validity of this criterion is incalculably enhanced by the consideration that the inconceivableness depends not merely on individual experience, but is a product of individual experience *plus* the total result, "up to date," of the experience of the race. It must certainly be admitted, as Mill argued, that propositions which appeared inconceivable to one age may cease to be so regarded by a later generation; but, nevertheless, there is no surer criterion at our disposal, and, though it is by no means absolutely sure, yet it may be accorded a much higher measure of confidence, when we regard the structure of the

mind and its consequent estimate of the conceivableness of a proposition, as not merely the result of individual experience, but as the product of the experiences of countless individuals in time past.

SECTION II

EVOLUTION IN SOCIETY

XIX

GENERAL

HERE we make a signal departure in our discussion of the evolutionary idea. Hitherto, in considering the evolution of matter, or living organisms, or even the human will, we have treated topics which every one admits to be fit objects of scientific inquiry—that is to say, matters which are governed by "laws" capable of discovery and formulation. But when we attempt to consider evolution as displayed in societies, we must boldly assert the claim of Science to a sphere wherein some will still be found to deny her right of rule. These diminishing few deny that there can be a science of society, because societies illustrate "the ways of God to men," and notably because they are governed not by laws inherent in the constitution of things, but by the decrees of Providence.[1]

[1] Providence is usually spelled with a capital, and one suspects that it is sometimes thought of as a person; but the only possible conception of it that is not ridiculous must regard it simply as a mode of divine activity. The use of the term would therefore appear to be small; and it would avert confusion to speak of human affairs as governed by God, rather than by Divine Providence. Certainly, if there be a Personal

Most of us will agree that the two theories are not compatible: either human destinies are governed by natural law—and we who worship the power of which nature is the manifestation know that the natural is but the supernatural as known to us—or they are governed by a person whose chief attribute, if we care to use our reason in judging of him, would appear to be an immeasurable incompetence and an utter incapacity for sustained volitional effort of any kind. It may be remembered, however, that Mr. Gladstone was prepared to accept both theories, the belief in Providence and the belief that there may be a science of society. This expression of opinion is one of the few interesting products of the many controversies in which Herbert Spencer engaged.[1]

The majority of thinking people to-day, however, have long ago accepted the belief that universal causation knows no exception in the case of human societies and their ways. It is to Auguste Comte, the maker of the word sociology,[2] that we owe the first clear and complete assertion of the belief that societies are subject to law. Comte, however, treated of societies as fixed or stable things. In so doing he was really in line with the general trend

God, He may be able to "look before," which is all that the word providence implies.

[1] See the last pages of the *Study of Sociology*.

[2] Comte derived this hybrid term from Latin and Greek to express the double origin of modern civilization. John Stuart Mill first adopted the word into English, and it was given universal currency by Spencer.

of all philosophic and scientific thought before Spencer's time; for it is the essence of the evolutionary philosophy that it discusses the dynamics of all entities whatsoever, and their statics in the light of their dynamics, whereas pre-evolutionary thought has been superseded exactly because it dealt with statics alone—and therefore imperfectly even with that.

As in the last section, it is not my purpose to discuss, either in general outline or in full detail, the Spencerian sociology. I am concerned rather to ask what current problems of the twentieth-century evolution the master-key can solve, or help to solve, in our service. Once we have admitted the possibility of sociology, it is evident that politics is no more than a particular branch of applied sociology; and infinite profit is to be obtained by the study of political questions in the light of evolution. For such a study I am certainly quite incompetent, and I therefore do not propose to undertake it.

Rather would I briefly refer, in this chapter, to the now familiar phrase "the social organism"; and thereafter I must attempt to outline, as a typical case, the Spencerian theory of the origin of my own profession. I have chosen this because it bears on the origin of *religion*, which, with *education* and *marriage*—three subjects of high import—I propose to consider in the subsequent chapters of this section.

First, then, as to the Spencerian comparison of society to a living organism. Of course, the image had been used before, as in the phrase "the body-politic." By no previous thinker, however, had its importance and real validity been recognized. In the light of evolution we see its completeness. We recall the history of individual and racial life, the development of one cell into several like cells united to form a lowly organism, and the subsequent differentiation of these similar cells with the production of a single organism composed of many dissimilar cells widely varying in anatomical structure and physiological function. Similarly we see how a dozen men or families may band themselves together for mutual protection—each like all the rest in its relation to the whole. Later there occurs a similar differentiation, you and I being variously-functioning cells in the social organism. It is quite obvious that if we follow the analogy still further, and, instead of regarding cells as the units (as in the first stage), or individual men as units (as in the second stage), look upon societies as units, each of which is at first like all the rest in its functions, but ultimately becomes differentiated, and, at the same time, more dependent on all the rest, we end with the conception expressed by Tennyson in "Locksley Hall"—"The Parliament of Man, the federation of the world." Nor need we stop here, for the imagination may pass beyond the stage of interplanetary warfare, as described by Mr. H. G. Wells, and

may conceive a cosmic society, of which the world states of various planets are the component units. The formula of evolution completely and exactly covers all these facts and possibilities. And we may further note that the evolutionary conception is entirely and inexorably opposed to the vulgar idea that whatever injures one state will benefit another. Just as the stomach, in the old Roman fable, was found to minister to the wants of the whole body—which is an organic whole, in accordance with the evolutionary formula of differentiation and integration—so the wisdom of the future will recognize the truth that the plague in India injures even Manchester, and a war in the Far East even the denizens of the farthest West. Altruism, in a word, is a necessary product of cosmic laws.

Now let us briefly consider the type-case of the evolution of a class in modern society.

The other day, at dinner, a Roman Catholic friend of mine, who had reached that stage preliminary to the priesthood in which the aspirant is known as an "exorcist," laughingly challenged me on the score of the relative antiquity of our professions, claiming priority for the priest as against the physician. Now, the history of medicine is not yet a recognized subject in any of our curricula, and even those who have studied it in the available treatises will perhaps find few data wherewith to decide a question which is of no small interest to the student of the past. Further-

more, the published figures of sale of the volume wherein the question is treated are so small that a brief discussion of the matter may prove novel to those readers who are already familiar with the outlines of the evolutionary sociology, and may serve to heighten their interest in the cheap edition of the *Principles of Sociology* which Messrs. Williams & Norgate are rumored to have in preparation.

Anthropologists are beginning to realize not only that the earliest pages in human history will never be written, but also that no existing race, neither Bushmen nor Fuegians nor Australians nor any other, can be regarded as primitive, or even approximately primitive. In the customs of no extant tribe can we find an illustration of veritable beginnings. It follows that any speculations as to the actual origin of any professional institution must necessarily have somewhat less certainty than belongs to a generalization formed by strict induction from positive data. Without dogmatism, then, but yet with the warrant which its source and the internal evidence provide, we may adduce the theory of the origin of the medical profession which Herbert Spencer has propounded. If I succeed in interesting any reader to whom the theory is new, he will find it in the section called "Data of Sociology," under the heading "Exorcism," and in the section "Professional Institutions." The argument, in a word, is that priest and physician have a common origin, neither be-

ing able to claim priority; and the survival of the title of exorcist as a stage towards the priesthood of the Roman Church admirably illustrates the Spencerian contention.

The primitive belief in the causation of disease by supernatural beings was impressed upon all of us when, as children, we made acquaintance with the New Testament, wherein the etiology of many neuroses is thus assumed. Now one of the first divisions of labor—to use a phrase and an idea which Spencer applied to sociology, borrowing it from Henri Milne-Edwards, the French physiologist—in primitive society consists in the setting apart of men, whom we may guess to have been chosen on account of superior intelligence and subtlety, to deal with those supernatural beings which exercised so potent an influence upon the health, and therefore the happiness, of the community. There are obviously two ways of dealing with a spirit. On the one hand, you may attempt to pacify and placate it. Show it sufficient respect and appreciation, try to see its point of view, and it may leave you alone, if indeed it does not go out of its way to do you a good turn instead of an ill one. This may be called the sympathetic or conciliatory method. Or, *per contra*, taking your courage in both hands, you may stand up to the infernal creature and endeavor to compass its destruction, or, at any rate, to make its host or hostel too hot to hold it—or too unpleasant, as by the exhibition of asafœtida, which must doubt-

less be unpleasant, even to a ghostly pair of olfactory nerves. This may be called the antagonistic, as it is certainly the pluckier and more honest, method.

Doubtless the primitive experts told off to deal with such matters employed both the conciliatory and the antagonistic methods. But it will readily be seen that different types of mind would tend rather to the one than to the other. From the primitive class there would thus be formed two: one which had established friendly relations with the demons, and had found their soft side; another which preferred to essay an overt opposition. In a word, the primitive expert is the ancestor of the two great professions, ecclesiastical and medical. The priest cultivates the conciliatory, the medicine-man the avowedly hostile method of treatment. On this theory, the office of my friend the "exorcist" is seen to be of great interest and antiquity. The differentiation of the original priest-physician is not yet complete, the "exorcist" still claiming the exercise of the medicine-man's antagonistic powers, while preparing for a high office in the exercise of the conciliatory or priestly method.

Such is the theory of Herbert Spencer; of its validity it is for the reader to judge. Meanwhile we may note that it settles the question of priority by declaring the honors easy; but if, as one is inclined to guess, the primitive expert would naturally tend to hostility in the first place, the idea of conciliation occurring only when the more obvious

method had failed, then we may claim for the profession of medicine such a seniority as belongs to the first-born of twins.

How completely this theory accords with the facts of to-day I would perhaps do better only to adumbrate. The priestly method, in cases of individual illness or epidemic, is still admittedly conciliatory, even in the highest types of the highest religion: supplication, penance, sacrifice being offered to appease an anthropomorphic Deity who is credited with anger, that extremely characteristic symptom of human weakness. And the physician, true to his history, is still antagonistic. It is true that the supernatural beings who were supposed to trouble his predecessor's patients have been hypostatized, usually taking bacillary or coccal form; but antiseptic surgery and antitoxic medicine are in strict accord with the primeval principle which dictated the exhibition of foul-smelling and obscene drugs in the "good old days" of demonology.

The section "Professional Institutions" occurs in the third volume of the *Principles of Sociology*, which costs the greater part of a sovereign, and of which only one or two thousand copies have been sold.[1] But it is well worth the while of every medical man to look up this volume, not merely because of the theoretical interest attached to this description of the origin of his profession, nor be-

[1] In Great Britain.

cause of the high place which primitive medicine is shown to hold as the parent of science and philosophy, but also because of the significant manner in which the evolution of this great professional institution throws light upon certain of the problems which are presented to it to-day.

XX

THE EVOLUTION OF RELIGION

BROADLY speaking, there are two theories as to the origin of religion, apart from such effete notions as that the revelation of one God has been granted to all men and that polytheism and fetichism, as seen among the savages of to-day, are developed from a primitive monotheism by a process of degeneration.

These two theories are, first, that primitive man began by taking an interest in natural phenomena —the thunder, the river, the avalanche—and then attributed life to such phenomena, thus deifying them. This theory, of academic popularity, is known as animism. It assumes an interest in nature which is not observed in the savage or the dull-witted peasant; it does not account for the known facts of ancestor-worship; and it assumes that men attributed life and volition to natural objects *before* they conceived the belief that the life of those who have lived persists after bodily death.

The other outstanding theory maintains that religion, in the beginning, consists in the worship

of a dead man—an ancestor or a great chief; and, after the belief in the continued life of the dead had come to be accepted, men came to people the thunder and the river with the spirits of the departed. This is the view held by the founder of the doctrine of universal evolution; but, whether it be right or wrong, the teaching of evolution is that religion is a natural product of the experience and characters of the human mind — a doctrine which strongly suggests that religion will be a factor in human life to the last.

Herbert Spencer's distinctive contribution to the theory of religious evolution is his suggestion that the belief in the continued life of the dead arose in the experience of dreams.[1] Primitive man accepts as true the experiences of his dreams. (In this connection it is amusing to note the recent suggestion of Mr. Schiller, of Oxford, in the *Hibbert Journal*, that we need accept waking rather than dreaming experience as true merely because "it is more convenient for our purposes." But *why* is it more convenient?) Now primitive man met his dead chief in dreams. He therefore concluded that the departed hero still lived *and still retained his ancient power*. Thus it became desirable to please and honor him. This, very briefly, is the dream-theory of the origin of religions. And, in

[1] An excellent example of the misrepresentation which Spencer's opponents permit themselves is to be found in the saying that, according to him, religion is no more than the "product of a nightmare."

point of fact, it is to be observed that the religions we know consist in the worship of dead men —dead men whom, in a very real though derived sense, we may nevertheless admit to be the immortal dead.

Now it is a cardinal part of Spencer's teaching that, despite their lowly origin, there is an essential element of truth in all religions. This, of course, is no new idea. On the one hand, there was the cynical Gibbon, who declared all religions to be equally false and equally useful; but many far profounder thinkers have declared that there is an element of truth in all religions, a statement which is surely much preferable to the mere assertion that religion corresponds to a permament need of the human mind. According to Spencer, it is in their recognition, on analysis, of the Unknowable Power that all religions find their true and common term. Much as I sympathize with this effort to find a basic truth in all religious beliefs, I confess that I find it difficult to convince myself of the recognition of anything I can call a truth in the savage who endeavors to please the ghost of his dead chief. But perhaps this is a recognition of the truth that there is a something beyond appearance—such as the appearance of a dead body. And, at any rate, we cannot believe either that all religions are equally false or that all are equally true.

However this be, let us make sure of a truth taught by evolution, than which none other is

more important. As we shall see in a later chapter, the synthetic philosophy teaches that ethics or morality is older—older by millions of years—than any religion. The confusion between religion and morality is almost inextricable in the modern mind. Yet, in point of fact, not only are the beginnings of a true morality to be found long before even the evolution of the vertebrates—as in the ant and the bee, both of whom do their *duty*—but ages elapsed before any moral or ethical element entered into religion. Between religion and ethics there is, therefore, no inherent relation.

It is easy to show, even on cursory analysis, that the truly moral element is not really so important, even in present-day religion, as is often supposed. The whole essence of morality, its beginning and end, is the subordination of self to others. The performance of any act in self-interest is not moral.[1] To save up money in a stocking or invest it in a commercial undertaking is to perform an act of no moral value. A large part of religion is concerned with acts that are precisely on the same plane; such, for instance, as the performance of certain rites in order to secure a happy old age. Whether it is expected to spend the happy old age in heaven or on earth in no way affects the moral value of the act. Similarly, when the true moral element does enter into the act,

[1] Not moral does not mean immoral.

its value is unaffected by any religious belief. An atheist or a Christian may visit the sick; the one believes that the act has no hidden significance, the other that "Inasmuch as ye did it unto the least of these my brethren, ye did it unto me"; but if the motive is love, the act is of equal value in each case. The present relation between religion and morality is therefore as "fortuitous" as anything can be in a law-governed universe. A profound writer might well spend much thought in discussing the causes which have led to this relation, but they are demonstrably not inherent in the nature of the related terms.

These things have long been recognized by men who have thought for themselves; but evolution has rendered great service in demonstrating the independent origin of religion and morality, and notably in proving that love is older than all the creeds. "Our little systems have their day," but love preceded and will outlast them all.

Thus the evolutionist is little concerned when he hears it said, as it has always been said in times past, that the future of morality depends upon the sustenance of this, that, or the other dogma. He knows that love can say, of any dogma whatsoever, "Before this was, *I am.*"

XXI

EVOLUTION AND MARRIAGE

If, as some of us believe, evolution is the guide of life, it should not fail us in regard to problems so grave as those suggested by the word marriage. It should furnish us with some indication, for instance, as to whether monogamy is a fetich, or merely an ecclesiastical invention, destined to be involved in that *Götterdämmerung*—to use Wagner's term—which is the distinctive mark of the age. It is the purpose of this brief chapter to show that evolution does not fail us here.

For it is the grand lesson of evolution, in relation to all that is worthy, to show that it is a product of nature and natural conditions. Thus when the sanctions of the so-called supernatural are found to be wanting in their title, evolution steps in with its insistence upon the sanction of the natural. It is so with marriage.

Evolution teaches that the history of animal life is continuous, and that man is neither more nor less than what Shakespeare called him, the "paragon of animals." Ignoring the "supernatural," then, and unready to deny that the good and the

beautiful may be products of the "merely" natural, evolution surveys the whole history of animal reproduction, and its verdict is that monogamy is not merely the ideal state, as all admit, but is demonstrably the state towards which animal life has long directed itself as towards a goal. In this connection the services of the synthetic philosophy are inestimable. There was granted to Spencer a most distinguished disciple in the person of Edward Westermarck, late of Helsingfors, and now of London, whose magnificent study of human marriage has completed the pioneer work of the *Principles of Sociology*. Professor Westermarck's wider researches have but led him to confirm his master's conclusion that monogamy is indicated as the ideal and final form of the sex relationship. This being the conclusion reached by students so distinguished and profound—to whose names may be added that of Dr. George Elliot Howard, of the University of Chicago, whose *History of Matrimonial Institutions* is an honor to American learning — the fearful need not be perturbed at the vaticinations of that brilliant band of professional jesters who decry the restrictions of monogamy, or at the inept suggestion of Mr. George Meredith, who, in an utterance which can scarcely be paralleled for its irresponsible mischievousness, coming from so distinguished a source, has advocated the return to the degrading custom of "leasehold marriage" as practised by certain tribes of disappearing savages.

The evolutionary study of society lends to marriage additional support besides that afforded by the evolutionary biology. For, when we come to admit the evolutionary assertion that society is a natural product, we are led to inquire into its architecture — which we must regard as no arbitrary product of a "social contract," but as determined by the nature of things. And we find that as the cell is the unit of the individual organism, so the family is the unit of the social organism. To tamper with the integrity of this unit, in accordance with some petty "generalization" really based on personal unfitness for marriage, or on the hasty observation of temporary conditions in some one locality, is to sap the foundations of society.

The present campaign against marriage, like Nietzsche's campaign against morality, is an instance of the disastrous consequences which ensue upon the attempt to bolster up the true by the false. When the false is exposed, the true is discredited. If the commandment not to commit adultery had no higher sanction than that stated in the Pentateuch, it would have ceased to possess any validity when the origin of the Ten Commandments was traced to the code of King Khammurabi, and when Jehovah or Yahveh was shown to be the mountain-god of Sinai. Temporary disaster must always follow the exposure of the false dogmas—such as the dogma of the inspiration of the Pentateuch—upon which the true has falsely been said to be based; but the disaster is only

temporary. We may or may not believe in the survival of the fittest, but he is a man of little faith indeed who does not believe in the survival of the true. It is only for a brief season that the downfall of the false can involve the true in its ruin. And in the case of such a truth as the value of marriage it will yet be found that the false dogmas supposed to support it did but cumber and hide and dim it.

XXII

EVOLUTION AND EDUCATION

THE vast question of education is touched at many points by the theory of evolution. In the present chapter it is attempted merely to note a few of the most important of these.

It is evident, in the first place, that our estimate of the value of education will vary according to whether we accept or repudiate the Lamarckian theory of evolution. For if acquirements are transmissible, education must have an infinite potency. Sir James Simpson, for instance, believed that education of the mother would increase the size of the child's brain. But this view must be repudiated as an expression of the crudest and most untenable form of Lamarckism. There is no evidence whatever, nor any train of argument, in favor of the view that the results of education are transmitted. Education may, indeed, fit a mother to care for her child; but only in such a manner are the results of education to be seen extending beyond the individual. But this is very far from justifying the assertion, sometimes made by opponents of Weismann, that on his theory education is a waste of time.

Another point. That great pioneer of organic evolution, Lamarck, has provided us with the means for framing a really adequate definition and conception of education. Probably few readers will assent to the miserably inadequate view that education is concerned only with the intelligence, still less that it consists of acquaintance with a certain number of facts. In rebutment of such views many have sought to frame an adequate definition of education. The definition I would submit, as that which is fairly indicated by the theory of evolution, is that *education is the provision of an environment;* the result of education is adaptation to the environment; and all such adaptation is properly to be defined as education. If the validity of this simple but comprehensive definition be admitted, we are prepared to look at educational questions in a broader manner than most of us display, and at least we cannot fail to recognize that the education of the emotions and the volitions thereby determined is at least as important as any other aspect of education. Indeed, we may go further, and assert that the true education is the formation of character. Thus prepared, the conscientious parent will find his duty more complex than ever. He will realize that every factor in the environment is educative and must produce its corresponding adaptation. The company of a vulgar nurse, for instance, is a fact of a child's environment, and therefore a factor in his education.

Then, again, the evolutionary idea finally disposes of one of the most pernicious theories that have ever held sway in education — the notion that the child is "a little man." This belief has caused incalculable sorrow to childhood, has vitiated the education of thousands, has caused endless misunderstandings between parents and children. Examined in the light of evolution, its absurdity is manifest. When we recall the recapitulation theory, which teaches that, in general, each individual, in the course of its development, "climbs the ancestral tree," we see that the child is not a little man, but something lower than man, human only potentially. We cease to blame the child for greed, we do not look for the exhibition of characters only lately evolved in the race, and we are prepared to inquire into the manner in which ideas and experiences strike a child, since we know that the child's mind is *not* a man's mind *in petto*, but has a character of its own — a character which is really subhuman. These considerations make for charity, sympathy, and success in teaching the emotional and intellectual components of a child's mind. Only as an aspect of the study of evolution and in the light of that idea is "child-study" intelligible and worthy of all the thought that can be bestowed upon it.

The preceding considerations might as well have taken their place in the section devoted to

psychology, save that it seemed well to place them near the sociological aspects of education, as regarded from the stand-point of evolution. These aspects are prominent enough to-day. In how far Spencer's views on education as a civic question were determined by the individualism which he consistently advocated, or were logically derived from the theory of evolution, I cannot here attempt to say. But for present purposes we may accept the able arguments of Professor Hudson in favor of the view that Spencer's political thinking is based upon sound deduction from the evolutionary formula.

It is a chief tenet of the Spencerian sociology that the functions of the state should be far more limited than we find them in most modern communities. In accordance with this idea, Spencer, almost alone, persistently opposed state education as vicious in principle. Recent events in Great Britain seem to be justifying him. We have proceeded from compulsory state education to free education, and now the cry is for state feeding of the children. Assuredly, no humane person will allow any theory to interfere with the feeding of a starving child. But the question arises whether the supersession of the parent by the state is not an inevitable outcome of modern tendencies, and whether the state can survive the moral deterioration of its component units. If it be true that the family is the cell of the body politic, what consequences must follow upon cell-deterioration?

Can the whole survive the deterioration of its parts?

This, of course, is too large a question to be more than merely adumbrated here; but I may be permitted to note a recent instance which would have roused Spencer's ire. It being thought that the urchins who attend the state schools of London are too prone to indulgence in cigarette-smoking, the metropolitan authorities determined that the evil must be checked. To this end medical aid was invoked, and pamphlets were prepared, stating the evil effects of tobacco upon the growing child. Thousands of copies were printed[1] and distributed. But to whom? Can it be believed that the distribution was not to the parents, but to the naughty little boys themselves? Never yet have I heard of any instance that demonstrates so clearly as this the utter imbecility into which the principles of collectivism are leading us. One tries to picture the father sitting at home, to whom enters Tommy, aged ten, bearing a pamphlet. Presumably, Tommy, being at bottom a good boy, and wiser in his generation than we are, hands the pamphlet to his father, who returns it with the remark, "Well, of course, it's none of my business; you must decide for yourself." Plainly no father can be expected to pay his education rate and attend to his child's habits himself; that would not be getting his money's worth.

[1] I am not quite certain how far these proposals have actually been carried into effect.

SECTION III

EVOLUTION IN MORALS

XXIII

THE EVOLUTION OF MORALITY

If any one is inclined to question the assertion that the application of his idea of evolution to ethical inquiry would alone have given Spencer a place among the greatest thinkers of all time, let him compare and contrast the literature of ethics before and after say the year 1890. To quote a convenient illustration of the all-embracing revolution which this master-idea has wrought in ethical inquiry, one may refer to the famous monograph written for the *Encyclopædia Britannica* by Sidgwick in 1878, and Professor Stewart's article written a year or two ago for the tenth edition of that work. In the former the name of Spencer does not occur, and the new ethics is briefly alluded to in the last few lines of Sidgwick's searching and scholarly discussion of the history of ethical inquiry. Turn to Professor Stewart's article, and it is seen that, in less than a quarter of a century, a revolution has taken place the magnitude and rapidity of which can surely never have been surpassed in the history of any branch of thought. Now it affords a sympathetic glow of pleasure to recall the fact that Spencer's aim,

throughout his life, was to ground morality in natural law. In the preface to the *Data of Ethics*—the masterpiece of a master-mind—Spencer says:

"Written as far back as 1842, my first essay, consisting of letters on *The Proper Sphere of Government*, vaguely indicated what I conceived to be certain general principles of right and wrong in political conduct; and from that time onward my ultimate purpose, lying behind all proximate purposes, has been that of finding for the principles of right and wrong, in conduct at large, a scientific basis."

Hence it was that Spencer, thinking that his powers were nearing exhaustion, hastened to the formulation of the evolutionary ethics, and left the sociological section of his philosophy untouched until this was completed. Readers of the anonymous and puerile essay on Spencer, informed throughout with every species of bias and ignorance, which disfigures the last edition of the *Encyclopædia Britannica*, may remember that even this writer is prepared to concede that Spencer's study of ethics is "not unlikely to be the most permanently valuable part of his philosophy." For forty years this man set himself, heedless of the ideals and "successes" which suffice lesser folks, to his supremely important task. Some few, in times past, have pursued some such ideal, and of these many, such as Spinoza, have fallen by the way, crushed by the brute forces of a heedless generation; but to Spencer it was granted not only to deserve but to achieve success.

And let us mark why the task may be called supremely important. That, if it be possible, it is of high importance, as a contribution both to philosophy and to practice, to demonstrate the worth, the sanctions, and the principles of morality as dependent upon and correlated with all the facts of the cosmos, no one will deny; but I have said that the task was of *supreme* importance. This it would not be if, in point of fact, moral principles could otherwise be reached and the sanctions of morality otherwise derived. The task would still be of extreme philosophic interest; but it would be almost negligible in relation to practice. But the new ethics, by what it would be most unphilosophic to regard as a "fortunate chance," arose exactly when it was most needed. The discovery of the natural sanctions coincided with the accumulation of the evidence — derived alike from geology and archæology, biblical criticism, and biology — which discredited the old sanctions. Spencer well recognized the danger — not by any means yet overpast — of a moral *interregnum* or vacuum which "must be filled," and he hastened to act because he saw that those who believed that it could be filled were "called on to do something in pursuance of their belief."

The Christian[1] ethics is essentially a modification of the legalism of the Jewish ethics, just as

[1] The word is used to indicate the system of thought invented by the church, not as in any way referring to that sublime system of thought which constituted the creed of the church's Founder.

Christianity, so-called, is a modification of Judaism. Right was right because it pleased the Almighty; wrong was wrong because it was forbidden by the decalogue. The foundation of the system was the arbitrary will of a person; and the answer to the unsatisfied inquirer was the answer given to the child who asks "Why?" — "Because I say so." Bolstered up by a penal system framed on the model of human legislation, this sufficed; or, if it hardly sufficed, in the complete sense of that word, it was better than nothing. But when the advance of humanitarian feeling compelled theology, for very shame, to become less brutal— when the dogma of eternal punishment came to stink in all decent nostrils, and when the decalogue was found to be the adoption, by the believers in a mountain-god, of the code of a heathen monarch, it was, indeed, high time that some true foundation for morality should be discovered. And the key to the truth was furnished by evolution.

Another theory, indeed, made attempt to "fill the vacuum." This was the "intuitional" theory of ethics, according to which a "knowledge of good and evil" is inherent in every human consciousness. In every man's breast God has a witness called conscience, whose voice is His voice, and whose intimations are His.

> "Whatever clime be sought or land be trod,
> The voice of conscience is the voice of God."[1]

[1] I have failed to trace the exact words of Byron, but these are very near them.

That was said, however, before evolution had given meaning and interest to the comparative method in the human sciences. It was found that the "voice of God" was worse than ambiguous: inciting the Jesuits to murder Bruno, Calvin to murder Servetus, the Mohammedan to murder the Christian; encouraging infanticide here, matricide there, incest somewhere else. The intuitional ethics does not explain these things, while modern psychology has no difficulty in explaining the genesis of conscience in a dog or a child.

The Spencerian ethics "filled the vacuum" by its demonstration that morality is a natural evolution of nature, as valid a product of the cosmic process as a man or a star. In so doing it opposed not only those who derived their ethical sanctions from Sinai or St. Paul or Aquinas—"critics of a certain class [who], far from rejoicing that ethical principles otherwise derived by them, coincide with ethical principles scientifically derived, are offended by the coincidence"—but also *their* opponents, who maintained that morality is simply the fruit of superstition, and must rot with its rotting. Notably does the Spencerian ethics refute the pestilent doctrine of Nietzsche, which that brilliant writer and shallow thinker conceived to be derived from the Darwinian theory of natural selection, but which ignores just one-half of the facts — facts which show that, as Spencer says, "self-sacrifice is no less primordial than self-preservation." Here, as so often, evolution is the rec-

onciler, the *via media*, the truth which combines the half-truths seen and distorted by extremists of all parties.

In proceeding to the subject which gives its title to this chapter, let us first note the existence of a school of thought to which the phrase evolution of morality appears meaningless. This, of course, is the idealist school, which regards consciousness as the prime, primitive, and only essential fact of existence. All other things existing only in consciousness—divine or human, the latter being a semi-insulated portion of the latter—it is plain that the laws and principles of morality must be given in consciousness—consciousness, which is distinguished from all other entities by having no antecedents. If this be granted, it is obviously absurd to speak of the evolution of morality; for, as Spencer somewhere says, "If the idealist be right, evolution is a dream."

The evolutionary ethics, on the contrary, naturally follows from the evolutionary psychology which teaches that the human consciousness, like all other known phenomena, *has* antecedents, is not exempt from the law of universal causation. Accordingly, it teaches that the laws of morality are no more arbitrary or accidental than the laws of motion or gravitation, and that there is, therefore, a profoundly real sense in which Emerson was right when he said that the "universe is moral." If this be true, can any other fact so welcome be conceived?

Accepting, then, the view that life, mind, and morals are natural products of nature, it behooves us, in the study of the last as of the others, to seek origins.

In this search we are encouraged to go far back by a general consideration of the facts of organic life and especially of general physiology. For we find, for instance, that all animal life depends upon vegetable life; without the green matter of the leaf there could be neither mollusc nor mammal. We find, also, that without the agency of the ubiquitous bacteria of putrefaction, scorned though they be, all life upon the earth would shortly cease, for their activities prevent the earth from rapidly becoming little better than a charnel-house or dung-heap. Again we observe that sequence of vital events which has been called the *cycle of life:* that the body of the dead animal is used by the plant for the formation of those nutritive compounds without which the living animal must die. We find, in a word, that the dependence of each upon all is the cardinal fact of the organic world; or, as I have elsewhere said, that altruism is a law of nature. If the word altruism, as indicating a conscious attitude or inclination, be objected to, and if "mutual aid" be similarly criticised, we may at any rate employ such a phrase as organic interdependence. The Italians have a proverb that not even a queen can do without her neighbors. It is, then, a fact—which preceded not only the evolution of self-conscious man, but that of the

mammalia, and even of consciousness in its lowest recognizable forms—that the world of living things is closely and necessarily interrelated; so that conscious morality, or the modification of conduct by the consideration that others may be affected by it, found in the facts of the organic world the necessary condition for its development —the fact that no individual organism is independent of its fellows. Thus, to consider morality from the lowest stand-point of mere physical utility, without any reference to its spiritual value, to the nobility it evokes, to the supreme achievements of love or heroism, we may see that the evolution and persistence of morality is explicable by some such theory as the survival of the fittest. All the conditions of the environment—despite the more obvious and plausible advantages of pure selfishness, have favored the survival of this most fit and noble thing. To put it on the lowest ground, *morality pays*—"honesty is the best policy"—because union is strength, and without morality there can be no union. This principle may be illustrated even in a somewhat paradoxical way; for the burglar is more likely to succeed, and will prefer to work, with a fellow whom he can trust, showing the value of a moral element even in the conduct of an immoral enterprise. When rogues *fall out*, honest men come by their own.

Leaving, then, those who say that morality is the child of faith, and that "Christianity is the only hope for the world," as if Christianity—or

rather the teaching and life of Christ—were not merely the most sublime expression and exemplification of moral truths which long preceded its advent, let us inquire into the beginnings of morality.

If we seek the very beginning, there is perhaps some temptation — certainly I feel it — to find somewhat more than metaphor in Shelley's familiar poem "Love's Philosophy." One is inclined to find morality expressed—there is no reason why one should not say *prefigured*—even in the inorganic world, even in the state of things that preceded the advent of life upon the earth. So profoundly true, and so perfectly expressive of the idea which I have attempted to embody in the preceding paragraphs, are these lines of Shelley's, that I must quote them; and, as it seems Philistine to dismember verses so delightful, I must quote them entire:

"The fountains mingle with the river,
And the rivers with the ocean;
The winds of heaven mix forever
With a sweet emotion;
Nothing in the world is single:
All things by a law divine
In one another's being mingle;
Why not I with thine?

"See the mountains kiss high heaven,
And the waves clasp one another;
No sister flower would be forgiven
If it disdained its brother;

> And the sunlight clasps the earth,
> And the moonbeams kiss the sea:
> What are all these kissings worth,
> If thou kiss not me?"

But, of course, it will not do, except in poetry, to attribute to oxygen and nitrogen—let alone argon, the supine—a "sweet emotion." Merely recognizing the truth, which, as far as I know, still requires expression, that the necessity of morality—of the just interrelation of individual with individual—is a necessary inference from the fact that the universe is not many, but one, that "all things by a law divine, in one another's being mingle," let us consider the lowest and most primitive forms of living matter and see whether the germs of morality are to be found in the germs of life.

According to Spencer, as we have already seen, they are to be so found; from the dawn of life altruism has been no less essential than egoism. The simplest living cell that divides, and loses its individuality in two new individuals, is already shadowing forth the sublimest acts of human self-sacrifice. At every succeeding stage we find the scope and the mere utilitarian importance of self-sacrifice increasing—in the worker-bee, in the vertebrate kingdom with ever-increasing emphasis, until we arrive at man, not one solitary example of whom has ever lived for seven days without the indispensable aid of morality. Thus I not merely deny that morality is a product of man, but assert

that *man is the highest product of morality.* In consideration of the facts of infancy, who will dispute this proposition, *No morals, no man?*

In the course of this glorious ascent certain great stages are to be noted. Of vast importance was the *evolution of sex*, as those distinguished Spencerians, Professors Thompson and Geddes, have shown in their book with that title. The development of sex was an instance of the physiological division of labor, and in all division of labor is implied that interdependence which, as I have tried to show, is at once the basis and the demand for morality. I will not enlarge on this subject, for it is to be hoped that no one will have time to read this book who has not time to read *The Evolution of Sex.*[1] Later we find more definitely emerging that which Drummond called the "struggle for the life of others." Even the lowliest mother has such a struggle. The production of her progeny costs her something. But it was an advance when the bird began to incubate her eggs by the warmth of her own body, and to encourage altruism in her mate by demanding that he should seek and bring her food. This was obviously a stage higher than leaving the eggs to the warm sun and sand, as does the reptile. Still more signal was that great step something of which is still taught us by the *monotremes*, or lowest mammals, of the

[1] The idea here referred to is expressed by Coventry Patmore, in the wild language of his muse, when he says that "God is sex."

Australian continent. It was a fresh triumph for love when the mother learned to form, from her own life-blood, the fluid that should feed her young. The duck-mole, or ornithorhynchus, the Australian egg-laying mammal, still extant, teaches us that this step was taken ere yet the ethical worth of reproduction had risen even higher. The next stage, while still retaining the ground gained by the evolution of the mammalia—ground which one would say was permanently gained did not one remember the "society" mother of to-day, who is apparently ceasing to be mammalian—was to retain the egg within the maternal body for some time and then to bring forth an immature creature which could survive only in the warmth of a maternal pouch. This is the lesson of the kangaroo. Lastly, the mammalian mother learned to perfect a marvellous organ called the placenta —the "after-birth" of which every mother has heard—and was thus enabled to retain her child within her own body for a much longer period than any mother had hitherto been able to encompass.

And, throughout, the evolution of love, of self-sacrifice, has justified itself *on every score*. The latest product of love, as we have seen, is man—more helpless and dependent at birth than any of his predecessors, yet their master beyond questioning. Love has produced not only this "paragon of animals," but has established herself in his breast as the source of all that is best in him. Having

thus produced him, and established herself in him, she has achieved the crowning stage in her evolution by compelling him to deify her; so that, in the highest forms of his faith, and in proportion to their height, we find Love in apotheosis, alike in the Christ who is worshipped as Father of Love, or in his followers, who deify him as love incarnate, or in the Pantheist, who at times can believe, with the Christian, that "underneath are the everlasting Arms."

In the foregoing it has been taken for granted that all the forms of morality can be referred to love, and that in describing the coming of love one is describing the coming of morality in general. At first sight it would certainly appear that this assumption is gratuitous. Justice, for instance, is an aspect of morality, but it is commonly considered that mercy and justice are antithetical. If this be so, and if mercy be an aspect of love, how can we regard justice as derived from altruism? But it is evident, on brief consideration, that even such an abstract moral sentiment as the idea of justice depends upon the assumption that complete egoism — as in stealing the property of another — is incompatible with the law of love. Every act of immorality, regarded as such by the evolutionary ethics, is so classified because it impugns this law, and everything which impugns this law is so classified. On this criterion, therefore, it is an immoral act, for instance, for a painter to

destroy certain of his sketches, not because they are bad, but because their existence will lower the price of the others; and to this may be referred such diverse acts of morality as Spencer's renunciation of fishing, a favorite sport, and his refusal ever to buy shares save with the intention of making a permanent investment. The whole of morality can thus be resolved into a single principle which ultimately depends upon the fact that the organic world has been so evolved as to consist of individuals which are related to one another; and the all-embracing character of this principle may best be expressed in the words of St. Paul, "Love is the fulfilling of the law."

XXIV

THE PRINCIPLES OF CONDUCT

THE conclusion of the last chapter will have reminded the reader that ethical principles derived from the study of biology are by no means new; but I have already tried to demonstrate the importance of deriving these principles from facts, from nature, rather than from the dicta of teachers, however illustrious or sublime. But the accomplishment of this is merely the initial service of the evolutionary ethics. For it takes the main principle of morality, the law of love, shows us its relations to biological, psychological, and sociological facts, and thereby guides us in the application of the principle. If we take, for instance, the older utilitarianism, which is associated with the ever-glorious name of that great saint and philanthropist and philosopher Jeremy Bentham, we find an ethical system which is purely empirical and lacks that guidance by principles which distinguishes the new ethics. Believing, as every one now believes, that our end must be the "greatest good of the greatest number," the older utilitarians

completely failed when they attempted to show how this end may be attained. The reason for this failure is evident. These thinkers were unable to make their science more than empirical, more than an inference from the facts of human life as observed by all. It was thus hardly worthy to be called scientific. But the new ethics grounds the principles of morality in the facts of life and mind and society. It is precisely because of the thirty years he spent on these studies that Spencer was enabled to reach his goal; and this is true even though he himself regretted that the principles of evolution had not furnished him, in this final inquiry, with as much guidance as he had hoped.

Spencer was the first to make explicit the assumption which underlies all ethical systems, the assumption that life is worth living. This I will not further examine until we come to discuss evolution and optimism. Given this primary datum, we are enabled to frame a definition of the best conduct. If life, on the whole, be worth living, "that conduct is best which achieves the greatest totality of life in self, in offspring, and in fellow-men." [Let us mark the inclusion of *self* in this definition, for it prepares us for some consideration as to the ultimate relation between egoism and altruism.] This definition must, of course, be interpreted in its highest and most liberal sense, as its author states in the context. Life must gain in "breadth" as well as "length." It must be "com-

plete living,"[1] the "fuller life," as Tennyson has it. One must insist upon the undesirableness of interpreting this definition in the vulgar and mean sense, because certain critics are not above doing so. In his essay "What was Shakespeare's Religion?"[2] Mr. W. S. Lilly actually permits himself to write thus of "Measure for Measure":

"And it must be confessed that if judged by the latest, and presumably the most perfect, system of Protestant morals, Isabella's virginal constancy is indefensible. 'Totality of life in self, in offspring, and in fellow-men,' is Mr. Herbert Spencer's criterion of most highly evolved conduct, of conduct superlatively ethical. Such totality Isabella would certainly have achieved by compliance with Angelo's desire; and therefore, I suppose, her non-compliance stands condemned by the Spencerian rule of right and wrong."

Would it were possible to say that Mr. Lilly does himself less than justice in this outrageous passage.

Leaving this luminous definition of the most highly evolved conduct,[3] since its fitness is almost self-evident, and since every reader is at least as

[1] We may recall the aphorism in the world-famous *Education:* "To prepare us for complete living is the function which education has to discharge."

[2] *Studies in Religion and Literature*, Chapman & Hall, 1904, p. 22.

[3] Spencer defines conduct as "the adjustment of acts to ends," a definition which consorts with Matthew Arnold's familiar dictum (in *Literature and Dogma*) that conduct is three parts of life.

competent as I am to trace its applications for himself, and merely noting that it affords a practical guidance which is lacking to Bentham's principle when unsupplemented, let us finally take note of the evolutionary assertion as to the ultimate relation between altruism and egoism. We have already observed that the claims of egoism are recognized in the definition of the most highly evolved conduct; and this prepares us for Spencer's criticism of the fallacy that there is an inherent opposition—a necessary and irreconcilable antagonism — between egoism and altruism. On consideration, the fact that the antagonism is not essential becomes apparent to all. Without laboring for the obvious, one may merely cite such an instance as that of husband and wife almost quarrelling because each insists on doing what the other wants. If it gives you more pleasure to give up your pleasure for another's pleasure than to follow your original inclination, is your satisfaction of this higher pleasure egoistic, altruistic, or neither or both? Plainly it is both. Thus the best among us are already approximating—and even those who are far from the best do, in their best moments, approximate—to that "perfect conduct" daily witnessed in the mother, whose pleasure and welfare are her child's, and who would be miserable if compelled to follow her own supposed pleasure at the cost of her child's pleasure. Already we not infrequently see not merely a compromise between egoism and altruism, but the

common and complete satisfaction of both in the one action.

With this consideration we may fitly enter upon a discussion of the manner and degree in which the doctrine of universal evolution justifies optimism.

PART V

EVOLUTION AND OPTIMISM

XXV

THE VARIETIES OF OPTIMISM

THE observed varieties of optimism may be classified, I think, according to their origin or according to their measure. In attempting such a classification one is perhaps likely to meet with more success than if it were essayed to answer the question, "What is optimism?" This, I believe, would be almost profitless; for I have heard two admirers of Mr. George Meredith, each thoroughly conversant with his work, declare respectively that he is an optimist and a pessimist. In this and a hundred other cases it is probable that the argument is not about facts, but about names. It is better, therefore, to forego any definition, and to ask ourselves what are the states of mind that may be included in the widest meaning of the term optimism.

Probably the most common and certainly the most practically important variety of optimism—to begin with the classification by origins—is not so much a state of mind as a state of body. This variety one may call organic, constitutional, visceral, or—if you like—gastric optimism. It invaria-

bly presupposes a good digestion. Though entirely non-rational, it is capable of a rational explanation. It is now known that the most important of the various "senses" which supplement the familiar five is dependent upon the innumerable sensory nerves which proceed from the internal organs to the brain. In health, these nerves combine to produce the "organic sense of well-being," the perversion and reversal of which are *the* characteristic feature common to all forms of melancholia. In other states, such as certain forms of mania, and in ecstasy, this sense may be heightened, but not reversed. In health, then, every man has an organic bias towards optimism. The overwhelming majority of people, whose normal health is not qualified even by the "malady of thought," are therefore optimists in virtue of their "organic sense of well-being." This variety of optimism is, as I have said, entirely non-rational, and thus may be compatible with a belief in hell, which no sympathetic person could *realize* without loss of his sanity, not to mention his optimism. But so powerful is the control exercised by the organic sensations over the higher faculties of most of us, that, given healthy viscera, it may be doubted whether the imagination is capable of realizing and explicitly appreciating the unspeakable ghastliness of such a belief. In describing gastric optimism as non-rational, however, I do not mean to stigmatize it. Granted that not one per cent. of the population thinks about the things

that permanently matter, it is indeed well that gastric optimism should exist and exercise such power. Its genesis is obvious to the evolutionist, who sees in it a factor that makes for fitness and survival. We therefore note its existence, congratulate ourselves thereupon, admit its inestimable practical worth, but dismiss it as of no rational or philosophic weight, *save in so far as its existence is itself an argument for rational optimism.*

Next in order of importance, perhaps, is the optimism which has a very different origin—not in the abdomen, but in the acceptance of some comforting creed. The reader certainly does not need my assistance in recalling the innumerable creeds —all, of course, of Oriental origin, Western man never yet having achieved the making of a religion, unless we except Christian Science and the like— which postulate a happy and illimitable hereafter to compensate for these present ills, "which are but for a moment." It is a common characteristic of these many creeds, ancient and modern, that they emphasize the ills of this life in contrast with the promise of the next. They thus inculcate a terrestrial pessimism, but a celestial optimism. Herein is a distinction to be noted in comparing this, which is the optimism of faith, with the third species now to be named, which is the optimism of reason. But again I protest that I am attempting to classify, not to pass judgment. And though it would be easy, and might on occasion be expedient, to jeer at gastric optimism, or at the optimism

of the faith which anticipates a happy hunting-ground, or a harem, or a harp, yet I believe that writer and readers in good health would probably each acknowledge *some* share in each of these varieties of optimism — that of the abdomen, that of faith (or hope), and that of reason. Most will offer some measure of some sort of assent to the optimism of faith as expressed by Socrates—"To the good man no evil can happen."

If I may be allowed yet another array of terms, I will name these three varieties of optimism, according to their origin, *sensory optimism*, *emotional optimism*, *rational optimism*.

Let us now attempt another classification, according to the measure of optimism. Obviously this classification will include various beliefs which may be referred, in their origin, to one or all of the causes named.

We must begin with the most thorough-going optimism—to which alone the term can properly be applied; for all the others are no more than greater or less degrees of meliorism. This, then, I take it, is the most universal form of the doctrine which used to be known as universalism, and which teaches that there is an eternally happy future *for all men*. [It is interesting to observe that modern theological teaching seems to be tending towards this position. I knew a child who was officially taught that though there is a hell, yet there is probably no one in it but Judas Iscariot.] But the most universal form of Uni-

versalism would extend its optimism to every sentient thing: "Admitted to that equal sky, his faithful dog shall bear him company." The broken bird whom Mr. Thomas Hardy has described as crawling away to die, with the "sportsman's" missile in its soft tissues; the albatross shot by the ancient mariner; the coster's donkey—all alike are to be recompensed, and much more than recompensed. No pang of pain, no distress of mind or soul, ever felt by any sentient thing since the dawn of sentiency, but shall be paid for with "good measure, pressed down, and shaken together, and running over." This alone can literally be called optimism. The next approach to it is Universalism proper, which postulates salvation and compensation for all men, just and unjust—but not for a "missing link," an ape, a bird, a kitten, or a worm. Whether these doctrines are sensory, emotional, or rational in origin the reader will consider.

Pope, who has already given me one quotation, will serve to illustrate another form of optimism. [One must use the word despite its inaccuracy.] This teaches that all partial evil is universal good: "One truth is clear, whatever is, is right." This, as Dickens somewhere remarks, involves the assertion that nothing that ever was, was wrong. Perhaps that is not a very profound criticism; but, at any rate, here is another variety of optimism well defined. A variant of it, much more poignant and affecting in expression, as well as more philosophic and intelligible, is to be found in Brown-

ing's "Abt Vogler": "There shall never be one lost good"; "Why rushed the discords in, but that harmony should be prized?" This, I think, is more in consonance with the teaching of evolutionary science than is Carlyle's "The great soul of the world is just"; or the vague corresponding line from the "Essay on Man": "All discord, harmony not understood." If *we* hear only discord and are racked therewith, what avails it to us that some one may be listening to the music of the spheres? Whereas Browning teaches that the discord is the condition of the harmony.

Browning's sublime lines naturally suggest another variety of optimism of which we may regard Leibnitz as a type, with his "best of all possible worlds." This, of course, did not mean, as is sometimes thought, that no improvement on this world is conceivable—a doctrine which, like the most universal Universalism, would, indeed, be properly entitled to be described as optimism. Leibnitz by no means meant to deny the existence of any kind of evil: his conception was nearer Browning's. Given certain conditions inherent in things—by whom given, we are not told—the Deity has done His best. This may be a vale of tears, but that is not the Deity's fault—no more could fairly have been expected of Him in the circumstances; this is the best word that was possible. Doubtless we can imagine a better, but if we remember how seriously He was handicapped, we must admit that He is not to blame. The reader

will acquit me of any intention to be irreverent; and perhaps he will agree that so puerile a conception of the Eternal is as well and seriously met by ridicule as by ostensibly serious argument. This saying of Leibnitz excellently illustrates the result of trying to trim truth to the taste of theologians. Nowadays we are hardly likely to worship, in place of the Unconditioned Condition of All things, a supposititious person who is conceived as "making the best of a bad job."

From these and many other variants of so-called optimism we pass by slow degrees, through such opinions as that which belittles present and personal evil by saying "it will be all the same a century hence," to attitudes which are optimistic only in so far as they repudiate explicit pessimism. Language is plainly in need of a word which shall express the doctrine that good and evil are balanced, or that "things might have been better and might have been worse"—an opinion which is usually, and most improperly, regarded as optimistic, as if any denial of pessimism were optimism; but at present we ask whether a man is an optimist or a pessimist, as if there were no choice save between two antithetic superlatives.

After this attempt to classify the varieties of opinion usually called optimistic, first according to their genesis, and secondly according to their measure, it remains to be considered what measure of rational optimism or meliorism may be based upon evolutionary considerations. We must ask

ourselves whether all forms of optimism, even though digestive or emotional in their origin, are not in some measure their own justification; and while attempting to discount the bias of health towards "looking on the bright side of things," we must inquire into the truth of such sayings as that "the darkest hour comes before the dawn," and that "when things are at their worst they begin to mend." Last we must ask whether the true rational optimism is, not "whatever is, is right"—but "whatever is wrong may be righted."

XXVI

SOME POPULAR FALLACIES

HAVING analyzed our concept of optimism, we found three varieties: oldest and most general, the animal optimism which has for its most complete expression, "Fate cannot touch me—I have dined to-day"; secondly, the optimism of faith, which has for its most sublime and quintessential expression, not the insane cry of Tertullian, "Credo quia impossibile," but the insuperable conviction of Job, "Though He slay me, yet will I trust in Him." In subsequent chapters we must consider the grounds of the third variety of optimism, which we call rational; and it goes without saying that here evolution is the "master-light of all our seeing."

But ere we consider the manner in which optimism may be grounded on evolution, it is necessary first to stigmatize as fallacious the popular notion that evolution teaches the necessary perfectioning of man and man's lot in time coming. Science knows no law of progress, but a law of change. Progress is obviously an anthropic term, denoting merely an ideal of ours; and if this ideal

is to become real, it is we that must make it so. Evolution teaches us that the task is possible, but that it is *our* task. Let us look at the brief history of this grave and dangerous error.

Scarcely more than a hundred years ago great words were on men's lips: formalism and formulism were tottering; Wordsworth felt that "bliss was it in that dawn to be alive, but to be young was very heaven"; Beethoven, soon to be betrayed, had not yet indignantly torn from the title-page of the "Eroica" symphony the name of that incomparable criminal who consumed eight millions of human lives; men had once again discovered that progress is *possible*.

The intervening century has added more to the sum of human knowledge than any of its predecessors; and in the dawn of the twentieth century men are coming to apply certain now established truths of the scholar and the student to the facts of every day. In a word, last century established, on an inexpugnable basis, the idea that change is orderly and universal—the idea of evolution. And in especial are men concerned with change as illustrated in their own bodies — many folk understanding by evolution merely the assertion of man's simian origin. Man, then, being descended, as Stevenson has it, from "Probably Arboreal," has undoubtedly made progress. Not only so: his progress is part of a universal process or immutable law; hence, while our predecessors of a century ago had concluded that progress is possible,

we may go, it is said, a step further and say that progress is *inevitable*.

But it does not follow from the fact of man's simian origin that he must *necessarily* become an angel. The popular logic is grossly fallacious. Evolution has not shown progress to be inevitable; but it has proved the contention of a century ago that progress is possible.

At first Spencer did not see this. Brought up to believe in progress, he employed that term in his early essays. It was not until he saw the illegitimacy of the assumption involved that he introduced the non-committal word evolution.

Properly speaking, I should here attempt to define the term progress — ignoring the example of the thousands who use the term without any nice inquiry into the meaning which they and their hearers attach to it. But space fails me, and I must merely protest that I will not hesitate to accept the noblest definition that can be given to it. I should not quarrel with a reference, in that definition, to the "beauty of holiness" or to the assertion that "righteousness exalteth a nation."

But let me at once try to show that evolution makes no statement as to the inevitableness of progress. Biology, to begin with, knows of species whose individuals are free-swimming when young, parasitic when adult. It knows of descent as well as of ascent. It is familiar with species of lowly form which occur unchanged in every fossil-bearing stratum of the earth's crust, and are multitudi-

nously alive to-day, having marked time these fifty million years. The existence of such forms has indeed, crassly enough, been urged as an argument against the theory of organic evolution, proving, however, only that the antagonist did not understand the theory. Spencer's copiously misinterpreted phrase is "survival of the fittest," *not* "survival of the best." In certain conditions, such as lack of sunlight, the fittest organism may not be the best. The best needs better conditions and dies out; the worse, being the fitter, survives. What is true of the fungus is true of man. The conditions may be such that mercy, justice, and genius cannot survive under them, while brutality, fraud, and convention can; then again the worse, being fitter, survives. This might apply to newspapers, to men under a military régime, to books, to what you please. It is invariably the fittest that survive; but the fittest may be the worst. Progress, then, is not inevitable, and the proof is furnished both by universal experience and by scientific generalizations.

Huxley's famous Romanes lecture, "Evolution and Ethics," furnishes me with a quotation which is to the point:

"There is another fallacy which appears to me to pervade the so-called 'ethics of evolution.' It is the notion that because, on the whole, animals and plants have advanced in perfection of organization by means of the struggle for existence and the consequent 'survival of the fittest,' therefore men in society, men as

ethical beings, must look to the same process to help them towards perfection. I suspect that this fallacy has arisen out of the unfortunate ambiguity of the phrase 'survival of the fittest.' 'Fittest' has a connotation of 'best,' and about 'best' there hangs a moral flavor. In cosmic nature, however, what is 'fittest' depends upon the conditions. Long ago[1] I ventured to point out that if our hemisphere were to cool again, the survival of the fittest might bring about, in the vegetable kingdom, a population of more and more stunted and humbler organisms, until the 'fittest' that survived might be nothing but lichens, diatoms, and such microscopic organisms as those which give red snow its color; while, if it became hotter, the pleasant valleys of the Thames and Isis might be uninhabitable by any animated beings save those that flourish in a tropical jungle. They, as the fittest, the best adapted to the changed conditions, would survive."

It is, then, a fallacy which must never be forgotten or mistaken that, because evolution has proved the almost incredible baseness of the degrees by which we did ascend, we are therefore *necessarily* still ascending. That we are ascending I do not doubt, but that *facilis descensus Averni* I also do not doubt. The ground gained can be held only by effort, and only by further effort can we go further.

This, as I see it, is a fact of the first importance. If, as might almost excusably be thought, we are in the hands of a law which urges us irresistibly *ad astra*, why need we take thought for the morrow and for the men of the morrow's morrow? At

[1] "Criticisms on the Origin of Species," *Collected Essays*, II., 91.

best we can only perchance expedite an inevitable advance; and, for that matter, may not our interference with the natural process which, without our aid, has evolved us from the worm, be as likely to retard as to accelerate?

But it is not so. Last century's revelation of a law which, on the whole, has proved itself so benign will be worse than useless if it suggest that humanity may rest upon its oars and drift with the tide. The tide, as far as we can judge, moves nowhither, is *utterly indifferent*. Who will question that, even to-day, a man, rather than to ascend, finds it as easy—nay, easier, given certain conditions—to sink, in his own brief lifetime, to a level simian and infinitely worse than simian, for *corruptio optimi pessima?*

Man has fought his way to a state a little lower than the angels' by converse with forces which treat alike the just and the unjust. I am an optimist because I am an evolutionist; because I look on man's amazing record and know that what man has done man can do; but, remembering the change of conditions that will ensue when the sun is *in articulo mortis*, I place my trust not in any supposed inevitable law which makes for progress, but in action, in effort, in

> "exultations, agonies,
> And love, and man's unconquerable mind."

But if we must regard as inadmissible the inference that we are being borne forward, in supine

certainty, upon a wave of progress which is none of our raising, we must also abjure the contrary error, which consists in rehearsing the base degrees by which we did ascend, and assuming our bestial origin to condemn us to irredeemable bestiality. This, as has well been said, is like setting forth to tell a good story and leaving out the point. The sound inference is surely that if the beast can become human, man may become superhuman. What the beast has done, man can do.

Furthermore, we still suffer from a fallacy which may be traced to Nietzsche, and of which the accredited philosopher of the many-headed in Anglo-Saxondom is a typical representative. The Nietzscheans take the law of the survival of the fittest—the struggle for life, the law of egoism—as the basis of scientific morality, or, rather, denial of morality, and close their eyes to the equally salient correlative law of altruism—the "struggle for the life of others," to use the phrase of Drummond. This their myopia and their prejudice against Christianity enable them to do, despite the fact upon which I propose to insist until I wear out, that without altruism no human being ever survived or ever will survive for one week after birth. Thus, using the word in two senses, I say that to abolish humanity would be to abolish humanity. When I hear of a single baby, past, present, or to come, that lived or shall live for seven days without the care of another human

being (or another animal, if you care to cite the Romulus-Remus fable), then I shall be prepared to retract the opinion that Nietzscheanism is the grossest, the most blasphemous, and the most grotesquely imbecile of all lies whatsoever, conceived or conceivable.

Nevertheless, there be those who still believe, with the Nietzscheans, that morality is essentially an artificial and unnatural thing, no inevitable product of evolution, but a thing dependent upon men's acceptance of certain dogmas. Destroy—we are told—the belief in free-will, moral responsibility, and future retribution, and man will straightway wallow unrestrained in that sink of iniquity so pleasing to his "desperately wicked" heart.

Those, however, whose eyes are opened to the master-light are apt to resent this view as the most outrageous of all impertinences, a colossal libel, a blasphemy but thinly disguised. According to them, morality is a cosmic product, naturally evolved, with roots now buried in geological strata of vast antiquity. We have discussed, in a previous chapter, the Spencerian revelation of the genesis of morality. We know the immense significance of the zoological term *Mammalia*, finding in the breast of the mammalian mother the fount whence love has flowed; and we have traced the strange sequence with which the *young* of successively higher orders of animal are found each to be more and more helpless at their birth. But

it is only until one lives with a baby that one can realize, in anything like adequate measure, the wonder of this biological truth.

It was John Fiske, the admirable writer who did so much to popularize the synthetic philosophy in America, that first pointed out a fact which affords striking confirmation of Spencer's theory of the origin of morality. Fiske observed that the prolongation of the infantile period, so notable in human kind, must have been a most important factor in the development of our altruistic sense. The tigress robbed of her whelps is obviously not without altruism — though a learned and distinguished Jesuit friend of mine insists that it is only "unconscious altruism" — but the young of the lower animals do not long need parental care. The tiger-cub and the fledgling of the bird are soon able to shift for themselves. In no preceding case, as Fiske observed, is the period of dependence so prolonged as in that of the human infant.

Indeed, the helplessness of infancy is not fully to be appreciated until one lives with it; nor is its significance to be measured until one appreciates its contrast with what is to be. Consider a week-old baby. Unable to stand, much less to wander in search of food; very nearly deaf; all but blind; wellnigh indiscriminating as to the nature of what is presented to its mouth; utterly unable to keep itself clean, yet highly susceptible to the effects of dirt; able to indicate its needs only by alternately turning its head, open-mouthed, from side to side

and then crying; possessed of an almost ludicrously hypersensitive interior; unable to fast for more than two or three hours, yet having the most precise and complicated dietetic requirements; needing the most carefully maintained warmth; easily injured by draughts; the prey of bacteria (which take up a permanent abode in its alimentary canal by the eleventh day)—where is to be found a more complete picture of helpless dependence? Can we wonder that one in seven, even in the most wealthy and civilized lands, dies before the first anniversary of its birthday?

Yet this is the creature which has spread over the earth so that he numbers some fifteen hundred millions to-day. He is the "lord of creation," master of creatures bigger, stronger, fleeter, longer-lived than himself. The earth is his and the fulness thereof. Yet without love not one single specimen of him has a chance of reaching maturity, or even surviving for a week. Verily love is the greatest thing in the world.[1]

[1] The infant's requirements, if I interpret them aright, afford an evolutionary explanation of at least one adult feature which has often puzzled me. For sleep it is desirable to exclude light and sound; while we have eyelids, no appartus for closing the ears is known save, I believe, in certain animals which inhabit the sea, and whose ears are of small auditory importance. In these days, when barrel organs assail us with the "Ave Maria," playing Bach's accompaniment in G and Gounod's air in somewhat more than G, and when the motor-car makes night hideous, one sighs for earlids. And I have even wondered why natural selection has not so endowed us; for it might seem an advantage to be able at will to protect

It would seem, then, that the gospel of force, the Nietzschean doctrine which is supposed to be a deduction from the law of the survival of the fittest, is based upon a gross misapprehension of the facts of biology. These facts teach us, without any aid from rhetoric or sentiment, but with entire impartiality, that altruism has been an invaluable factor, not merely in the ennobling of human life, but in its actual production. They further teach us that morality is no artificial and artificially-to-be-fostered product, but an inalienable possession of humanity, older than all the churches, much older than human thought. Thus, though "Nature, red in tooth and claw," may appear indifferent to good and evil, her sun shining alike on the just and the unjust, yet every new baby teaches us that love is a cosmic product of which humanity itself is not the author, but the fruit; and that, therefore, Emerson was nevertheless justified when he said that "the universe is moral."

The untutored daily observation of all men, in all times, then, and the generalization of evolution, which is the highest product of the tutored ob-

one's nervous system from sound as from light. But it occurred to me that I had not appreciated the significance of the "infant crying in the night, and with no language but a cry" —crying, however, not for the light, but for its food. It would be a sorry business if a child had to rely for its nocturnal refreshment upon the willingness and ability of its mother to keep awake, or to waken spontaneously when wanted. This, perhaps, may partially explain our deprivation of earlids. If our mothers had been able to exclude our infantile cries, where should we be?

servation of all times, alike teach us that altruism is an inalienable factor in human life, older than all religions and ethical systems, independent of them, and destined to outlive, not, indeed, Truth, which "fails not, but her outward forms that bear the longest date." Or, to turn from Wordsworth to St. Paul: "Charity never faileth: but whether there be prophecies, they shall fail; whether there be tongues, they shall cease; whether there be knowledge, it shall vanish away."

XXVII

THE GROUNDS OF RATIONAL OPTIMISM

If, now, having defined the varieties of optimism, and having noticed certain erroneous inferences from the law of organic evolution, we proceed more precisely to inquire into the grounds of a rational optimism, we must begin by making the convenient, though philosophically untenable, distinction between "physical" and "moral" evil. And, physical evil being prior in order of time, we may first consider the evolutionary grounds for optimism in this respect—first as regards the present and then as regards the future.

Thinkers in all ages have argued as to the balance between pleasure and pain. Influenced in the main—as one may guess—by their internal sensations, some have declared that pleasure outweighs pain, some that pain outweighs pleasure. Others have inferred from certain psychological considerations that, in the life of each, pleasure and pain are necessarily balanced, each being purely relative.[1] But this is another question

[1] An American correspondent of mine, Mr. Vogel, of Brooklyn, N. Y., hence argues that the lot of all is equal—that "even-handed justice" prevails.

which the genius of Herbert Spencer has finally solved. In controversion of the theory which has been upheld by so many religions, that the pleasurable is evil and deleterious, and vice versa, Spencer has demonstrated that the pleasurable is normally correlated with health, and that the painful brings disease and ultimately death. Plainly, pain is none other than dis-ease.

Once this principle is grasped, the problem is solved. The very fact that we wish to live, that there is a struggle for life at all, implies a balance of pleasure over pain. Further, the law of natural selection is seen, despite Tennyson's indictment of nature as "red in tooth and claw," to be beneficent; for the fittest are necessarily the happiest, and the survival of the fittest necessarily means the survival of the happiest, the extinction of those least fitted for happiness. To question this conclusion is to question that health and happiness are correlated. It is thus a necessary part of the constitution of sentient things, and has ever been so, that pleasure has predominated over pain. This fact is a refutation of, at any rate, complete pessimism.

Let us now look to the future, and inquire into the grounds for expecting an amelioration of physical evil—pain, disease, and death.

Though it need not be doubted that scientific discovery—which teaches us to dose bacilli with carbolic acid, and so forth—can be subsumed under the law of evolution, and though much might be

written concerning the probable disappearance, in time not far distant, of disease as an important factor in human life, my concern here is with the all-embracing biological generalization which its discoverer, Herbert Spencer, called the law of multiplication. Disease is due either to imperfect adaptation of man to his environment (a term which includes bacilli), or to competition between man and man—as is abundantly taught us by the coincidence between the curves of death-rate and overcrowding. Biological theory and actual observation, however, teach us that the law of competition, as stated by Malthus, is only a half-truth. True, in its measure, it certainly is that if the population increases in geometrical ratio while the means of life increases only in arithmetical ratio, the weakest must go to the wall—so true that this statement suggested to Darwin and Wallace independently the theory of natural selection; but another truth of equal importance was unrecognized by Malthus. This truth, which immediately abrogates the horribly pessimistic inference from the Malthusian proposition, is that the population does not increase in geometrical ratio, but that its rate of increase constantly tends, with the development of the individual organism, to diminish. In other words, the higher the organism, the lower the birth-rate. This is a fact demonstrable not only *a priori*, by consideration of the fact that if the individual expends more energy upon his own individualization he has less to expend

upon reproduction, but also *a posteriori*, by consideration of the observed facts of animal and human reproduction. The falling birth-rates of civilization are unquestionably, to my mind, related in some measure to this biological law.

And so, also, are the falling death-rates of civilized peoples. We are evidently approaching a period of adequate adaptation, when the abominable infantile mortality which now disgraces civilization will be abolished—as it might be to-morrow if we cared enough — and when the number of births and of deaths will fall almost to a minimum; every birth being the beginning, and almost every death being the conclusion, of a *complete* life: instead of, as now, an immense proportion of births being the prelude to, and deaths the expression of, failure. In those days men will see shame and not humor in the question attributed to the dead infant: If I was so soon to be done for, what was I begun for? That question should be addressed to, and answered by, not Deity, but man and his humanity.

But those who have not come to see that moral evil is so called only because it implies physical or mental evil or disease to its subject or to others, may argue that the practical abolition of disease, and of any deaths save such as peacefully close a rounded life, are matters of no moment if moral evil is to survive. Let us, then, ask whether, in this relation also, science permits us to call ourselves meliorists.

But, before doing so, let us make a digression concerning our concept of sin, or moral evil. It does not need more than a few moments' impartial consideration of the subject to compel agreement with Spencer when he declares that "happiness is an inexpugnable element of the conception" of good. The good, or the good action, is that which makes for the happiness of some one. No matter what the religion or the philosophy, this remains true — grounded as it is in biological facts. An action may be thought to be, and may indeed be, good, though it makes for present pain or unhappiness, but only because the present discipline makes for future happiness on this earth, or the present renunciation for an eternally happy life hereafter. Even if the present or future happiness of self or others be not thought of, yet an action may be deemed good—because it is conceived as pleasing, or conducing to the happiness of, the Deity. Hence it is self-evident that physical, mental, and moral evil are, in the last analysis, one; for the moral evil which does not entail physical or mental unhappiness to some one, human or divine, cannot even be conceived.

Further, the Spencerian analysis of the concept of evil furnishes a further argument in refutation of pessimism. Optimism, so called, or the belief that life brings a predominance of pleasure over pain, is so universally admitted that it is everywhere and at all times implicit in all systems of ethics and in all our moral judgments. Did life

normally bring a balance of pain over pleasure, the saving of life would be criminal, the "giving of one's life for others" would be an abominable selfishness, murder would be the highest virtue, and Napoleon, therefore—in effect—the saint of saints. Whoso is unprepared to admit these conclusions is *ipso facto* committed to a denial of pessimism.

Having found the simple principle that unifies all our conceptions of evil—toothache, death, self-indulgence—we may now consider the future of moral evil.

In the last chapter we saw reason to believe, despite the Nietzscheans, that altruism is an inalienable law of organic nature.

But even this is not an adequate expression of the faith that is in the evolutionist; for he believes not only in the permanence of altruism, but in its ultimate triumph. The student of the *Principles of Ethics* finds cause to believe—human nature, thank Heaven, *not* being the same in all ages—that men will one day become so adapted to the social environment that right conduct will be as natural as is the act of breathing by reason of the adaptation of the respiratory apparatus to the atmospheric environment. The unbounded prejudice which attends the efforts of academic criticism has caused Herbert Spencer's prediction to be called "somewhat dreary"; and exponents of the free-will theory and the punishment-reward morality see little to please them in the prospect

which dissociates right-doing from an accompaniment of effort. To do justly and to love mercy is no "merit," they think, unless, in one's heart of hearts, one hates mercy and would rather do unjustly. Nevertheless, the evolutionist, who is not concerned with imputing merit or with passing such judgments, is well content to believe that human nature, which is at bottom responsible for nearly all evil, may one day attain to such heights that men shall do as they would be done by, not for extrinsic and (ultimately) egoistic reasons, but because that is their inevitable mode of self-expression. And if our opponents maintain that inevitable virtue is no more worthy of merit than cloistered virtue, and, indeed, that doing the right is not really to be called virtue if one likes doing it, we, whose study of the human will leads us to refrain from passing any such judgments upon anybody, will not quarrel with them. It suffices us that, seeing virtue already expressive of the innermost nature of our holiest to-day, we may believe it possible that, in time to come, the many shall be raised to their level, so that sanity and virtuousness shall be synonymous, and wrong-doing be regarded as the mark of a rare and terrible disease.

The profoundest thinker among English poets anticipated this vision of Spencer's; and perhaps the critics who would deny and decry this most radiantly optimistic of all the inferences from the law of universal evolution will be surprised to hear

that their abuse is directed against Wordsworth's "Ode to Duty."

> "There are who ask not if thine eye
> Be on them . . .
> Glad hearts! without reproach or blot;
> Who do thy work, and know it not."

The evolutionist is an optimist because his study of sociology and ethics has led him to regard as more than possible the realization—though only after many centuries—of the ideal of the triumph of righteousness, which Wordsworth saw just one century ago:

> "Serene will be our days and bright,
> And happy will our nature be,
> When love is an unerring light,
> And joy its own security."

PART VI

DISSOLUTION

XXVIII

THE MEANING OF DISSOLUTION

We are now compelled to consider a theory of incalculable significance, which goes by the name of *dissolution*. It was only after many years that Spencer found it necessary to add to his definition of evolution a description of a correlative process which he called dissolution. Had he appreciated earlier the facts on which this theory is based, we would not be subject to the confusion in the use of the term evolution, which is properly a general and universal process, but may also be used to indicate the "upward" phases of that process, as distinguished from the "downward" phases, which we describe as dissolution.

The doctrine that "progress," or increasing heterogeneousness, or complication, cannot continue forever, but must be followed by a phase of retrogression, involution, or dissolution, is of greatest interest, not only in relation to creeds or societies or individual lives, but also in relation to the present phase of activity manifested throughout the known universe.

It is a commonplace that the sun is moribund.

Judging by the cogent evidence before us, we are led to the conclusion that there must be a term to the "upward" course of cosmic evolution. Of all the predictions of contemporary thought, this is the most dismal. It sorely distressed the beautiful and sympathetic soul of Charles Darwin, who did so much to establish the doctrine of hope, only to face the probability that the sun must ultimately cease to support life upon the earth filled with happy peoples in the coming time. And though the recent discovery by Professor Rutherford that radium is a general constituent of the earth's crust,[1] and the high degree of probability that this potent source of heat is also present in the sun, give us reason to believe that the future duration of life upon the earth may be much longer than was formerly supposed, yet we are still asked to believe that "the last catastrophe" is as inevitable as the laws of physics can make it.

This, then, is the local and personal illustration of that converse of evolution which Spencer termed *dissolution*. In the present state of our knowledge there are grave reasons to believe that not merely this lukewarm bullet, but the stellar universe—in virtue of the law of the dissipation and degradation of energy—is travelling towards universal death.

This is a hopeless conclusion—a circumstance which, indeed, gives us no warrant for rejecting it, but which has led physicists strenuously to seek

[1] See Harper's *Magazine*, January, 1905.

reasons why it may appear untenable. Furthermore, it bears the inevitable implication that to this strictly finite process there must have been a beginning.

If the universe, as Robert Boyle and Paley thought, be like a clock or watch, made and wound by an Almighty Clockmaker, it is to be expected that this world-machine will ultimately run down and stop—not even the cosmos as a whole is to be regarded as a perpetual-motion machine. Or if we regard the universe as a living thing, whose motion is the evidence of its life, we may expect that, like other living things, it must ultimately die. Its substance will remain intact, as the doctrine of the conservation of energy assures us, but its life will have ceased; it will be merely a corpse immune from decay.

Now there is a well-established "law" of thermodynamics, discovered by Lord Kelvin in 1852, which bears directly upon these two metaphors that regard the life or activity of the universe, though not its mere existence, as having had a beginning and as destined to end. The doctrine of the dissipation of energy teaches us that, while energy never disappears, it ever tends to become unavailable. For the purposes of the present argument we may regard heat as the common or undifferentiated form of energy which all the other forms constantly tend to assume. Now heat, like water, must always "seek its own level," and when we suitably arrange any system of which one part is

hotter than another, we can make it do work. But when the water has fallen from the height, or the heat has distributed itself, no more work can be got out of it. The energy is still there, but it is no longer available. At present there is a great difference of heat potential between the different parts of the solar system, one consequence of which is the presence of life upon the earth. But in time to come the heat will have distributed itself so that what corresponds to the solar system of to-day will be all of one temperature, and life will be impossible.

Now if energy, as represented by heat, is ever seeking its own level, the time must come when, if there be no compensatory process, all the energy in the universe ceases to be available. To state the case broadly, the heat will still be there—the dead universe will have a certain temperature—but there will be no difference of potential, and the cosmic life will have run its course. If the law of the dissipation of energy be the whole truth, the universe is certainly comparable, in this connection, to a watch that is running down. Furthermore, there is within it—if this law be the whole truth—no possibility of being wound up again, for it is a prime character of natural processes, as Lord Kelvin was the first to point out, that they are irreversible. "This remarkable property of all natural processes," as Dr. Merz says, "seems to lead us to the conception of a definite beginning and to shadow forth a possible end—the interval, which

contains the life or history of nature, being occupied with the slow but inevitable running-down or degradation of the great store of energy from an active to an inactive or unavailable condition." Recent discoveries, such as that of intra-atomic energy, radio-activity, and the presence of radium in the earth's crust, may show that the watch will run for millions of æons longer than we had thought; but they do not affect the fact that it is running down. The imminent picture suggested by the law of the degradation of energy into heat and its dissipation throughout space is that of a dead universe, existent, indeed, but no better than a perdurable corpse—"stable in desolation," as Stevenson has it.

Now ere we inquire whether there are indications that this is the whole truth we may note how remarkably this, which is the accepted scientific teaching of the time, consorts with various conceptions of the Deity. It is exactly compatible with the idea of God as entertained by Boyle and Paley and Cowper—the Great Artificer. He built the watch, wound it up, and, as Carlyle has it in *Sartor Resartus*, is now the absentee God, who has sat idle since the first Sabbath, watching the universe go. And when it has at last run down, He alone can wind it up. If we pursue the metaphor somewhat further, we may inquire whence the Watch-maker obtained the materials from which the watch is made. And here is an analogy which breeds an insuperable difficulty. For the human

watch-maker does not create the steel and rubies and so forth of which his watches are made. They were extant before him. And similarly the doctrine of the conservation of energy teaches that the substance of the cosmos, its corporeal frame, is from everlasting. The scientific teaching thus appears nicely to confirm the ancient conception of an aboriginal Chaos, into which the Deity infused at some definite period the breath of life—or which He built into a machine, wound up and set going. It is therefore possible to construct a scientific defence for the doctrine of a primeval entity, without form and void, which is presumably "self-existent"—whatever that may mean—and to which a Deity, conceived as independent thereof and having His (or Her) habitat beyond the range of any telescope yet constructed, has given form and a finite period of activity. His sole object in constructing it was, as Dr. A. R. Wallace has lately written a book to prove, the production of the human soul. Thereafter the machine will run down, having served its purpose; and will so remain unless its Maker should care to wind it up again.

On this position there are two criticisms to be made. The first has reference to the origin of the energy or stuff of which the universe is composed. Plainly any ultimate answer which leaves out of account or fails to explain the existence of the universe, apart from its life or activity, cannot be regarded as adequate, or even as true in so far as

it goes, for we can scarcely be satisfied with any explanation that does not meet all the facts. Furthermore, we cannot accept as final any explanation which proceeds on the assumption that time is what, for our daily purposes, we regard it. Few will now dispute the proposition that time is no more than the symbol by which we express our consciousness of change without and within us. Now evolution is simply an assertion of universal and ordered change, so that time is thus merely an expression or symbol of our consciousness of evolution, and cannot be included in any ultimate explanation of the fact of evolution. Let me make a second attempt to express myself. The foregoing theory states that evolution, change, life, activity—to live is to change, says Newman—had a beginning and therefore a Beginner, and will have an end. But if time be an expression of our consciousness of change or activity, we cannot introduce this (derived) temporal concept into our explanation of the cause of that which it symbolizes. Judged by any philosophical canon, therefore, the argument for a beginning of the cosmic activity must be regarded as circular and vain. We might, indeed, apply to it, as to any other circular argument, that blessed word "self-existent," with which Professor Haeckel explains the prime fact of Nature's being.

Secondly, we may leave the philosophic and consider the scientific question. Ere we infer from the law of the dissipation of energy that the

universal clock is running down, let us ask ourselves what it is that we really know. We shall find that even when the objective validity of the concept of time is impugned, there still remain some difficulties in our argument. For instance, we know nothing, or practically nothing, as to the destiny of the heat-energy and light-energy which are incessantly being radiated from the solar system. Perhaps they are restoring the balance elsewhere; the energy that is dissipated for us may be marshalled for others. All we have observed are certain facts as to the part of the universe which we know; but when the doctrine of the dissipation of energy was framed, *our* universe was thought to be infinite and the *only* universe. Yet to-day the astronomers are inclined to think that the stellar universe—bounded by the Milky Way—may possibly be to the sum of things no more than the solar system is to it. And even if our universe be running down, there may be that in process elsewhere which shall wind it up again; a speculation in which is implicit, let us mark, the assumption that other universes, if such there be, and ours, are interrelated. Yet who shall say whether this assumption is gratuitous or not? Indeed, the prophecy of universal death is a sorry piece of presumption when we come to inquire into it. Here, in a point of what they call infinite space—not that they can conceive space to be either infinite or finite—is a race of beings, born but yesterday, whom gravitation bloweth where it listeth.

They have lately discovered that their prison-home is moving, but are not sure whither. The other day they made a few experiments, which they have interpreted as their reason permits them, and which they infer to imply that *All things* are coming to a stand-still. They were not there when the dance began, nor will they see its conclusion. Their total life history can be but a moment in its course, but they are assured that it did begin and will end; for are they not the privileged spectators of "all time and all existence"?

The reader must not say that science points to a conclusion which I dislike, and that I am trying to sail away from it on the inflated wings of rhetoric. If science does point to this conclusion, then it must be accepted; but the question is whether so tremendous an inference, involving a whole host of tacit and unexamined assumptions, can legitimately be drawn from the known data. I maintain that it cannot. If it were necessary, I might quote the considerations advanced by Lord Kelvin himself in 1874, to show that certain indications point to the restoration, not of energy, but of its availability; and these considerations might be reinforced by the inquiries of the past thirty years. But I am not prepared to admit that the question of the death of the universe can be solved by any balancing of known or conceivably knowable considerations. If, for instance, there be no other universes than that which perhaps the galaxy bounds, I do not see how their existence could be

disproved save by the lapse of infinite time during which no disturbance attributable to them was observed in ours. To say that our macrocosm is to die when it may be no more than an atom in a greater whole, to which it is of no more account than a constituent atom of one of your blood corpuscles is to you, would surely be madness. Indeed, we may venture to say—while not forgetting the many instances in which apparently similar assertions have been falsified, as when Comte declared that we could never tell whether gravitation acts among the stars, or of what they are composed—that even if the life of the All be finite, we shall never be able to prove it. Radium clocks have been made that will go for a million years; but I believe that the universe was never made and will go forever.

Herbert Spencer, arguing not from physical facts, but rather from certain principles at which he had arrived—such as that of the universality of rhythm—declined to accept the view that the cosmos is doomed. This, indeed, goes without saying, for such a view of the world-process is quite incompatible with Spencer's *First Principles*, and, if it be true, evolution is a dream. We may fairly inquire, therefore, into such reasons as Spencer can give us against the acceptance of this appalling sentence provisionally pronounced — and already being provisionally withdrawn—by contemporary physics.

After demonstrating the fact that dissolution

inevitably follows upon evolution, alike in the history of societies, living things, the earth's surface, and the earth itself, Spencer is met with the inference that "evolution must come to a close in complete equilibrium or rest," which, for aught that appears to the contrary, may last indefinitely. This, as we have seen, is the inference of the physicists.

But there is no questioning the astronomical evidence which Spencer quotes, and which has been abundantly confirmed since his time, that evolution and dissolution are both proceeding "in many thousands of places throughout our sidereal system." As far as the visible evidence goes, there is no hint of any imminent full stop, any more than there is of "one far-off divine event to which the whole creation moves." The conclusion to which Spencer is led is that

> "It is not inferable from the general progress towards equilibrium that a state of universal quiescence or death will be reached; but that if a process of reasoning ends in that conclusion, a further process of reasoning points to renewals of activity and life."

It is to this last conclusion that the physics of to-day is trying to find its way; but whether Spencer's *a priori* assertion will or will not be confirmed by the inductive or experimental method we can scarcely yet decide.

But to return for a moment to the personal question, it is evident that, have it which way we will,

there is little satisfaction for us. Whether the cosmos is tending towards universal and final death, or whether there is to be eternal re-formation and ceaseless re-attack upon the weary ascent[1]—the whole business seems futile and vain. But I sometimes wonder whether in *First Principles* or in the modern theory of entropy sufficient allowance is made for *the influence of human intelligence upon the evolutionary process*. M. Maeterlinck, at any rate, with his brilliant daring, is little concerned about a solar catastrophe. Postpone it for a century or two, he says, and man will have learned to control gravitation and steer his planet where he will. And, though one does not quite see how such power could avail us much, considering the long journey through inconceivable cold to the nearest fixed star, yet we will do well, in predicting the future of matter and motion, not to deem impotent the factor of mind.

[1] See chapter vi.

XXIX

THE LAW OF UNIVERSAL RHYTHM[1]

ALLUSION has more than once been made in the preceding pages to Spencer's law of rhythm, which we saw illustrated notably in the chapter on "Cosmic Evolution." In the last chapter we have seen that Spencer adopted the "cyclical" view of universal change—

"rhythm in the totality of changes—alternate eras of evolution and dissolution. And thus then is suggested the conception of a past during which there have been successive evolutions analogous to that which is now going on; and a future during which successive other such evolutions may go on—ever the same in principle, but never the same in concrete result."—*First Principles*, first ed., p. 536.

These sentences do not appear in the last edition of *First Principles*, but they express the specula-

[1] In writing this chapter I have availed myself of the invaluable references in Dr. Merz's *History of European Thought in the Nineteenth Century* (see II., 286 *et seq.*). This work of unrivalled industry and insight, a conspicuous illustration both of the love of truth and the philosophic temper, must necessarily be studied by all who take a serious interest in that mighty being of which they form a part.

tive and avowedly tentative opinion of the author. Here, however, we are less concerned with his opinions than with the most reasonable opinions that may be held. In the last edition, Spencer advanced various considerations which seem to qualify the likelihood that the sentences quoted are really in consonance with the past and the future facts. At the end of the last chapter I have advanced another consideration, the influence of man's mind on the future of things, which does not appear to have occurred to Spencer. I am certainly not prepared to express any opinion as to what this suggestion is worth; but perhaps it is, at any rate, worth considering.

The cyclical idea of the cosmos appears to have originated with Heraclitus, the first evolutionist, and to have been borrowed from him by the Stoics, who thought that "the history of the world and the Deity moves in an endless cycle through the same stages." The Pythagoreans thought that "the succeeding worlds resemble one another down to the minutest detail."[1] This doctrine Spencer expressly denies in the passage quoted. Some day, when a scholar and student like Dr. Merz, aided by many collaborators, has given us that *Historical Dictionary of Ideas* for which I provided the title a year or two ago, but with which no one has yet been good enough to supply me, he will doubtless spend many pleasant hours in studying

[1] Zeller, *Philosophie der Griechen*, III., 136.

the history of this idea of endless repetition, which delighted Heraclitus, the Stoics, the Pythagoreans, Empedocles, Virgil (in his fourth eclogue), Nietzsche, and many more.[1]

But it is plain that this idea, haunt us as it may, cannot be prevented from arousing a sense of futility. Surely all is vanity, if it expresses the whole truth. What, for instance, could be more disheartening than its partial expression in a passage that occurs near the end of the twelfth book of Aristotle's *Metaphysics:* "Every art and every philosophy having probably been found out many times up to the limits of what is possible and again destroyed"? For myself, I am the rather attracted by the conception of the world-drama expressed in Lotze's *Microcosmos:* "The series of cosmic periods, . . . each link of which is bound together with every other; . . . the successive order of these sections shall compose the unity of an onward-advancing melody."

The question, however, in science and philosophy is not what we would prefer to believe, but what, if anything at all, it is compatible with intellectual honesty and the philosophic temper to believe. Doubtless there are many serious and thoughtful men who will say that this question can affect no practical issue, and that our duty is merely to "work while it is called to-day." Nevertheless,

[1] A living poet and essayist, Mrs. Alice Meynell, has a fine essay in this vein, entitled "The Rhythm of Life."

it may be maintained that even a speculative opinion on this matter may well affect conduct in that it can scarcely fail to affect one's intellectual and emotional attitude towards life.

Let us note, then, in the first place, that the Pythagorean idea of *exact* recurrence, or, indeed, the idea of anything like exact recurrence, is incompatible with the modern scientific belief that causation is universal. This belief, if it be true, implies that every act, however small, whether performed on the house-tops or in solitude, affects, in its measure, the whole subsequent course of events—of *all* events, since

> "thou canst not stir a flower
> Without troubling of a star"

—a statement which Newton has taught us to be literally true.

In the second place, there is the fact, which cannot be discounted by the Aristotelian speculation quoted above, that human knowledge is now capable of influencing external events in a measure, which, amazing though it would have seemed to our great-grandfathers, promises future developments to which we can set *no measure whatever*. The agnostic assertion as to our knowledge of reality, which is implied in the term unknowable, and which is deduced from the considerations of psychology, is entirely compatible with the belief that there is no necessary limit whatever to

man's knowledge of phenomena—knowledge which is power.

Thus, though the scientific assertion may be that dissolution is imminent in our part of the universe, and that, in accordance with the laws of rhythm, the upward or ascending phase must yield to a stage of undoing and disintegration, yet I, for one, am unprepared to yield assent to this most hopeless of propositions until I am assured that mind is negligible as a factor in the future history of things. Until they can show that man's mind cannot possibly avert the threatened ruin of itself and its products, the upholders of the theory of mechanical rhythm, as futile as stupendous, cannot be held to have proved their case.

PART VII

EVOLUTION AND THE RELIGION OF THE FUTURE

XXX

THE QUESTION OF QUESTIONS

THE question of questions is the concern of philosophy — which is the quest of reality. Hence we may divide all schools of philosophic thought into two great categories — those which believe that they have found the answer to this question, and those which believe that it is unanswerable.

Truth not being determinable by a counting of heads, however distinguished, we need not expect to reach any conclusion as to whether or not reality is knowable, by citation of the authorities for or against. Perhaps the great names are equally balanced; and perhaps exception might be taken to any off-hand attempt to assign the great thinkers to one or other category. But Plato (?) and Kant, Spinoza and Spencer may be named as representative of those who, though widely differing among themselves, agree in denying that the ultimate reality can be known. The terms noumenon, thing-in-itself, and unknowable may be recalled; while even "the God-intoxicated" Spinoza, who spoke of *Deus sive Natura*, declared that "to define God is to deny Him."

On the other hand, there are many illustrious thinkers who teach that reality can be known. It is true that most of them lived before the days in which men began to study the knowing process; but their names compel our respect. It will probably be admitted that Democritus, Aristotle, and Berkeley were of their number. But if the mutual differences of the first—the ultimately sceptical or agnostic group—are immense, profounder still are the differences between the thinkers of the gnostic or dogmatic group. For this method of classification—which I am nevertheless prepared to regard as the primary classification of all philosophic systems — groups together, in respect of their dogmatism, the theologians of all creeds — Christian, Buddhist (if it be not incorrect to speak of a Buddhist theologian), Mohammedan, Hebrew, or what you please—since every religious system includes a philosophy or theory of reality, and all such theories are necessarily dogmatic or gnostic: the idealists, who maintain that mind, which they regard as obviously and immediately knowable, is the ultimate reality; the materialists, who regard matter or atoms as the (knowable) reality; and their successors, who answer the question of questions by referring us to an (equally knowable) energy or force. Thus, in respect of their belief that the quest of philosophy is attainable, the theist, some pantheists, and some atheists may be found to agree.

But in one respect, at any rate, *all* the philo-

sophic thinkers of any weight, whether gnostic or agnostic (I use the words in their primary senses), are found to agree—and that is in the belief that reality, whether knowable or unknowable, whether personal or impersonal, material or immaterial, is *one*. No philosophy that counts is content with anything but some form of monism. If we believe in God and nature as antithetic, we must at any rate declare that God made nature from His own substance; if we believe in mind and matter as antithetic, though knowable, we must at any rate declare that reality consists in the "union of subject and object"; and so forth. Mr. Balfour, who ranks at times beside the ancient sceptic who denied everything, even to denying that he denied anything, doubts whether there are any grounds for this constant search for the One;[1] but, at any rate, we find that a belief in the unity of reality is common to all the systems that are not negligible. Whether reality be a knowable God, or the unknown God, or matter, or the "unknowable," it is believed to be *one*.

As a camp-follower of those who believe that we cannot know reality, I am in company too good to permit me any distress at the allegation of "having one of those uncentred minds which cannot be happy without a mystery"; and so I hope I can refer, without any resentment due to such an unkind heart-thrust, to a lately published volume—

[1] Presidential address to the British Association, Oxford, 1904.

The Evolution of Knowledge, a Review of Philosophy, by Raymond St. James Perrin.[1] The author of this book believes that "the reason why our knowledge is only of phenomena is that there is nothing but phenomena"; he regards the postulating of anything that cannot be known as mysticism and superstition, and his main thesis, which he considers to be abundantly proved, is that the ultimate reality is *motion*. He is an evolutionist, and it would appear that, from the doctrine of universal change, he infers reality to be none other than material change or motion. It would be idle to follow him in the whole of his argument—how idle no reader will need more than ten pages to show—but it is expedient, I think, to consider the chief difficulty which he has to encounter — the resolution of mind into motion.

While we who believe that neither mind nor not-mind is the ultimate reality, but that both are phenomenal of an underlying reality, can afford to recognize a *proximate* dualism of mind and not-mind, those who believe that they have found the answer to the question of questions are commonly compelled, by the passion for unity which they share with us, to resolve mind into not-mind, or vice versa.

A few years ago we could have used the word materialism to describe the doctrine which professes to explain mind in terms of not-mind. But

[1] Published by Messrs. Williams & Norgate.

recent discovery, as every one knows, has cracked the clay feet of materialism, and we are now at a loss for a word until people shall become familiar with the appropriate substitute, which is, I suppose, energism. Let us admit that everything that is not mind may be resolved into energy—ignoring the palpably derivative concept of motion—and let us then inquire into the contention that mind may be resolved into energy.

From our author we may take the very crudest conceivable form of the doctrine which explains mind in terms of not-mind. In words which this pen is too feeble to characterize, Mr. Perrin gives, as "the modern scientific definition of mind"—"*that part of the sensorium capable of the greatest molecular activity*"—a definition which is almost enough to make one forswear science forever and go in for black magic or the hell-fire theology or the Baconian theory. But admitting that the matter of which the human sensorium is composed is really like all matter, a manifestation of that form of energy which we call electricity, let us consider it in relation to our author's theory of mind.

Now ere we consider the teaching of the evolutionary philosophy, which is one of those that regard the question of questions as unanswerable, we may notice the most popular and therefore the most important of the proposed answers. This is the philosophy which, in one form or another, regards mind as an attribute or function or occa-

sional property of not-mind—the said not-mind being regarded as the knowable reality. This doctrine has taken many forms. The oldest and crudest is that which regards mind as a property of (knowable) matter. But now that modern physics has shown matter to be no more than a fleeting manifestation of something else, materialism in its crudest form has been abandoned. This solution was, indeed, never other than fallacious, since, as the distinguished French scientist M. Poincaré remarks,[1] it is meaningless to assert that mind is a property of something which, on analysis, can only be regarded as symbolic.

Therefore the modern successors of the materialistic theory are framed in somewhat less vulnerable terms. Here, then, we may resume consideration of one of these quasi-materialistic theories, which is, at any rate, no worse than any of its fellows.

It is an easy thing to dissect a human brain. The post-mortem-room attendant preserves it in formalin or alcohol and sells it to the student, who proceeds with a long knife to slice it from above downward, examining each section *seriatim*. He can also make microscopic sections of the gray matter from various areas, stain them with silver salts, and examine them under a high power. He thus is certain to encounter "that part of the sensorium capable of the greatest molecular ac-

[1] *Science et Hypothèse.*

tivity"; but as he fingers and smells and sees it, does it ever occur to him that he is fingering and smelling and looking at mind?—so that he is entitled to say, "This morning I bought a small piece of consciousness, cut a thin section of it, stained it by Golgi's method, and mounted it in Canada balsam"? Even granted that the thin section is really a manifestation of energy, can anything more fatuous than such a mode of thinking be conceived?

Of course the materialistic or energistic theory of mind can be framed in terms slightly less ridiculous. If we avoid the use of the term "matter" and confine ourselves to such words as "energy," we can declare, if we like, that "consciousness is a form of energy." This is by far the most plausible form in which the theory can be presented, for we are easily deceived by the excellence of the metaphor into thinking that it is more than a metaphor. But—to name the most serious objection that occurs—all the natural sciences have united in the demonstration of the fact expressed by the phrase "conservation of energy." Heat, light, electricity may be transformed, but they are never lost; nor is any energy ever created. Those who would persuade us that "consciousness is a form of energy" must be good enough to demonstrate that its manifestations are compatible with this law. But how is this to be done while no one can even furnish us with any unit or scale of consciousness? Even if we assume, for argument's sake, that ex-

actly the same number of milligrammes of phosphorus are oxidized during an hour's consciousness — whether of a Shakespeare or a sot — who will declare that those two conscious entities, even though accompanied by exactly equal amounts of chemical change, are equal? Burn a gramme of phosphorus, in a brain or a pan, and you will always obtain an invariable amount of heat. But one brain will yield, meantime, the prelude to "Parsifal," another the "Washington Post March," while the pan yields nothing at all but the heat. The law of the conservation of heat-energy is observed, but to resolve mind into energy (which is, as a fact, a material concept) you must demonstrate that the prelude to "Parsifal," Mr. Sousa's march, and nothing are equal. We wish you joy of the task.

The law of the conservation of energy might be stated as the law of the conservation of not-mind. If it could be demonstrated to be applicable to mind, the discovery would be welcomed by those who seek for evidence of the persistence of the individual consciousness after death;[1] but it has not been so extended; nor is there any conceivable method of such extension. Meanwhile the theory that not-mind is the reality which philosophy seeks must be rejected.

[1] "Thought, we know, dies. Shall that alone which knows
Be as a sword consumed before the sheath
By sightless lightning?"—"Adonais."

Even less plausible is the converse theory of those who hold that reality is knowable. Whereas materialism, to use the old term, teaches that mind is in the brain, idealism, as held by its greatest representative, Bishop Berkeley, teaches that the brain and all else that is not mind are *in mind*, which is the knowable and only reality. The ultimate reality is the idea; and as it is assuredly ideas of which we have immediate and unqualified knowledge, reality may be known to us if we will but earnestly pursue it.

Modern science, however, guided by its most subtle and important study, which is that of mind, declares neither for crude realism nor for idealism, but for what we may know as transfigured realism. This teaches that the external world does indeed exist, whether we be there to perceive it or not; but that our sense-knowledge of it is conditional and qualified by the nature of the sensory process. The most noble presentation of this theory is assuredly to be found—we need not now inquire into its author's own meaning—in that moving and memorable fable of Plato,[1] who pictures a group of men doomed forever to sit facing a blank wall, upon which are thrown the shadows of the real, which moves behind them. Might such an one but turn his head for a moment and then resume his doom, could he, like his comrades, remain content with shadows? Not so; for to him has been

[1] In the *Republic*.

granted a moment's vision of things not as they seem, but as they are.

So, according to science, we know but shadows or phenomena: the noumenon (Plato), reality-in-itself (Kant), or substance (Spinoza) being forever hidden from us. A correspondent has lately remarked to me that agnosticism is in need of sanitation and antisepsis; but I submit this conclusion, whether false or untrue, as at any rate reverent, modest, and decent.

In a subsequent chapter I shall attempt to show that mind itself is, strictly speaking, as unknowable as the reality which is manifested in not-mind.

Repudiating, then, alike the materialistic and idealistic assertions as to the nature of reality, we may pass on to the consideration of the answer—in so far as it is an answer—given by the synthetic philosophy to the question of questions.

XXXI

THE UNKNOWABLE

SPENCER was not primarily an ontologist. His philosophy, designed to deal with phenomena, was not at first intended to include any *ultimate* considerations. The section upon the unknowable was not included as a basis for the rest of the philosophy, which, as a unification of our phenomenal knowledge, is independent of any statement of an ontological position, just as is the law of gravitation. But it was very wisely pointed out to Spencer that, in the absence of any statement as to his *ultimate* beliefs, misconception would arise. It would naturally be supposed that he imagined his description of phenomena to be a description of reality. He would, indeed, be accused of being a materialist. The section upon the unknowable was therefore included, in the very natural expectation that it would remove all misconception and leave him free to develop his philosophy of phenomena without let or hinderance from the ontologists. This, however, was an entire miscalculation. Despite the unequivocal assertions of this section and their frequent repetition and

amplification elsewhere — as in the *Principles of Psychology*—the academic opponents of Spencer have never stickled at misrepresentations which cannot possibly be explained without an assumption of either wilful misinterpretation or sheer stupidity. In his article "Metaphysics," written for the *Encyclopædia Britannica* but the other day, Professor Case, of Oxford, classes Spencer under the heading "Materialistic tendencies," and demonstrates to his own satisfaction that Spencer was a materialist without knowing it, though no reader of *First Principles* could possibly avoid—or, one would think, could possibly forget—that fine saying about "A mode of being as much transcending intelligence and will as these transcend mere mechanical motion." I offer no explanation of this remarkable feat of Professor Case; but this is not because there is none to offer.

It is a curious but perfectly intelligible fact that the opponents of Spencer, when they have attempted to refute him, have confined themselves to this small section of his work—a section upon which the validity of the synthetic philosophy does not and obviously cannot depend. Among scientists, of course, he has no opponents, except upon details in different spheres of expert knowledge. The great mass of his work is concerned with a unification of science—this last word being used in the wide and only defensible sense. But this is obviously outside the sphere of writers such as T. H. Green, James Ward, Bradley, Case, and Caird.

The Oxford school has had to confine itself to that small section of the synthetic philosophy with which its limitations permitted it in any manner to deal. Such writers could not attack the *Principles of Biology*, to take an instance, for reasons too obvious to name. The fact that the idea of evolution is essentially independent of the section upon the unknowable explains a circumstance which is at first sight difficult to interpret—the fact, namely, that Principal Caird, for instance, while scorning what he regards as the basis of the evolution philosophy—the first section—can yet issue volume after volume with the word evolution in its title and as its guiding idea. Even the Oxford school is compelled to accept the Spencerian conceptions—but fancies itself absolved from the necessity of making acknowledgment, because it fancies that it has already disposed of this thinker by its criticisms upon a small section of his philosophy, the truth of which, however, is demonstrably non-essential to the validity of the rest.

But though the order of phenomena—the body of science, that is to say—is capable of study and unification, whatever our theory of ultimate reality may be, or, indeed, in the absence of any theory as to reality, yet all thinking persons admit that this question as to ultimate reality is supreme and of infinitely greater importance than any question whatsoever with which science deals. The mind of man can never rest content even with the most perfect and complete knowledge of phenomena

alone. We may, therefore, finally inquire into this first section of the synthetic philosophy and see whether it has any more searching light for us, after our consideration of the greater part of the philosophy which deals with the knowable phenomena of star and star-fish, mind and morals.

It has been said, without knowledge or any attempt to gain it, that the section on the unknowable took its origin in the fact that Spencer had to set down something about reality, and therefore fished about in the metaphysical text-books of the time for something that would do. It sounds likely. The present chapter may, therefore, fitly conclude with a refutation of that assertion; whereafter we may proceed to look at the doctrine which Spencer actually conceived. In a letter written to his father in 1849, Spencer says, as to the "ultimate nature of things":

"My position is simply that I know nothing about it, and never can know anything about it, and must be content in my ignorance. I deny nothing and I affirm nothing, and to any one who says that the current theory *is not* true, I say, just as I say to those who assert its truth: 'You have no evidence. Either alternative leaves us in inextricable difficulties. An *uncaused* deity is just as inconceivable as an *uncaused* universe. If the existence of matter from all eternity is incomprehensible, the creation of matter out of nothing is equally incomprehensible. Thus finding that either attempt to conceive the origin of things is futile, I am content to leave the question unsettled as *the insoluble mystery*.'"

This letter refers to a conversation of the year before, so that at the age of twenty-eight the young engineer "had reached," as he says, "a quite definite form of that conviction" which he found it desirable to set forth twelve years later in *First Principles*.

The idea that all objective things are merely the signs or manifestations or symbols of reality is familiar to all of us; and the word phenomena is an expression of this idea. Behind all such phenomena we are compelled to postulate a noumenon, or reality, which the very nature of our knowledge renders forever unknowable to us. And in our haste we may be tempted to suppose that this conception of phenomenon and noumenon suffices to express all that we need to say of reality; but so to suppose would be to forget the mind to which these phenomena or appearances are presented. That mind is a reality, *or the expression of a reality*, is even more certain than that there is a reality behind matter. Are we then committed to a dualism of mind as one entity and the objective universe, or the reality which it represents, as another? At first sight this would appear to be the conclusion.

Now we find, in reading the *Synthetic Philosophy*, that its author uses the word phenomena in a wider sense than that above indicated; and official philosophers have declared the whole Spencerian system invalid because of what they call the confusion which enters into Spencer's use of this word.

The word phenomenon, they say, refers only to the appearances of objective things, and it is a misuse of the term to speak of *phenomena of mind*, mind being that to which phenomena are presented. Herbert Spencer, we are assured, begs the whole question by his illegitimate use of the word phenomenon in two totally distinct and irreconcilable meanings.

Now when an ephemerid accuses an immortal of confusion and incoherence, the chances are pretty high that the critic has not fully acquainted himself —either through carelessness, incapacity, or lack of desire—with the object of his attack. Spencer's use of the word phenomena, as applicable to what we know both of matter and of mind, is a deliberate and logical application of his conception of reality. To him the reality of the perceiving mind and the reality underlying that which it perceives are not two realities, but one. To quote his own words, the unknowable power of which all objective phenomena are the manifestation *is the same power that wells up in ourselves in the form of consciousness*. The ultimate reality, both of mind and matter, is therefore one.

It may be said, of course, that this is simply cutting the Gordian knot. Apart from our wish to arrive at a unity, what evidence have we that the power underlying stars and trees and dust is identical with the power that produces the consciousness to which these things are made manifest? And if we take the adult human consciousness and

study it without inquiry as to its origin, we may well decline to recognize any community of origin between it and the reality that underlies a piece of "dead" rock, or even what Wordsworth, with poetic insight, calls the "living air." But if we recognize the psychology which Spencer revealed, and apply the law of evolution to an adult human consciousness, seeking to explain it by a study of the consciousness of a new-born or unborn child, of a dog, or an amœba, we come to a different conclusion. We find that the ignorant and contemptuous distinction between living and "brute" matter has utterly broken down. We can trace the rudiments of a perceiving consciousness not merely in the embryo of a man, but in any one of the millions of white blood-cells that circulate in that embryo's blood. We discover that "brute matter," ingested as food by a sentient organism, may pass to its brain and take its temporary place as the material constituent of that organ with which the more obvious forms of consciousness are inseparably associated. Thus reflecting, we have little difficulty in seeing good reason to believe that the unknowable reality which underlies the phenomena of objective things is identical with that which underlies the phenomena of mind, and that the Rig-Veda was right in its assertion, many millennia old, that "the real is one."

Spencer arrived independently at this conclusion, and gave it a certainty and a proof which it never before possessed, but ere the tubercle bacil-

lus claimed the greatest Jew of our era, it left him time enough to formulate the same idea. Spencer has merely proved that which Spinoza had seen and asserted two centuries earlier—that mind and matter are but the correlative manifestations of one underlying reality, of which mental and material phenomena are the revelations. The work of Spencer in the realm of ontology was the independent conception and establishment upon the evolutionary psychology of this thought of the God-intoxicated Spinoza, which Goethe might well declare to be the grandest, profoundest, and truest of all ages.

XXXII

ON MIND AS UNKNOWABLE[1]

THIRTY years ago, physicists unacquainted with psychological inquiry and with the subtler physical considerations, believed that they could claim complete knowledge of matter, which they regarded as the only reality other than mind. It is not meant that they claimed to have exhausted all the possibilities of chemistry or physics, but that they believed they had identified and could describe the ultimate units of matter, the atoms which, as Clerk-Maxwell said, are "the foundation-stones of the material universe, which have existed since the creation, unbroken and unworn." But modern physics has proved that matter is none other than the expression of an eternal power which can be known to us only in its appearances, or phenomena. Materialism as a dogmatic system has been irremediably destroyed by the continued application of those methods on whose early, uncritical employment it was based. We may leave it now for those whose scientific knowledge is sufficiently imperfect and antiquated.

[1] Reprinted, with some modification, by permission, from the *Occult Review*, June, 1905.

But though modern physical inquiry has ousted the dogmatists from their fortress of matter, they have, as it would appear, an impregnable citadel in mind. They may freely admit the lessons taught by the phenomena of radio-activity, and may freely assent to the doctrine, truly time-honored, that our knowledge of the "external world"—of not-mind—is merely an inference, however irresistible, from certain changes in our consciousness. All this the dogmatist may grant, but yet find a stable footing in the doctrine that, though matter is but an inference from mental states, yet mind, on the other hand, is directly known to us—the only thing, indeed, that is so known. It would thus follow that whereas the phenomena of not-mind are demonstrably occult, mind and its phenomena are demonstrably patent; for, whereas our knowledge of not-mind is mediate, inferential, at the mercy of sensation, with its few avenues, each of which is known to be imperfect and misleading, our knowledge of mind is immediate, direct, involved in the possibility of any knowing at all, independent of all external factors, and careless of all sources of fallacy, since mind's knowledge of itself is supra or extra or pre logical.

But if we really know mind as it has been argued that we must, there could be no psychology or "metapsychics." For these sciences treat mind objectively just as physics treats matter, and yet they would appear to have their problems still to solve—which is not conceivable on the theory that

mind is known to us as Deity might be conceived as known to Himself. Furthermore, if mind itself be not occult, hidden, unknowable, but, on the contrary, the only entity that is directly and essentially known, there cannot be anything inexplicable in its characters in any circumstances. The phenomena which so many keen thinkers are studying to-day must be not only fictitious, but factitious; indeed, the term phenomena cannot be used of mind; for a phenomenon is an *appearance*, which implies a reality of which it is the appearance, whereas the *essentia*, or substance, of mind is a thing given in all its operations. The idea is the only reality, and, in so far, reality is known to us. So they say.

On the contrary, it may be shown, by the same analytical methods as have disintegrated dogmatic materialism, and with equal facility and certainty, that dogmatic idealism is merely the converse expression of the same error. The materialist thinks, or thought, that matter, as he conceived it, is not phenomenal, but veritable reality, and very easily knowable reality at that. The idealist, for his part, thinks that ideas, or various states of his consciousness, are not phenomenal, but noumenal, real, essential, substantial, in the proper, undegraded meaning of those fine terms; and, like the materialist, he thinks that this reality is not only knowable, but very easily knowable. Indeed, no other knowledge so easy can be conceived. And just as materialism pro-

posed to shut men's eyes to *every attribute and indication and significance of matter* that was worthy of the philosopher's attention, so the idealism which fancies that consciousness—all the mind it knows—is the noumenon, the reality of mind, proposes to shut men's eyes *to every fact of mind* that bears upon the sole and supreme question of philosophy, which is the quest of reality—of things not as they seem, but as they are, as Plato would have said, or of essences, not accidents, in the phraseology of the school-men.

Hence it is that our academic philosophers, who, just now, are followers of Hegel—in accordance with the generalization that "Good German philosophies, when they die, go to Oxford"—and who regard their own consciousness as portions of reality directly and wholly known to them, are to be heard discussing, for instance, the psychology of Herbert Spencer, on the ground that he speaks of mental facts as phenomena (or appearances), whereas the term should properly be confined, they say, to material facts. To discuss the "phenomenal ego," they aver, is to abuse language and evidence an incapacity for appreciating the conditions of the problems under discussion, for the ego is that to which the non-ego appears—*i. e.*, is phenomenal. The one thing known as it is, not as it appears, is the ego, and from it may, therefore, be constructed a complete dogmatic system of the Cosmos, not as it appears, but as it verily is.

But as we well know to-day, academic idealism

involves the identification of *consciousness* with *mind*, an error which is more than verbal, more than relevant to the superstructure of the system, but vitiates it root and branch, and is comparable only to the analogous error which has made materialism a name of perpetual scorn. The classic researches of many students, varying in philosophic stand-point as widely as did Carpenter and Myers, have revealed to us the amazing fact, the full philosophic and ontological significance of which has hitherto been appreciated by few, if any, that consciousness, even as known to the conscious subject himself, is precisely the analogue of matter as known to him. Each is the expression, appearance, or phenomenon of an underlying reality; and as he can never know not-mind in its essence, since his consciousness cannot become identified with its objects, so he can never know mind in its essence, since his consciousness can never become identified with the non-conscious entity of which *it* is the efflorescence, or phenomenon.

It is scarcely possible to overestimate the validity and certainty of this conclusion. Let us consider some of the evidence in its favor. In the first place, we have seen that the academic doctrine of the immediate knowableness of mind can be disproved by the *reductio ad absurdum*, directly we contrast its pretensions with the notorious and, as I believe, essentially insoluble difficulties of psychology. On the academic theory, there is only one plain-sailing, self-evident science, which is

psychology; whereas the physical sciences, such as astronomy, are necessarily inferential and confined to phenomenal knowledge alone. The facts immediately negative this conclusion, so that if we were compelled to declare either mind or not-mind to be the more unknowable, the palm would have to be awarded to mind, as the present state of our knowledge thereof clearly indicates.

In the second place, the conclusion of the essential unknowableness of mind — again I use the word essential in the great scholastic sense—is forced upon us by the infinitely complex character of its manifestations. (In order to believe that, say, the idea of the good is ultimate noumenal reality, one must be wholly ignorant of its incalculable antiquity and complexity—in other words, one must deny evolution.) Each year brings with it more cogent evidence that, whatever we may know, even phenomenally, of matter, we certainly know hardly anything, *even phenomenally*, of mind. We do not even seem to see our way towards any such generalizations concerning phenomenal mind as we have framed concerning phenomenal matter —such as the laws of gravitation or conservation. While we are assured that the reality underlying not-mind is eternal, indestructible, uncreated, we see consciousness daily—and nightly—arrested (destroyed?) and recreated. We have hardly yet asked whether this implies that the law of conservation is not universal, or whether, as I believe, it must not be interpreted as showing that conscious-

ness — the phenomenon consciousness — is impermanent, as the phenomenon called radium is now known to be impermanent; and while the physicist is assured that the reality of which the radium atom is the fleeting manifestation is nevertheless permanent and changeless, so I assuredly believe that the unknowable reality of which consciousness is the fleeting manifestation is also eternal and changeless.

In the third place, there is the remarkable fact that the most diverse thinkers, whose names would be anathema in one another's ears—save in the few cases where the philosopher has the philosophic temper—converge to this conclusion. The student of "psychic phenomena," for instance, is assured that there is more in mind than "meets the eye" of consciousness. From such workers, who may loosely be called "spiritualists," let us turn to those who, with equal impropriety, have been called materialists. John Locke, who was accused of atheism, and whose perdurable work was proscribed by his university, clearly showed, though he had never heard of "unconscious cerebration" or the "subliminal mind," that our knowledge, even of our own minds, is no more than phenomenal—that we know it only as it appears to us, not as it is "in-itself."[1] This opinion of Oxford's great glory does not recommend itself to the consideration of those who now prosecute

[1] See Lewes's *Biographical History of Philosophy*, Routledge's ed., p. 507.

the study of the "human understanding" by the Isis.

If, now, we turn from Locke to one of his great successors in the associationist school of psychology —to John Stuart Mill, whom no one will accuse of mystical tendencies—to Mill, the disciple of Auguste Comte, than whom dogmatic materialism never had a more persuaded exponent—we find, in an early chapter of his masterpiece, the *System of Logic*, the clearest possible demonstration of the fact that our knowledge of mind is, in reality, as empirical and inferential as our knowledge of not-mind. Spencer, as we have seen, held the same opinion. It appears to me that serious and impartial students of the more recondite psychic phenomena should not be lacking in appreciation of the fact that the leading thinkers of the school most opposed to their own in its methods and traditions and underlying assumptions have united in asserting that mind, as we know it, is not mind as it is; just as the idealists—and, later, the physicists—have shown that matter, as known to us, is not matter as it is.

If the reader is still unconvinced, let him inquire as to the terms in which we think and speak of mind. He will discover that they are terms of matter. With fine confusion—but in support of my present contention that mind is really unknowable—we have spiritualists quoting the evidence of spirit-photographs, thus suggesting that their conception of spirit is of something that reflects

light. There is little need to labor this truth. The whole of language is framed for the convenience of the materialist, and every term in which we speak of mind is a *metaphor from the material.* Compare, for instance, the two meanings of the word spirit. That the essence of mind is not only unknowledge, but unthinkable and inexpressible by language, all languages demonstrate.

But it is evidently not enough to establish the sceptical or agnostic conclusion, and to rest content therewith. If mind, as known to us, and matter, as known to us, are only phenomenal expressions of underlying realities, can we say aught of that which they express? Must we remain content with a dualism only one whit less unsatisfactory than those of the past? Is there no final synthesis towards a true monism? The answer is that mind and matter as we know them, or the spiritual and the non-spiritual, or that of which consciousness is the manifestation, and that of which mud or diamonds or lips or eyes are the manifestation, are the correlative expressions of one reality, which has been "nicknamed God" (as a Roman Catholic priest once said); which has been apotheosized as Nature by the pantheists and pantheistic poets; which St. Paul calls unspeakable, and Spencer named unknowable, but the eternal existence of which is, in the last resort, our one indefeasible certainty.

XXXIII

OUR KNOWLEDGE OF THE UNKNOWABLE

THE title of this chapter, as it stands, is plainly a contradiction in terms. And indeed the term unknowable, fine though it is, has proved unfortunate in that it has led the superficial to twit Spencer with self-contradiction in attributing certain characters to the unknowable, and the malignant to make inept and impudent criticisms, as that Spencer desires us all to worship at the shrine of "X^n." However, I fancy both Mr. Bradley and Mr. Frederic Harrison have lived to be ashamed of themselves for their brilliant efforts in this direction.

But if, in this chapter, we take as granted the existence of the unknowable, there arises a sublime question. Granted that most of us—to use the Platonic image—are forever chained upon a bench which permits us but to gaze upon shadows, have there ever been, can there ever be, moments during which the thrice-happy few may turn their heads and attain a clearer, a transcendental vision of the transcendent? If, in truth, there be mind underneath all, and if our minds be indeed frag-

ments or sparks of the All-Sustaining Mind, may not it sometimes be granted to the pure in heart that "they shall see God"?

Let me put the question in the clear words of a friend:

"You say that reality is, strictly speaking, unknowable, yet we can infer somewhat of its nature by the behavior of its appearances! It seems to me that this should commend itself to everybody, so long as our ordinary faculties are relied on. But does this inability to escape beyond the limits of consciousness necessarily preclude our arriving at reality? What of that higher consciousness which pantheists possess—that ardor, that feeling of association with nature and the universe, often tempered with a deep sense of beauty, which we meet with in Wordsworth, Shelley, Richard Jeffries, Walt Whitman, and others? Does not this consciousness within the consciousness lead to reality? Is it too much to say that reality is limitedly known to the pantheistic mystic?"

Here, indeed, is a question to be approached barefooted, lest we be on holy ground. If answered at all, it can be only after a serious study of mysticism in all places and ages—some such study as Professor Seth's. Thereafter is answer to be made in general and comprehensive terms by any student? or must we make personal experience our guide? And if so, what shall those say who have no such experiences? Are they to explain away, or to accept, or to withhold judgment? Ere we continue, let us hear the case as put by Plotinus the Alexandrian. "The finite, as finite, can never

know the infinite, because it cannot *be* the infinite. The faculty by which the mind divests itself of its personality is ecstasy, in which, separated from individual consciousness, it contemplates reality, becoming absorbed in the infinite intelligence from which it emanated." Thus Neo-Platonism.

Save once, when the scherzo of the "C Minor Symphony" passed into the finale, and the heavens seemed opened, I have never had an ecstasy, and am therefore negligible. We must inquire of those who have had experience. One such, who has suffered greatly, writes to tell me of his case; but, alas, he speaks of his disillusionment "when reason returned." With infinite regret, and hope perhaps not quite extinguished, the student must declare that, as far as he can see, ecstasy is not the vision of the soul. For we know ecstasy not merely as Wordsworth knew it—

> "I have felt
> A presence that disturbs me with the joy
> Of elevated thoughts"

—but also as a sad phenomenon of the asylum and the mind diseased. If the one be a veritable vision, what of the other? If ecstasy be vision, what of agony? Here I leave what is too high for me.

But whatever be the true answer to these awful questions, there is more than mere negation for us to whom the moment of vision, if indeed it be such, has been denied. Though not *illuminati* or mystics,

we may yet yearn to know reality, and surely some measure of knowledge may be attained by a study of scientific truth. At least reality cannot be inconsistent with its appearances. We must not follow those whose laughter Solomon has described as the "crackling of thorns under a pot," and fancy that the term unknowable excludes the possibility of all knowledge. To assert the existence of an unknowable is to assert some knowledge of it.

It is plain that though reality be, strictly speaking, unknowable, yet science, which deals with its appearances, can yet infer from them somewhat of its nature. If, for instance, science can prove, as it has conclusively proved, that all phenomena are inter-related, that in virtue of gravitation, for instance, I cannot push this table without affecting the position of every atom in the universe throughout all coming time, or, as Mr. Francis Thompson says,

> "Thou canst not stir a flower
> Without troubling of a star,"

then we may surely make the sublime inference that there are not many realities, but one reality; or, to adapt in the light of modern knowledge the words of the Athanasian Creed, not many incomprehensibles, but one incomprehensible. The interrelations of phenomena lead us to the assured inference that the noumenon is not many, but one. We are compelled to believe that there is no con-

tradiction in the cosmos; that there is no fact inconsistent with any other; that just as all the "elements" can be resolved into manifestations of one truly elementary entity, and just as all forms of activity — heat, light, electricity, and so forth — are known to be mutually convertible forms of energy, so all phenomena, multifarious though they be, are yet expressions of a supreme unity. So, as no one accuses the Athanasian Creed of absurdity because it makes many definite statements about Him whom it calls incomprehensible, we may be spared petty criticism in making this definite statement about the unknowable (which we might just as well call the incomprehensible) — that it is not many, but one.

In the second place, to admit the doctrine of the conservation of energy is to assert that we may know the unknowable to be "eternal and uncreated"; for these are precisely the qualities which that doctrine attributes to phenomena. It is true that the law of the conservation of energy merely asserts that energy is indestructible, and that there is no iota of energy which is not, though apparently new, a transformation of pre-existent energy. The inference that all energy has always been is not only justifiable and consistent with the oldest known generalization — *ex nihilo nihil fit* — but is, indeed, a truth of the highest certainty,[1] since the negation of it is inconceivable. Fur-

[1] See chapter xvi., "The Test of Truth."

ther, the philosophical conception of time renders meaningless the crude popular notion of creation, which is merely a pseud-idea. If, then, its phenomena are uncreated and eternal, so is reality. This we may properly predicate of it, though we continue to call it unknowable.

Hitherto we have not reached any conclusions that have more than a purely intellectual and impersonal interest. If, indeed, it be possible to assert of reality that it is one, uncreated and eternal, we may be impressed and even awed; but we have said nothing that even remotely affects human life and human action. As I see it, the implacable fact is that the more poignant and practical the questions we put, the less certain is the answer. Thus of these three attributes there can surely be no question whatever; but henceforth doubt seems to creep in.

To make any assertion about the unknowable is surely to assert that it is, in some measure, intelligible, and therefore in intimate relation with our intelligences. Is it not, indeed, the "infinite and eternal energy from which all things proceed" that "wells up in ourselves in the form of consciousness"?—a belief which seems to imply that, at least, the unknowable is semi-intelligible or partially knowable. We may conclude, then, that the eternal is, in a limited sense, intelligible.

To assert the existence of mind is surely to assert that there is an intelligence at the heart of things.

But here we have reached a new stage in our speculations. The ideas of unity, intelligibility, eternity are entirely non-anthropomorphic; but the idea of intelligence is as plainly anthropomorphic—*i. e.*, based upon a human character. Now, it has been argued by some, including Fiske,[1] that all human thinking must be anthropomorphic; but I am unconvinced that there is not here some confusion as to the meaning of this term. All human thinking must certainly be *human*—must conform to the laws of the human mind; but by anthropomorphism much more than this is meant. Anthropomorphism is the attribution of human characters to what is not human; and is as fairly to be applied to the idea that, say, a worm suffers pain as we do, as to the stupendous impertinence that "God made man in his own image." And there is surely a very sharp and real distinction, as I have said, between the attribution to the unknowable of perdurableness, which is not a human character, and of intelligence, which is. If, then, we are bound to avoid anthropomorphism consistently and without exception, are we to deny that the Eternal is intelligent? In other words, are we to regard reality as lower than one of its manifestations? That would surely be absurd. That there was a third possibility has been seen by Herbert Spencer alone. May there not be, he says, "a mode of being as much transcending in-

[1] See *The Idea of God.*

telligence and will as these transcend mere mechanical motion?"[1] Of all the ideas we owe to him, this I hold to be supreme.

Hereupon we are faced with the question of personality. The glibness with which this is discussed and settled must amaze every thoughtful person. To talk of personality without asking in what it consists is surely, as Job said, to "darken counsel by words without knowledge." To ascribe personality to the Eternal is really no less anthropomorphic than to talk, with Genesis, of his hinder parts. Furthermore, it is palpably to assign a limitation to him and to ignore the wise counsel, "Enlargissez Dieu." Now, if personality means anything, it connotes the possession of intelligence and will, and the answer to the supposed alternative between attributing to the Eternal either personality or something lower is the same as the answer to the question of intelligence—that the choice is not between the personal and something lower, but between the personal and something higher. Form a "clear and distinct idea," in the Cartesian phrase, of the supra-personal, we indeed cannot; but that is surely because the unknowable *is* unknowable. And in relation to this question of personality we may remember that it has always been in losing his personality *and its limitations* that the mystic has thought that he has attained to a vision of the Eternal.

[1] I offer no apology for repeating so soon a saying so splendid.

If, then, we must apparently deny the validity of the vision of the soul, can we continue to do so when the vision of those who have so seen coincides with the conclusions reached by reason? The mystic and the realist may agree that reality is one, is eternal, is intelligent, is, at the very least, intelligible. May not conclusions reached by such different methods be regarded as valid?

Indeed, there is a cloud of witnesses. For if the mystic and the realist can agree that reality is one, so certainly will the idealist; and he, too, will regard It as uncreated and eternal, though he may not go so far with the Athanasian Creed as to admit that It is incomprehensible.[1] It may surely, then, be maintained that, even if we question the evidence of ecstasy, yet witness of so many orders may be accepted when it teaches that reality, whether knowable or unknowable, is one—and intelligent, or, rather, endowed with something that far transcends intelligence.

But reader and writer are each keenly aware of a conceivable attribute of which mention has not been made, and that is benevolence. Here, indeed, the witnesses disagree. The majesty of the Athanasian Creed is disfigured by its denial of benevolence in the awful language of its later clauses. The idealist inclines to attribute benevolence to the Eternal; the scientific realist is inclined to the view

[1] The word in the Latin is not *incomprehensibilis*, but *immensus*. Immeasurable, however, is almost synonymous with incomprehensible.

that when we speak of benevolence we are in the chains of anthropomorphism. The mystics assure us that their ecstatic visions show them love as the supreme attribute of the Supreme. Yet this question, on which the witnesses differ, is of more import to us, hearing each other groan, than any on which they agree. Indeed, while none of the more or less certain conclusions to which we may be led by consideration of phenomena and inference from them as to the nature of the unknowable, are of any appreciable, practical import to us, it is this last question the answer to which is vital. From our present point of view no answer is possible, because the question is meaningless, apart from the fact that it involves a palpably anthropomorphic assumption. Furthermore, even the answers given by philosophers of the past are meaningless. Leibnitz declared that this was the best of all possible worlds, not meaning thereby, as is sometimes thought, that no better could be conceived, but that the circumstances of existence did not admit of things being better than they are. The less ambiguous rendering of his meaning would be not "the best of all possible worlds," but "the best world possible." In the light of the evolutionary explanation of the problem of evil, even this ceases to have a meaning, for the world is better now than it was in the time of Leibnitz, and will assuredly be better yet. As far as I can see, the answer of the evolutionary philosophy to the question whether the unknowable is benevolent

would be that the question itself is now a meaningless anachronism.

The critic may say, as I have heard it said, that the facts we allege of the unknowable—that it is one, eternal, uncreated, supra-personal, and supra-intelligent—are of no use to him and can be of no use to us. They afford no solace, no guidance, no inspiration. And certainly if he asks whether what we believe to be our partial knowledge of that which, in its essence, transcends knowledge, in any way affects the conduct or the happiness of the Spencerians, we must answer that it does not. But we must add that the problem is not to find something useful or potent or satisfying or solacing, but to find what is *true;* and, in our allegiance to Truth, to refrain from seeking to outstrip her, but to be content, or, at any rate, willing, merely to follow wherever she leads.

This, also, we may add. It may appear that doubt and an assertion of ignorance must mean mental distress, or, at least, mental unrest; and certainly the creed which I have tried to present is no bulwark in the hour of sorrow as is that which teaches, in glorious imagery, that "underneath are the Everlasting Arms." On the other hand, it is still left to us that we may "faintly trust the larger hope"; and, further, the belief in the unknowable is not entirely without its own solace, though we strenuously repudiate the suggestion that we believe in it for that reason. It is immeasurably better than blank materialism;

not only because philosophic doubt or suspension of judgment is less unbearable as a mental state than some suppose, and not even merely because anything that saves us from dogmatism makes for intellectual health and a decent humility; not merely because it leaves us free to dream the most salutary dream that there are more things in heaven and earth than are dreamed of in our philosophy; but especially because, in leaving us unbound either by the facile optimism or the plausible pessimism which, each alike, is an argument against action, it permits us to use our activities in the practical belief that, even though, as we suspect, the Eternal is non-moral or supra-moral, yet evil is not an irreducible or even a necessary fact of existence. We are still free to believe, with the immortal Socrates, that to the wise man no evil can happen. Doubt of any kind, said Goethe, can be relieved only by action, and our doubt of the attributes of the unknowable can thus be practically solved. If it impel to action, it may be worth more than any positive belief.

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