SCIENCE AND PHILOSOPHY.

ACCORDING to Mr. Herbert Spencer, "the truths of philosophy bear the same relation to the highest scientific truths that each of these bears to lower scientific truths. As each widest generalization of science comprehends and consolidates the narrow generalizations of its own divisions, so the generalizations of philosophy comprehend and consolidate the widest generalizations of science. It is therefore a knowledge the extreme opposite in kind to that which experience first accumulates. It is the final product of that process which begins with a bare colligation of crude observations, goes on establishing propositions that are broader and more separated from particular cases, and ends in universal propositions. Or, to bring the definition to its simplest and clearest form: knowledge of the lowest kind is *un-unified* knowledge; science is *partially unified* knowledge; philosophy is *completely unified* knowledge."[1] I quote this description of the relation of philosophy to science, or of science to philosophy, partly, because it is necessary now-a-days for any one who thinks and writes on the subject either to agree or reckon with Mr. Spencer; and partly because, considered from a purely formal point of view, I regard the description as accurate. By which I mean that, with him, I hold philosophy to have essentially the same aim or aims as

[1] Herbert Spencer's "First Principles," p. 133.

science; and that its domain is the whole of which the domains of the several sciences are the parts. My differences with him begin when he proceeds to define science. He says, "Science concerns itself with the coexistences and sequences among phenomena; grouping these at first into generalizations of a simple or low order, and rising gradually to higher and more extended generalizations." [1] If this were a sufficient definition of the nature and aims of science, I should feel compelled to accept *in toto* the description of philosophy previously quoted: if insufficient, then the description, though formally correct, must be treated as materially inadequate or even incorrect. Everything turns on the conception formed of the true aims of science. Does, or can, scientific inquiry concern itself solely with the coexistences and sequences of phenomena?

At this point it will be well to interpose a word or two touching, first, the sciences to which I refer; and, secondly, the use of the word "science."

1. The sciences to which I refer are the material or inductive as distinguished from the formal or demonstrative sciences. The latter have to do with the abstract or the ideal; the former with the concrete or the real. To the latter class belong logic, mathematics, and especially the mathematico-physical sciences which have both an abstract and a concrete side, as, for example, astronomy and dynamics—dynamics including, perhaps, optics, acoustics, thermotics. The material or inductive sciences are physics, chemistry, crystallography, biology, and psychology or anthropology, comprising sociology.

[1] Herbert Spencer's "First Principles," p. 131.

2. The mode in which the term "science," which is of course a generalization from the sciences, is frequently employed, seems to me fitted to give rise to confusion. Indeed, I am not sure whether the same charge might not justly be brought against many other general or abstract terms. As frequently spoken of, the generalization "science" fosters, or gives rise to, the notion that all the sciences have essentially the same method, aims, and tests of certitude. Now this is by no means the case. The method, aim, and tests of mathematics are not identical with those of the physical sciences; nor those of physics with those of chemistry; nor those of chemistry with those of crystallography: those of biology again differ from the preceding, and those of anthropology from all the rest. Each science or class of sciences has its own distinctive features. This is apt to be forgotten, or at all events unnoticed, by scientists, especially when they discourse to the general public. Each, in using the word "science," generalizes from the method, aims, and tests of his own particular science, or sciences, to those of all the sciences. When he speaks of "science" teaching or doing or being this or that, he really means, and ought to say, "my science teaches, does, or is this or that." Unintentionally he takes for granted, as well as conveys the impression, that his particular science represents all the sciences. For example, an astronomer, or one who takes his cue from astronomy, will represent "prescience" as the true test of science, and observation as its right method: physicists and chemists, on the other hand, find their test in "experiment." And as at the present moment astronomers, physicists, and chemists happen chiefly to hold the public ear, nineteen

out of twenty people are led into erroneous notions of the true criterion and method of scientific knowledge. I am far from meaning that these scientists consciously ignore the limits to which I have referred, or intend to sow confusion; but it does appear to me that they themselves are sometimes unconsciously led astray by the habit of false generalization to which every one is liable to yield, more particularly such as have had little philosophical training. A conspicuous illustration of the confusion in question was supplied by the discussion started, some years ago, by certain scientists, on the efficacy of prayer. They insisted on "experiment" as necessary to the testing of its worth — experiment, that is, of somewhat the same kind as that which the chemist is accustomed to employ: experiments of a certain kind, be it remarked, not only being admissible, but always a strong point with Christian teachers. If they had required of an astronomer, or physiologist, or sociologist, or mathematician, to proceed after the same manner as a chemist or physicist, they would, I think, have been accounted unreasonable.

For these reasons the abstract term "science" ought not to be used in controversy, either with religion, morals, or philosophy, without care being taken to define its scope. I shall accordingly generally use the more concrete expression "sciences."

But, to return from this digression, the question is, What is the true and essential aim of the several material or inductive sciences? I do not ask what each individual scientist consciously seeks for; but what is the goal which he instinctively aims at reaching? what are the main features of the results at which he arrives? It often happens that a truer interpretation of men's

aims may be drawn from the direction unconsciously taken by their thoughts than from the theories which they consciously advocate.

Let us commence our inquiry with the *Physical Sciences*, under which may be included astronomy, mechanics, heat, electricity and magnetism, acoustics, optics. What is their aim? Their aim is to ascertain causes and modes of relation; in other words, they seek forces and laws. The Positivists, no doubt, decline this description; or, at all events, they accept only the "laws" part of it. And yet the language of their leader, when he is not engaged in polemics, can have no other meaning. Comte says, indeed, "We have nothing to do with the causes or modes of production of motion, but only with the motion itself; . . . we hear too much still of the old metaphysical language about forces and the like;" and yet, immediately after, he tells us that "the business of rational mechanics is to determine how a given body will be affected by any different forces whatever, acting together, when we know what motion would be produced by any one of them acting alone."[1] What do the words "body," "affected by," "forces," "produced by," "acting," denote, if not the very things he denounces as "metaphysical"? In another place, after vehemently protesting that gravitation is a mere law, he adds, "Gravity is the only natural *force* that we are practically concerned with in rational statics."[2] Again, "the object of dynamics" is defined as "the study of the varied motions produced by continuous forces."[3] "Gravitation" is affirmed to "maintain the order of our system and universe;" and yet in

[1] Martineau's "Comte," vol. i. p. 107. [2] Ibid.
[3] Ibid. vol. i. p. 126.

the same connection we are assured that "their stability is a simple consequence of the working of mechanical laws."[1] In other words, if law mean simply mode of sequence or coexistence, the order is its own cause! Elsewhere, too, in numerous places, gravitation, heat, light, and so forth, are spoken of as forces and agents; and what their respective sciences deal with is, directly or indirectly, represented to be forces and laws. In his treatise on physics, Deschanel remarks, "Science can only exist where there is a mass of accurate knowledge in which the facts are related to each other and studied in connection with the causes which produce them." He speaks too of "laws being frequently disguised by disturbing causes," though he is also aware that "when the general law of a class of phenomena is known the expression of this law is often called the physical cause of the particular phenomena which it includes."[2] He defines force as "any cause which tends to urge a material point in a definite direction with a definite velocity;" with which may be compared the more careful definition of Balfour Stewart, "Force is that which changes the state of a body, whether that state be one of rest or motion." It would seem just, therefore, to define the aim of the physical sciences as the discovery of causes and laws.

We next interrogate *Chemistry*. With what is this science chiefly concerned? What does it seek to discover for us? What are its actual results? Again let us hear what Comte says on the subject. After observing that chemistry, like physics, which precedes it, and physiology, which follows, has for its "object the molecular

[1] Martineau's "Comte," vol. i. p. 143.
[2] Deschanel's "Physics," translated by Everett, pp. 1–5.

activity of matter," he goes on to say that "chemical activity occasions a profound and durable change in the very composition of the particles." He further defines chemistry as relating "to the laws of the phenomena of composition and decomposition, which result from the molecular and specific mutual action of different substances."[1] Now in this definition there are three distinct points—there are *laws;* there is *action,* which surely implies a force or forces; there is further *result,* which again involves causation; and there are *substances* as distinguished from phenomena: and these three points—law, force, substance—constitute the aim of chemistry. What is peculiar to it, as distinguished from physics proper, is the search for substances. This view is in harmony with the references Comte elsewhere makes to the "simple substances," and to the atomic theory. The three elements in question are distinctly recognized also in Miller's definition:[2] "The province of chemistry is to ascertain the nature of the different component substances—components of the substances ordinarily met with—to trace their mutual actions on each other, to effect new conbinations of these components with each other, and to define the conditions under which the combinations existing around us are producible." In speaking further of "elements, or simple substances," of "ultimate particles," and expressing the opinion that the "divisibility of matter has its definite limits," he distinctly brings out the feature by which chemistry is distinguished from physics; and his language is common to chemical scientists.

Crystallography, though a branch of mineralogy and

[1] Martineau's "Comte," vol. i. p. 291.
[2] Miller's "Chemistry," vol. i. p. 1.

closely related to physics and chemistry, has so specific a character and function of its own, that it deserves separate examination. Indeed, some scientists have evinced an inclination to regard it as rather the link connecting chemistry with biology than as belonging, like chemistry, solely to the domain of the inorganic. In that which differentiates it from the rest of the inorganic world, it seems to pass over into the organic. But, leaving this question aside, let us ask, What are its great aims? What is its contribution to knowledge? To the forces, laws, and substances of which chemistry treats it adds what, for lack of a more satisfactory term, I will call *idea;* by which I mean, substantially, form, or type—symmetrical regular form, by whatever conditioned and produced. Dana, in his treatise on mineralogy, defines the object of crystallography to be the ascertaining of the internal structure, fundamental forms, and the laws regulating the variations of crystals. He speaks of crystals having "fundamental forms" (p. 13); of their "forms being constant;" of each having a distinct shape of its own, as much as each animal or plant, and as being as readily distinguished by the characters presented to the eye. He speaks of the "irregularities of crystals" (p. 45); of "perfect crystals" (p. 21); of "the distortions of crystals" (p. 46); of "imperfect crystallizations" (p. 52). Miller,[1] too, in the work already quoted, says that "the general principle on which the classification of crystals is founded is the symmetrical arrangement upon which every crystalline form is constructed." The words quoted clearly recognize the point to which I drew attention. So also do such statements as the following. "If a crystal rest

[1] Miller's "Chemistry," vol. i. p. 120.

upon one face during its formation, the mechanical obstacle to its symmetrical development is frequently the cause of considerable interference with the regular growth in this direction." "Some crystals exhibit forms termed pseudo-morphous, that is to say, they exhibit forms which are not truly related to their crystalline system." [1] In short, then, each crystal has its *idea*, by which it is judged as by a standard. When it conforms to the idea it is called perfect, symmetrical; when it does not, it is called imperfect, pseudo-morphous, and the like. Crystallography, accordingly, may be said to be concerned with the search for ideal forms. If it were not, it would surely be strange to find it thus speaking of perfection and imperfection, truth and the like.

If we pass on to consider the *biological sciences*, which have organic existences for their subject-matter, we shall gain a new conception of the aims of science. For these sciences have not only the aims which I have shewn to belong to the sciences of the inorganic, namely, cause, law, substance, idea, but also one specifically their own, namely, proximate, if not ultimate, *causæ finales*, or ends. In other words, they are teleological. So far as substances are in question, they belong to the domain of chemistry—organic chemistry—on which it is unnecessary for my purpose further to touch.

Whatever view may be taken of such expressions as "vital force," so long as biologists speak of the "action" and "reaction" going on between organs, or organisms, and their environment; so long as even the most persistent denouncer of the search for forces, causes, and

[1] Miller's "Chemistry," vol. i. p. 121.

the like, namely, Comte, uses such language as the following: "Placed in a given system of exterior circumstances a definite organism must alway *act* in a necessarily determinate manner; and inversely, the same *action* could not be precisely *produced* by really distinct organisms;" so long as he defines the end of the sciences as, "given the organ or organic modification, to find the function or act, and reciprocally," [1] it can scarcely be disputed that biology is engaged in the investigation of forces, agents, causes. Action without agent, production without producer, would be an absurdity; and whether we shall designate the agent or producer, force or cause, or otherwise, is a mere question of terms. Taking for granted that it is engaged in the search for *laws*—an assumption which probably no one will question—let us still further consider what is implied by the references to "type," "homologue," "homotype," "analogue," "normality," "abnormality," "monstrosities," "departures from the normal type," and the like, which are scattered over the pages of biological works? What else but an analogue to that which, in the case of crystals, I designated idea? Every vegetable and animal organism seems designed to realize, or embody, a form peculiar to itself; and any serious deviation therefrom is described as a "defect" or "imperfection." The notion is applied to everything connected with organisms, from the cell, whose primary and normal form is affirmed to be spherical, up to the most complicated animal structure. In discussing biology, Comte uses the following language: "Man must necessarily be the type of the science, because he is the most complete epitome of the

[1] Martineau's "Comte," vol. i. p. 364.

whole range of cases; man in his adult and normal state."[1] He speaks, further, of the complete subordination of the vegetable to the animal life as the "ideal type" towards which humanity tends;[2] and of the "idea of man as the only possible standard to which we can refer other organic systems."[3] If the now current notion that all organisms are undergoing slow modification towards something very different from themselves be true, it may seem to some that science must give up the search for what I term the idea—at all events in biology. And yet idea is not excluded because it is not original, primary—in the absolute sense, permanent. There may be no such thing as species, or genera, in the old sense; the boundary lines may be constantly shifting; all forms may be subject to a perpetual flux; but nevertheless it may be undeniable that an idea—as impulse, norm, goal—may be immanent in, interwoven with, every individual organism. The recognition of this fact is sufficient for my purpose; and that it is recognized, explicitly or implicitly, it is impossible to dispute. But even in a sense more nearly identical with the notion of species and genus it is unquestionably present to, and has influence over, the minds of scientific biologists.

No subject acts more irritatingly on the mind of Comte, and Positivists generally, than that of final causes; and yet Comte himself closes a long tirade against them with the words: "The science of biology is continually engaged in establishing a harmony between the means and the end."[4] Elsewhere, too, we read of "vegetative life being *destined* to support the

[1] Martineau's "Comte," vol. i. p. 373. [2] Ibid. vol. i. p. 363.
[3] Ibid. vol. i. p. 365. [4] Ibid. vol. i. p. 395.

animal, which is erected into the chief end and preponderant character of organic existence."[1] Referring to organic tissues, he also remarks: "By an increasing condensation of the parent tissue, three distinct but inseparable tissues proceed from the derma, all of which are *destined* to an important, though passive, office in the animal economy."[2] Indeed, the notion of end, design, final cause, really underlies such terms as "organ," "function," "environment," "office," "conditions of existence," and the like; and these terms are thickly strewn over the pages of Comte and other writers of his school. But no one furnishes more striking evidence of the truth of what I am maintaining than the man who is supposed to have given the death-blow to all teleology, namely, Darwin. Illustrations of the power of the teleological idea over him might be adduced by the score, if it were necessary; but one or two must suffice. In his work "On the Fertilization of Orchids" he says: "The labellum is developed into a long nectary, *in order* to attract Lepidoptera; and we shall presently give reasons for suspecting the nectar is *purposely* so lodged, that it can be sucked only slowly, *in order* to give time for the curious chemical quality of the viscid matter settling hard and dry."[3] And, again, of one particular structure he says: "This contrivance of the guiding ridges may be compared to the little instrument sometimes used for guiding a thread into the eye of a needle."[4] The notion that every organ has a use, or a purpose, would even seem, from the following extract, to have

[1] Martineau's "Comte," vol. i. p. 363. [2] Ibid. vol. i. p. 407.

[3] Quoted by Cocker, "Greek Philosophy," p. 221 *et seq.*, where also may be found references to Harvey, Cuvier, and Whewell.

[4] Darwin, "On the Fertilization of Orchids," p. 29.

guided him in his discoveries. "The strange position of the labellum, perched on the summit of the column, ought to have shewn me that here was the place for experiment. I ought to have scorned the notion that the labellum was thus placed for no good purpose. I neglected this plain guide, and for a long time completely failed to understand the flower."[1]

We come, finally, to *Psychology*, which may be regarded as one of the natural sciences, if at least we take the word "natural" in its widest sense. That the psychologist is interested in the same aims as the physicist, chemist, and biologist, scarcely needs establishing. He involuntarily asks after the nature of the soul, after the something which lies behind the constantly changing phenomena of feeling, thought, emotion, and which gives them their unity. No problem so completely absorbs his attention as the problem of the *will*—that force which in the last instance seems to move itself from within. Law, in his domain, is too familiar a conception to need more than a passing reference. That there is a *type*, an *idea*, to be realized by every man, which makes its presence felt rather in the form of instinctive tact than of a consciously seen copy, and that the determination of this idea for the physical, intellectual, and emotional life is a point of supreme importance, must surely be evident enough from what is being constantly said and written about right and wrong, nobility and baseness, normality and abnormality, progress and retrogression, ideals and the contrary, in connection with human conduct and nature; and a man without conscious *aims*, *ends*—that is, whose conscious life is not under the guidance of final causes,

[1] Darwin, "On the Fertilization of Orchids," p. 262.

and whose own ends are not felt to be secondary to some greater and vaster ends which his activity is meant to subserve—if he deserve the name of man at all, is certainly not recognized as a type of man worthy of our admiration and imitation.

These, then, would appear to be the ruling aims or principles of the sciences—cause, substance, law, idea, end. It is for these that the mind searches, more or less consciously; it is in these that the mind really rests. They may be described as the essential element of the knowledge aimed at in scientific inquiry. Whatever else is characteristic of the sciences—as, for example, classification and the like—is either preparatory, subordinate, or reducible to these elements.

But if the view just propounded of the aims of the sciences be correct, then, following Mr. Spencer's formal guidance, we shall have to define Science and Philosophy in themselves and in their mutual relation as follows:—The sciences aim to ascertain the substances, causes, laws, ideas, and ends of the particular domains of the cosmos of phenomena to which they relate; philosophy aims at ascertaining the substance or substances, cause or causes, law or laws, idea or ideas, and end or ends, of the entire cosmos of phenomena.

If this is philosophy, philosophy, we are assured on all hands, is impossible. But if science, in the sense described, be possible, philosophy, too, in the sense described, is within the bounds of possibility. Notwithstanding the difference in the extent of their several domains, both, I venture to think, stand or fall together. The tangible objections against the possibility of philosophy are drawn from the immensity of the cosmos and

the limitations of the human intellect. These same difficulties, however, lie as truly in the way of philosophy, in the sense advocated by Mr. Spencer, or indeed in any sense differentiating it from science, as they lie in its way in the sense given above.

I shall endeavour to justify the position I have assumed by an examination of the method ordinarily pursued in arriving at scientific results. How do the sciences arrive at the principles which I have affirmed to be the most essential feature of the knowledge they embody?—the principles which are the more or less conscious goal of all scientific investigation? The method of the sciences is commonly supposed to be inductive—exclusively inductive; that is, its results are a "generalization from experience," to use Mill's words, beginning with particulars and going on to generals; and one of the chief reproaches brought against philosophy, as I have defined it, is that it does and must proceed by the method of deduction. How far, then, is it true that scientists proceed exclusively by what is commonly called induction? Let us see. Induction has to do solely with phenomena, whether of the outer or inner world—with experiences, or, as we may put it, primarily with affections of the outer or inner sense. These phenomena, experiences, or sensations, are single, isolated, disconnected, considered as they are in themselves. All that induction can do is to collect and arrange them in accordance with certain marks or features of the phenomena themselves. It cannot go a step beyond. Whence, then, come the notions of substance, causation, law, idea, end, which we found to be actually the aim of scientific inquirers? Not one of them is supplied by experience or by induction. Hume

was the first to call attention to this fact in connection with causation; but what he maintained with regard to cause, holds equally true with regard to substance, law, idea, end.

As far as cause, substance, idea, and end are concerned, many at the present time would assent to this position, perhaps cheerfully, under the impression that they had thus easily got rid of what are called metaphysical entities. But *law* also must be included among the things which are not supplied by induction. And what is science without law? Unless the term be rigidly taken as simply and solely another expression for actually observed coexistences and sequences —which in point of fact it rarely, if ever, is—it certainly is not given us by experience. Whence, then, is it derived? It is derived primarily from the mind itself. We bring it with us, even as we bring with us the other notions to which I have referred. No exception can be made in favour of any one of them. They enter our science not like form, colour, and so forth, through the channel of sensation; but, to use Locke's terminology, through the channel of reflection. The questions explicitly or implicitly put by science—What is the substance? the cause? the law? the end? are each and all alike suggested from within. We begin and carry on our inquiries under the influence and guidance of a congenital tendency, or rather necessity, to ask these questions. I do not of course mean that these notions have a conscious existence in the mind prior to experience, but that they are, as it were, the moulds into which thought casts experience. We can no more help thinking in these moulds than we can help moving the joints of our fingers inwards and not

outwards. In other words, when thought begins to act, the mind dictates to it what it shall seek, prescribes what it shall find. Scientific investigation means, therefore, in a very true sense, *the human mind finding itself in the world outside itself;* or, consciousness finding itself in the unconscious. Now this is neither induction proper, nor deduction proper. For lack of a better term, I would call it *analogical induction.*

It may seem as though in taking this view of the origin of our conceptions of cause and so forth, I had pronounced sentence of condemnation on science, not to mention philosophy; or, at all events, on my own definition thereof. But, unfortunately, sciences exist; and, still more unfortunately, mere induction is unable to give us a science of the type of, at all events, most of the sciences. Besides, a profound fallacy underlies the notion out of which this supposition springs—the fallacy that because mind finds itself in nature, therefore the results of its search lack objectivity, truth. Though backed by the authority of Kant, and though tacitly accepted by many eminent authorities of the present day, it is, at the bottom, an assumption, to which I would simply oppose the opposite assumption; namely, that because, and so far as, mind really finds itself in nature, therefore the results of its search are objective, true. In point of fact, we never have the consciousness of being in possession of knowledge or truth until we do find ourselves in that which we are investigating. Nor need this occasion surprise, if it be remembered that in reality the human mind is itself a part of the nature it investigates; not separate therefrom, as seems too often to be unconsciously taken for

granted; and that, accordingly, the mind examining nature is in a very true sense nature examining itself. In mind, nature becomes conscious of the principles of its own existence and development.

But what about philosophy? The assertion that science and philosophy stand or fall together may strike some as invalid, if for no other reason, yet because of the difference between the whole cosmos and the parts. It may be urged, "We are possibly justified in searching for the substances, causes, laws, ideas, and ends of the several parts of nature; but what can warrant the effort to find out the ultimate substances and cause, the all-embracing laws, the central idea, and the true final end or ends of the entire universe?" But I reply, the effort is inevitable, and surely, therefore, warrantable. As a matter of fact, men always have sought to give themselves an account of the universe as a whole, which is philosophizing; and they have done so with the feeling and conviction that they were then engaged in the loftiest occupation open to the human intellect—which after all tells for something. Men still philosophize, moreover; not least some who seem most earnestly to scout the notion. Unfortunately, however, they philosophize wrongly, in that they apply principles which hold true of some one section with which they have familiarized themselves, to the cosmos in its entirety. And, further, so long as the idea that the system, of which we form a part, constitutes a great whole forces itself on the attention of men, so long will they be impelled to the endeavour to unlock the whole mystery. Nor is any lesson more obviously taught by modern scientific investigation than this: that all the parts of the universe are corre-

lated, each presupposing and conditioning the rest; that, in a word, as the term denotes, the *universe* is *one*. And if the world of phenomena be one whole, the intellect can never content itself with principles that are seen to have merely a partial application and validity.

But how is a philosophy to be sought? What method is to be pursued in the effort to arrive at the principles of the cosmos? Following the definition previously given, we must answer: The search for a philosophy must begin where the sciences leave off; that is, the results at which the sciences have arrived must be worked up into philosophy. Under the guidance of the same congenital tendencies by which its scientific inquiries were inspired and directed, the mind proceeds to the examination of the substances, causes, laws, ideas, and ends supplied by the sciences, and seeks for ultimate, all-embracing, principles. The sciences furnish the material to philosophy, just as the phenomena observed in the outer and inner worlds furnish the material to the sciences. This would be the scientific method pursued by the sciences—the so-called inductive method.

I may remark, however, by the way, that another starting-point is conceivable, one, too, equally objective; namely, *the congenital tendencies themselves*, as they have been brought to light, in the course of human reflection on experience, especially scientific reflection. In a sense, this would be an *a priori* beginning, and would of course involve rather an analytical than a synthetic method of procedure.

Perhaps the best plan would be to combine both the *a priori* method just described, and the *a posteriori*

method dictated by the definition appropriated, as to its formal character, from Mr. Herbert Spencer.

If philosophy is to proceed inductively, and to start with the results achieved by the sciences, three paths are open to it. The *first*, and the one that seems most readily to suggest itself, is that of reducing the principles found by the several sciences to those which have been found by one science; in other words, subsuming for this purpose all the sciences under some one science. One particular science would thus be not only science, but also at the same time, if in another aspect, philosophy. Or, one science might supply us with the ultimate substance or substances; a second, with the supreme cause or causes; a third, with the widest law; a fourth, with the ruling idea; a fifth, with the chief end or aim. Or, again, several of the supreme principles might be furnished by some one of the sciences. *This* is the form, indeed, which a good deal of philosophizing now actually assumes. There is an effort, for example, to reduce everything back to the elements found by chemistry, and the forces and laws expounded by mechanics. But, as yet, success is a matter of faith or hope, rather than of sight. No bridge has yet been flung over the gulf separating the chemical from the mechanical; still less between the biological and the chemical, or between the psychological and the biological. There would be greater probabilities, in my opinion, in favour of the reverse process; but hitherto systematic attempts have scarcely been made in this direction, or, if they have been made, they have been dictated and nullified by false presuppositions.

The *second* path would be the reduction of all the

principles back to a principle, or principles, different from anything of which the sciences inform us—different in kind, as well as in degree. Such a principle, or principles, would be simply the unknown; for of that which differs from us and our world, not only quantitatively but qualitatively, we can have no real knowledge. This is the solution to which the Agnostics, with Mr. Herbert Spencer at their head, resort—if solution it can be called. To term it a solution, however, is a misnomer; for to reduce all things back to the unknown and unknowable is to decline reduction altogether. It is not so much a false philosophy as the negation of philosophy under the form and pretence of philosophy. The philosophizing effort is there; but it ends in a "beating of the air."

The only *other* course open to us is that of the sciences themselves in a higher form, or at a higher stage; that is, the method of analogical induction. In other words, we judge the ultimate principles to be in analogy, though not identical, with ourselves. There is a certain affinity between this method and the one to which I referred at the close of my remarks on the first path; but it *is* affinity, not identity. The science of psychology, or anthropology, does not give us all the actual principles of which philosophy is in search; but it does supply us with hints as to the nature of those principles. On the basis of those hints, and guided by this method, we arrive at the conclusion, that at the foundation of things there are principles qualitatively identical with, though quantitatively immeasurably transcending, those which anthropology reveals to us as their blossom and crown.

But now to the justification of this method. And

as the only justification of a method is its promise to lead, or its actually leading, to the desired end, I have to face the question, Can philosophy, or, in other words, can the ultimate principles of which the human mind is intellectually in need, be reached in this way? Let us see.

(*a*) As a matter of fact it is only in ourselves that we can claim to be in real and direct contact with principles such as we are compelled to seek. All forms of *causation* besides the human we are in the way of shewing to be mere transformations, or transmissions, of force. The force in us is the only approximation to an original force, a force irreducible to other forces that we encounter. Again, we are nearest to an ultimate *substance* in ourselves, far nearer than anywhere else. Indeed, it may be questioned whether we do not derive our notion of substance altogether from our consciousness of a permanent background to the everflowing stream of mental phenomena. *Law*, as involving obligation, is known to us in ourselves; we feel ourselves bound to act in certain ways. This obligation, which is essential to law as generally conceived of, we transfer from our inner world to the world outside us. This is true also of *idea*, but most emphatically of *end;* for we are certain of setting to ourselves ends of activity. The world outside is a lock to which these congenital tendencies, or, as I might term them, categories, are the key; in the world within we are in direct contact with the "reals" reflected in the categories. In thinking itself, the mind thinks the reals which, in the form of congenital tendencies, dictate and condition its thinking.

(*b*) Further, and by way of supplementing what was

said in another connection, I may remark that the cause, law, idea, end, which we find in ourselves do actually exercise sway over, and subsume under themselves, many other forms of causation, law, idea, end. Man, and man alone, is a veritable microcosm. Qualitatively, if not quantitatively, the *anthropic* force does discharge the functions of the other forces. It is a force which in the human organism wields mechanical, chemical, perhaps crystallific, vegetative, and animal, energies; and this force reveals its true nature in its highest and latest modes of activity; namely, in the psychological—in the intellectual and emotional—activities. No other force with which we are acquainted can do this. As such, this force naturally subordinates or tends to subordinate all other laws, ideas, and ends to its laws, ideas, and ends, within certain limits. It is solely in relation to substance that we are compelled to recognize a dualism. But this dualism exists in man himself; and his only real conception of that "other" of spirit which we commonly term matter is derived from his own constitution. If all this be true, it is no great extravagance to imagine that the ultimate principles of the cosmos may be essentially akin to those of the human mind.

(*c*) Still further; in one section of the psychological or anthropological domain we come into contact with phenomena which are directly confirmatory of the method in question; namely, in the science of religion. "Religion is a relation, due or true, of man to God." It is supposed to be as real a relation on the part of man to an invisible Power as is his relation to a fellow-man whom he respects or despises, trusts or dreads, loves or hates. It is no doubt true that the conceptions

formed of the object of religion have diverged from one another to the extent of incompatibility; and a survey of the heathen religions would scarcely enable us to form any definite and positive notion of the Power whose presence men have felt and confessed. All we should be able to say would be, They have felt the presence of some Power, but they interpret their sensations in very self-contradictory ways. In one religion, however, an interpretation of the experiences out of which religions grow has been given, which, when intelligently and distinctly presented to the human mind, at once commands its assent, and is felt to be light where otherwise there is darkness. That religion is the Christian religion. Wherever it is proclaimed men feel it to be, though new, yet not new, the true revelation of a Being who had been constantly acting on themselves, but whose nature and character they had misunderstood and misrepresented.

Now in this Christian or Biblical religion men have claimed, and still do claim, to be sensible of the presence, influence, and action of an absolute personal Being, transcendent to, and yet immanent in, the cosmos. They affirm also that this Being has declared Himself to be such a principle as philosophy seeks—the ultimate ground and *cause* of the universe; and that He has given glimpses of the supreme *law* by which the universe is governed, the lofty *idea* which it is realizing, and the final *goal* towards which it is being conducted. Is this a delusion? Anyhow, men of diverse nationalities, widely separated countries, varying culture, different temperament, disposition, and capacity, throughout more than thirty centuries, have given substantially the same interpretation of the inner

phenomena termed religious. This unity of interpretation has existed in the midst of the divergences of heathenism; and, in its leading features, this interpretation still commends itself as a worthy representation of God, if there be a God. But if so, what is the explanation? The facts demand an explanation which shall not be an explaining away. To me they seem to fit naturally into, and therefore to confirm, the view of philosophy which I am advocating.

(*d*) Finally, however, the true test of a method is its outcome. Does it lead to results in which the mind can rest? which the mind recognizes as knowledge, as light? The Christian, or, rather, the Biblico-theistic hypothesis is the most satisfactory that has been hitherto advanced. Whatever difficulties of its own it may present, *quâ* hypothesis of the cosmos, it enables us to see our way more clearly than any other. It has unquestionably its own difficulties; it would have difficulties even if it explained everything in the cosmos. The only way in which we can get absolutely rid of all darkness is by reducing everything back to nothing, and shewing how out of nothing all things arose; and this is obviously an impossible undertaking. But so long as we start with something which has to be taken for granted difficulties are inevitable. Even if we assume nothing but Professor Tyndall's "cosmic mist," it involves its own difficulties; and in relation to what it is expected to explain it leaves us in the dark. Either that, or it is surreptitiously endowed with qualities which convert it into something closely resembling God, or the original hypothesis has to be buttressed and supplemented at every new turn in the cosmic development by fresh hypotheses.

The method I have advocated for philosophy leads to Biblical theism. It is the method of which Protagoras gained an uncertain and partial glimpse when he spoke of man being the measure of all things. The German Jacobi gave brilliant expression to its underlying principle when he said, *Man anthropomorphizes in representing God, because God theomorphized in creating man.* Both of them were anticipated and excelled by the writer of those wonderful words in the Book of Genesis, "God created man in his own image; in the image of God created he him." D. W. SIMON.

THE FOUR NEPHEWS OF MOSES.

LEVITICUS X.

IT is not easy to find any new incident in the life of a man so great and famous as Moses, "the man of God." Nevertheless, two incidents are recorded of him in this Chapter which will probably be new to most readers of the Bible: one of them is certainly new even to many students of the Bible. And, I suppose, these facts are comparatively unknown because the Book of Leviticus is but infrequently read. For since this book is, for the most part, a mere chronicle of rites and ordinances long obsolete, it is not unnatural that the historical fragments imbedded in it should be commonly overlooked.

Such a fragment is contained in the Chapter before us. It narrates two incidents, in both of which Moses and his nephews played a part, both of which happened in a single day, and that the very day on which Aaron and his sons were consecrated to the service of