

## IS SCIENTIFIC MATERIALISM COMPATIBLE WITH DOGMATIC THEOLOGY?

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THE qualifying adjective is necessary, for the object of this Essay is to enquire whether Materialism, in its strict sense, necessarily bears the meanings which have been inferentially put upon it. Scientific Materialism means the reduction of not only the inorganic universe, but also the phenomena of life and mind, to conditions of matter and force. The question is, Does it also necessarily mean the denial of a personal God and Creator, or of the existence of spiritual beings, or of other minds than that of man, or of a future life of man? These last constitute, together with the former, the popular meaning attached to the word, and no doubt it is so far justified by the fact that many scientific Materialists do hold these last opinions. Many, also, of those who, on metaphysical or other grounds, have abandoned the beliefs of Dogmatic Religion, and even Theism, use the arguments of Scientific Materialism in their favour, just as has been done in the case of Astronomy, Geology, and other departments of science in their turn.\*

\* There are other popular meanings of the word Materialism to which Atheists, Deists, and Pantheists reasonably object; the ethical and æsthetic one, for instance, which may be defined as a low tone of mind, which is set upon money and material possessions, the gratification of personal wants ministering to bodily comfort, to luxury, vanity, and other objects of vulgar ambition, in preference to the more spiritual states, desiring intellectual, artistic, and the higher moral objects involving self-sacrifice. The objection is just, and we have no right to charge on any philosophical opinion the inferences which we, and not the author, put upon it as respects natural morality. Spinoza and David Hume were among the most amiable and upright of men. Again, Materialism has been characterised by Comte as the endeavour to explain phenomena of a higher in the terms of a lower order; to explain chemistry by physics, biology by chemistry, and social science as a simple

It must be kept in mind that Physics and Biology are not the only sciences on which ethico-religious Materialism has been based, for, on their own foundation, many metaphysical writers have reared a like superstructure. I shall, however, confine myself here to the bearing of scientific Materialism upon the Theory of Evolution, and the connection of Life and Mind with organised matter. Even here it will be impossible to go into detail, except on a very few points, and the arguments will be summarised, or the positions merely stated in their proper place, without attempting proof in detail; the subjects themselves being so large that volumes rather than pages would be necessary for their full discussion.

We have first to deal with the conflict of the Evolution theory with Natural Theology, the counterpart and handmaid of Dogmatic Religion. Natural Theology is set forth in its earliest and probably its best and purest forms—as not derived, even unconsciously, from any other source than that of nature and thought—in the Dialogues of Socrates.\*

corollary of biology. Again, G. H. Lewes, in his recent Essay (*Fortnightly*, May, 1876), limits the word “to the explanation of vital phenomena by physical and chemical laws, without regard to the speciality of organic conditions, and to the explanation of mental phenomena without due regard to the complexity of psychical conditions, vital and social.” Likewise, he objects to looking on mind as a property of the brain isolated from the rest of the organism, instead of recognising the inter-dependence of all parts; and also to the coarse chemical views of some Materialists, who would reduce mental power to the standard of the phosphorus contained as the nerve tissue. On the strength of these he asserts for himself a middle position equally opposed to pure Materialism and to pure Spiritualism. At the same time, however, he rejects all “extra organic agency in the causation of vital and mental phenomena.” This position does not really differ from that of the physiologists who hold the protoplasmic theory of life; and, therefore, unless the distinct profession of belief in non-material spirits or agencies is added (as by Fletcher for supernatural, and Beale for certain natural phenomena), it, as well as Comte's, must share the position of the popular notion of Materialism; as must also the speculations of those philosophical idealists who maintain that the personal life of the individual perishes with the ideal matter composing his body.

\* In proof of this may be given some passages from the fourth chapter of Xenophon's *Memorabilia*. Socrates is conversing with Aristodemus, a man who professed contempt for religion and the gods:—“Whether do those who form images

In these we see anticipated all the strong points of Natural Theology, in the arguments from design, as well as in those founded on metaphysical reasoning. Yet, although Socrates speaks of a Supreme Deity, or Wisdom, it was to the gods, who made and ruled all things providentially, that he prayed for only that which was good, and whose will was expressed in oracles and omens, and was to be enquired into by the practice of divination. His Natural Theology thus without sense and motion, or those who form animals endowed with sense and vital energy, appear to you the more worthy of admiration? "Those who form animals, by Jupiter, for they are not produced by chance, but by understanding." "And regarding things of which it is uncertain for what purpose they exist, and those evidently existing for some useful purpose, which of the two would you say were the productions of chance, and which of intelligence?" "Doubtless those which exist for some useful purpose must be the productions of intelligence." "Does not he, then, who made men at first, appear to you to have given them, for some useful purpose, those parts by which they perceive different objects, the eyes to see what is to be seen, the ears to hear what is to be heard? What would be the use of smells if no nostrils had been assigned us? What perception would there have been of sweet and sour, and of all that is pleasant to the mouth, if a tongue had not been formed in it to have a sense of them? In addition to these things, does it not seem to you like the work of forethought, to guard the eye, since it is tender, with eyelids, like doors, which, when it is necessary to use the sight, are set open, but in sleep are closed? To make the eyelashes grow as a screen, that winds may not injure it? To make a coping on the parts above the eyes with the eyebrows, that the perspiration from the head may not annoy them? To provide that the ears may receive all kinds of sounds, yet never be obstructed? and that the front teeth in all animals may be adapted to cut, and the back teeth to receive food from them and grind it? To place the mouth, through which animals take in what they desire, near the eyes and the nose? And since what passes off from the stomach is offensive, to turn the channels of it away, and remove them as far as possible from the senses? Can you doubt whether such a disposition of things, made thus apparently with attention, is the result of chance or of intelligence?" And so on in the same strain. Again, if we are conscious of reason and intelligence, can we suppose there is not an intelligence elsewhere, which has produced this stupendous universe, and not chance? And if we do not see the gods, neither do we see our own souls, which govern and direct our bodies. Again, from the manifold gifts to man above the animals, he infers the providential government of the gods. Again, would the gods have brought into the mind of man a persuasion of their power to make him happy or miserable if they had no such power? Again, "Consider, my Aristodemus, that the soul which resides in thy body can govern it at thy pleasure, why then may not the soul of the universe, which pervades and animates every part of it, govern it in like manner?" Again, he infers the love and sympathy the gods must bear to us from the love and sympathy we bear towards each other. Finally, that the Supreme Deity, who raised and upholds the universe, is Himself invisible, and it is only in His works that we are capable of admiring Him.

led to Polytheism, and to practices we hold to be superstitious. These are no doubt its natural outcomes, and not the pure Deism of the moderns, whose foregone conclusions are carried into it from another source.

Socrates did not answer Empedocles, whose philosophy anticipated to a certain extent the explanation of adaptation to purpose in the organic world by the "survival of the fittest;" nor did his teaching prevent Democritus, who was one of his hearers, from propounding his Atheistic atomic theory. Nor, on the other hand, did the latter, nor the Greek philosophy in general, succeed in delivering the people from the incubus of their ridiculous and debasing mythology. That was reserved for the theology of a people far inferior in culture to the Greeks; a fact which speaks at the outset for a very different source of that theology.

The anticipation by Socrates of the whole strength of the teleological argumentation from adaptation to purpose is proved complete by the admitted impossibility of going beyond it, even now, in the full light of both Revelation and Science.\* It was, no doubt, fondly hoped and believed that the progress of scientific knowledge would multiply and expand the proofs so greatly, that we should finally be able, from nature alone, to demonstrate inductively the being and attributes of God. In this sense the numerous works on Natural Theology have been written, down to the famous *Bridgewater Treatises*. But, alas! for the vanity of human anticipations! The very contrary has proved to be the fact; and, since the publication of those works, three great discoveries have given quite an opposite direction to the current of thought, viz., the Conservation of Force, the Origin

\* "No stress whatever need be laid upon minute anatomy, as, for instance, of the eye: it signifies not whether we do or do not understand its optical structure as a matter of science. If it had no optical structure at all, if it differed in no respect (that we could discover) from a piece of marble, except that it sees, this would not impair the reasons for believing that it is meant to see."—(J. Newman, *The Soul*, p. 83.)

of Species, and the Protoplasmic Theory. The tendency is now again to refer the undeniable fitness of things to the working of natural causes without the interference of a directing power. And, unquestionably, the deeper we see into the processes of nature the further all evidence of such interference is pushed back.

With regard to the sciences of Physics and Chemistry, it is of little consequence by what avenue you enter, but, if you only go deep enough, the evidence of design in any particular adaptation, so palpable on the surface, becomes less and less obvious as you come to perceive that the properties relied on as proofs of specific design become merged in far higher and wider relations, which ultimately transcend our planetary world altogether. One of the best illustrations with which I am acquainted is that given by Dr. Samuel Brown,\* who shows the fallacy of the teleological argument resting on the law of diffusion of gases. Unquestionably, without that law the earth would be unfit for the habitation of man, or the greater part of the organised creation, for, among many other reasons, the surface of the earth would have been wrapped in the deadly folds of a stratum of carbonic acid. It is easily shown that this law results from the nature of the gaseous state of necessity, and has a scope and bearing infinitely wider than the purpose here chosen for special comment. In the same manner, the whole field of inorganic nature can be analysed, and every one of the exquisitely fit and beautiful adaptations to be found therein can be reduced to the blind interaction of the physical and chemical properties of the matter concerned. Let us take as proved, what Paley himself was inclined to admit, that, from the evidence of the inorganic kingdom alone, you cannot demonstrate that matter is not self-existent and eternal, with inherent properties

\* *The Argument of Design equal to Nothing ; or, Nieuentytt and Paley versus David Hume and St. Paul.* Edinburgh, 1842.

sufficient to explain all inorganic phenomena. Still, the organic kingdoms of Nature remained the stronghold of the argument from design, replete as they are at every turn with innumerable examples of exquisite fitness to purpose, and displaying palpably, as was thought, the hand of an intelligent power fashioning pre-existing materials into species of plants or animals predetermined to fulfil that purpose. But now that the theory of Evolution has arisen, we may conclude that the discovery of Darwin has deprived the adaptation to purpose displayed in the organic world of all special significance, and placed it on a level with the inorganic. And, in fact, that, for example, the wonderful adaptation of the human eye to vision is just as much the effect of the blind interaction of natural causes as the deposit of beds of coal or salt. Nay, even—and this is a hard thing to receive from the Evolution doctrine—there is no more evidence that the eye was directly fashioned from pre-existing materials for the purpose of vision, than that rivers were made for the purpose of grinding water-worn stones into their present shape. In fine, it seems to be now generally recognised that the universe is too vast and the mind of man too limited for us to infer the purpose of things, and thus pronounce the direct design of any adaptation to purpose.\* Hence, Natural Theology must be excluded from the sciences, properly so called. Perhaps happily, for should one wish to go beyond the quality of a skilful designer, after the manner of men, and desire to find in Nature the evidence of the benevolence of the Deity, put forward by the Optimistic natural theologians, from Socrates to the modern Deists, let him ponder well on the almost equally strong evidence that exists of malevolence in

\* In Mr. Huxley's amusing and apposite illustration, a death-watch is supposed to be shut up in a kitchen clock. "He, listening to the monotonous 'tick! tick!' so exactly like his own, might arrive at the conclusion that the clock was itself a monstrous sort of death-watch, and that its final cause and purpose was to tick." So with us and the universe.

the order of Nature. Consider how, if the survival of the fittest is the law of Evolution, the whole of the sentient creation must have been from the beginning perpetually, and still is, in the groaning and travail of the birth of new species, through the cruel, pitiless, and selfish law of Natural Selection. "If," says Darwin, "it could be proved that any part of the structure of any one species had been formed for the exclusive good of another species, it would annihilate my theory, for such could not have been produced through natural selection."\*

Thus selfishness and the law of the strong prevail everywhere, and while the strong are occupied in preying on the weak and fighting among themselves, the weak keep their place by the limitless sacrifice of individuals through the excessive prolificness of the species, or their life is a daily escape from death in the guardianship of perpetual fear. They may be truly said to die the thousand deaths of the coward, and their fear is only too sure a presage of the death by violence which awaits them all. Consider, too, the same exquisite adaptation of the organs of the carnivora to the purpose of destroying and even torturing their victims; consider the whole race of parasites, so perfectly adapted for the purpose of devouring and tormenting creatures infinitely more noble than themselves. In view of all this, may we not rejoice that the fact that a particular tapeworm cannot exist without human beings to prey on, as the only creature adapted for its purpose, no more proves that man was made for food for tapeworms than that rivers were made to grind pebbles, nor that we are bound to conclude the world was designed by a malevolent being. If this carries also the giving up benevolence, and no other source is open of the knowledge of the attributes of the First Cause, we would perhaps willingly acquiesce in Hume's conclusion, that the

\* *Origin of Species*, 6th Ed., p 162.

First Causes of the Universe "have neither goodness nor malice."\*

"Who trusted God was love indeed,  
And love Creation's final law—  
Tho' Nature, red in tooth and claw,  
With ravine shrieked against the creed."

Are we, then, to banish Final Causes from Science? Hardly. Bacon's epigrammatic comparison of Final Causes to vestal virgins, which are necessarily barren, can only apply to the error of putting final in the place of secondary or natural causes. For example: the effusion of organisable lymph round a wound in the intestines glues the parts together, and prevents the escape of noxious matters, thus saving the life of the individual. But if we saw here the operation of a Final Cause, viz., the preservation of life, even though not directly, through an imaginary power called *vis medicatrix naturæ*, we should be wrong; for the same effusion of lymph takes place from other irritants, and then often causes the death of the individual. Here we not only deny the direct power of a Final Cause, represented by a *vis medicatrix*, but also the existence of any such Final Cause at all. The Evolution theory extends this denial to all nature. Vision is generally said to be the Final Cause of the eye; but if the eye came into existence, and became adapted to the purpose of vision, through the blind operation of natural causes which had no special relation to vision, and if the same is true of all other adaptations, then there are no Final Causes, in the strict theological sense, to be discovered by induction as above said. But Bacon does not exclude the use of Final Causes in reasoning, nor deny their existence. The end or purpose of organs or apparatus in organised

\* According to Baden Powell, "Natural Theology confessedly proves too little, because it cannot rise to the metaphysical idea or scriptural representation of God."



beings has been always looked to, and that correctly, since the time of Galen, as a potent instrument of discovery. Was it not the instinctive conviction that the valves must be in the veins for some useful purpose that spurred Harvey on till he found the true mechanism of the circulation? It is only when we rest upon Final Causes that we go wrong; and it is exactly the exceptions to the apparent rule of necessary purpose, viz., the presence of rudimentary and useless organs, that have conducted us partly to a truer and wider view of the natural causes of these adaptations, which were looked on so long as the direct carrying out of purpose, or proofs of Final Causation. This truer view, however, in the mean time, leads us into a blind alley; viz., it refers us back to the properties of matter and force, of whose original cause—or whether uncaused and self-existing—inductive reasoning can tell us nothing. Is there, then, no other source of knowledge? Yes; two. First, the intuitive and instinctive beliefs of the human mind;\* and, second, revelation. From the first (and this, possibly, only as an unknown derivative from the second) we have strong, though vague and indistinct, and from the second, clear and decided intimations of the existence of a Creator of matter and force, possessed of intelligent and moral attributes. Teleology thus becomes again possible and compatible with the Evolution theory, but it must be far higher and wider than the old one, and it pushes back design, and purpose, and foreknowledge, to the creation of matter itself—a view surely more consonant with the ideal of the Supreme Being than the common one of perpetual interference with, or addition to, the powers of nature, conferred at the beginning.† St. Paul, in his discourse at

\*“ No syllogism is pretended, that *proves* a lung to have been made to breathe; but we see it by what some call common sense, and some intuition.”—(Newman, *The Soul*.)

† Cudworth (1678) “ contends that the belief of Efficient Causes in the sphere of matter does not exclude the belief in, or the possibility of, Final Causes.

Athens, and in his Epistle to the Romans, admits intuitive beliefs as a source of knowledge of God, while enforcing the infinitely more perfect and authoritative power of revelation. Without the latter, indeed, teleology has but a feeble hold on the scientific mind, and, in our day, has been unable to resist the weight of the Evolution theory in favour of Pantheism and Atheism in a large class of men of the highest intellectual powers. It is only when Nature is illumined with the supernatural light of revelation, that natural theology takes again its rightful place, and thus the whole universe becomes one grand poem in illustration of the glory of God. Then, and then only, when the heart is filled with unquestioning faith, can we truly sympathise with the Psalmist and the Prophets, to whom "the heavens declare the glory of God," and receive as irresistible the appeal to our deepest instincts in the words, "He that planted the ear, shall He not hear? He that formed the eye, shall He not see?" and a thousand similar passages in the scriptures. Then, and then only, shall we enter into the spirit of the Christian natural theologians, from Derham, Ray, and Paley, down to the writers of the *Bridgwater Treatises*. Doubtless, we shall again, ere

As against the doctrine of the direct efficiency of the Deity in inorganic phenomena, and in order to explain the phenomena of organisation in the universe as a whole, and pre-eminently in living beings, he adopts the hypothesis of a plastic or formative nature, endowed with general and special activity, both efficient and teleological—a force producing the results of design without consciousness."—(*Ueberweg*, I., 358.)

Butler says:—"An intelligent author of Nature being supposed, it makes no alteration in the matter before us whether he acts in nature every moment, or at once contrived and executed his own part in the plan of the world."—(*Analogy*.)

Huxley (1871) says:—"There is a wider teleology, which is not touched by the doctrine of Evolution, but is actually based upon the fundamental proposition of Evolution. That proposition is, that the whole world, living and not living, is the result of the mutual interaction, according to definite laws, of the forces possessed by the molecules of which the primitive nebulosity of the universe was composed. If this be true, it is no less certain that the existing world lay, potentially, in the cosmic vapour, and that a sufficient intelligence could, from a knowledge of the properties of the molecules of that vapour, have predicted, say, the state of the fauna of Britain in 1869, with as much certainty as one can say what will happen to the vapour of the breath on a cold winter's day."—(T. H. Huxley on "Häckel's *Natürliche Schöpfungsgeschichte*." *Academy*, 1871.)

long, witness a revival of that school of thought, profoundly modified, however, by the great discovery of Darwin, which has in the mean time suppressed its manifestation altogether.

Thus, then, the question of our title is answered in the affirmative, as far as Evolution is concerned.

To pass now to the Materialist theory of Life. The first question is, How are we to judge how far the properties and forces of matter can be said to account for life without the addition of an immaterial essence? Let us take the method of Dubois-Reymond, who, calling up the exalted Intelligence imagined by Laplace, which, by mathematical calculation from the position and forces of the atoms at a given moment, could determine, on the mechanical theory, the past and future of the universe, proposes thereby to determine the limits of natural science. Can life be *brought within the powers* of matter and force alone, as known to us by experience? or at what point do its phenomena transcend them? The cardinal points in which living matter, in its simplest form, differs from a chemical compound, are, that in the latter each of the components disappears in their mutual reaction, and a third body is formed. Moreover, they disappear in an exact proportion. On the other hand, living matter placed in contact with heterogeneous matter decomposes it in indefinite proportion, and is not only not decomposed, but grows itself in definite stages and into definite structures of infinite variety of form and composition. From this faculty results the enormous distinction between the organic and the inorganic kingdoms, which it would be idle to dilate upon. But is the distinction of the fundamental properties of the two kinds of matter really so great? Have we not examples in the laboratory where the canon of double decomposition is violated? Yes; we have, in catalysis and the chemical

fermentations, where it is well known one of the reacting bodies remains intact, while the other splits up into two or even more bodies. Again, have we not in crystallisation an example of matter in a formless state depositing material in a form predetermined by the properties and forces of the molecules while still in the formless state? Nay, more; crystallisation repairs deviations from the pre-established complete form; for an octahedral piece of alum, if fractured and placed in mother-lye, will in a few days exhibit a restoration of the original form. The whole crystal increases, but the increase is greatest in the broken edge, and the octahedral form is completely renewed. Of course I admit the vast difference between crystallisation and vital deposition of formed elements—nay more, that the two are incompatible, and that in no one instance does crystallisation occur as a part of vital processes. But is not this significant? for while it shows the production of predetermined forms to be a property of matter, it renders it probable that it is this very property which is otherwise employed. We have thus two of the apparently characteristic distinctions of living matter represented in inorganic matter by catalysis, or fermentation, and by crystallisation. There remains, therefore, only the *self-renewal from heterogeneous material* as the primary characteristic of living matter, and in which it stands alone, and from which, if granted as a simple property of matter, with its essential concomitants, all the powers of life may be accounted for. Summing up all the transcendent powers of living matter herein implied, over the chemistry of the laboratory, whereby it performs, in a moment almost, and simultaneously and at one and the same common temperature, analyses and syntheses which either wholly baffle the chemist, or can only be performed by a long succession of designed processes at different, and most of them non-vital, temperatures, we must conclude that this power, if possessed by

matter at all, can only be by matter in a totally distinct state of affinity, and one altogether *sui generis* in comparison with the state in which matter is known to us otherwise. The hypothesis is, that such is the case. There must be some profound mystery at the bottom of life. It must either depend on a new state of chemical combination, which, as we cannot penetrate without destroying it, must ever remain unknown to us; or it must depend on some extra organic agent, of which we can know nothing at all, and thus remain for ever outside the boundaries of science altogether. My respected predecessor in this chair, the Rev. H. H. Higgins, objects, that to tell us life is the property of a substance as unknown as itself, is to tell us nothing; "and that to say, 'no life without protoplasm,' is to say no more than 'no life without oxygen,' or no life without carbon, which may be very true, but is not very significant."\* I cannot agree with this. On the contrary, it seems to me that to tell us that vitality is the property of a peculiar combination of matter, just as saccharinity is of a chemically-combined carbo-hydrate, is to tell us a great deal; it is, in fact, an immense step, and brings life within the boundaries of natural science, even although we cannot analyse either the one or the other, except by destruction.

In accordance with the foregoing, we must therefore postulate four radically distinct states of matter:—1st. The unknown substratum of the elementary molecules, which,

\* The passage stands thus:—After quoting Beale's description of bioplasm and its products at death, he says: "Why, then, bioplasm is not a *thing* at all; it is masculine and feminine, probably both, but neuter never! Protoplasm is, then, not the physical basis of life, but the physical basis of some utterly unknown compound, in association with which the phenomena of life are manifested." Then follows the sentence quoted above.—(*On Potency in Matter*, p. 24.) There is an ambiguity here. The word protoplasm should, in my opinion, always be restricted to the unknown compound itself, and not to the isomeric components associated as we find them after death, as albumen, fibrin or myosin, gelatine, fats, salts, and the rest. To speak, therefore, of living protoplasm, is tautology; and of dead protoplasm, incorrect.

though not demonstrated, is now inferred by all chemists and physicists. 2nd.- The elementary molecules. 3rd. The chemical combinations accessible to the laboratory, from the simplest binary inorganic compound up to the most complex organic chemical product. 4th. The protoplasmic state, in which the most complex organic compounds are themselves combined into a state of inconceivable complexity, and with the result of *thus* attaining to the properties and powers we call vital. It is not unreasonable that we should find at one end of the scale a simplicity which the laboratory of the chemist cannot resolve, and on the other a complexity which it cannot build up. The common objection that if living matter is a mere chemical compound, we ought to be able to make it in the laboratory, is futile; for there are thousands of chemical compounds which cannot as yet be made from the elements. Until we can transmute the elements, let us not ask why we cannot build up living matter. But now comes a difficulty. If life be merely the quasi-chemical reactions of this peculiar substance, it must submit to the essential conditions of chemistry; there must be a mobility of the particles composing the substance, *corpora non agunt nisi soluta*; it must therefore be in a state approaching to liquidity; also, if death be the resolution of this substance into simpler compounds, some change in the physical properties of the substance must first take place, as it is not conceivable that substances differing so widely as living matter and its proximate principles united into rigid tissues, can have the same physical properties. Upon this is founded a train of deductive reasoning, by which was anticipated the modern protoplasmic theory of life. For if we look at an organised body just after death, *it does not appear to us, at first sight, to have undergone any change* in its physical aspect and properties; no part of this visible structure has undergone the change we should naturally expect from its

having passed from such an extraordinarily complicated condition to the chemical compounds found after death; and, besides, before death the structures were not mobile, but fixed, as after. From this the remarkable conclusion was drawn by Fletcher, in 1836,\* that the whole visible structure of organised beings was, in reality, dead, and that vitality resided in a universally-diffused pulpy substance alone, forming the gray matter of the ganglionic and cerebro-spinal nerves, pervading the muscles, the glands, and all parts where vital action proper was manifested. This substance possesses the requisite of semi-fluidity, and, besides, manifests a change after death, viz., coagulability, of which, if not the sole cause, it is an essential element. We have thus a universally-diffused mobile substance, which may satisfy the conditions of a complexity of constitution embracing in one compound all the proximate principles found after death in the matter that was living. These are held together by a mode of affinity which is called vital, and for the time superseding ordinary chemical affinity. This hypothesis is nearly identical with the protoplasmic theory of Beale, now so well known, which attributes life to the universally-diffused germinal matter alone in all living bodies, animal and vegetable, while all visible structure is actually dead, although formed, absorbed, and renewed, when required, by the germinal matter. In this germinal matter the chemical relation of the elements to each other is thus described by Beale, almost, although unwittingly, in the very words used by Fletcher a quarter of a century before:—"Of the relations which these elements bear to one another in the living matter we know indeed nothing; but since every kind of living matter exhibits the same character, it seems probable that during this temporary living state the elements do not exist in a state of ordinary chemical combination at all. Their

\* *Rudiments of Physiology*. Edinburgh: Maeklachlan.

ordinary attractions or affinities seem to be suspended for the time."\*

Since then the necessity for some such unknown compound of the proximate principles has been felt and met by Mr. H. Spencer, in his theory of the "Physiological Units," without, however, any acknowledgment of the priority of Fletcher and Beale. Nor does he appreciate the necessity of the sharp restriction of all truly vital phenomena to the action of this peculiar substance, for his mind is cramped by a definition of life, which requires the inclusion of the sum of the actions of living beings, many of which are avowedly chemical and physical. But it seems to me that the sharp and abrupt distinction between the living and non-living matter in organised beings, so strongly insisted on by Dr. Beale, is absolutely essential to the Materialistic theory of life. For although the discovery of the law of conservation of force has, on the whole, vastly contributed to the reduction of the phenomena of living beings to the interactions of matter and force, still the progress of chemistry has not brought us one jot nearer to the comprehension of vital phenomena by the chemical reactions of the proximate principles, or any combination of them possible in the laboratory. The best chemists are the last to claim this on behalf of their science. There seems, therefore, to be no alternative between a new state of combination, entirely *sui generis*, and the addition of some extra organic spiritual agency outside the realm of science.† For the notion that a mode of force, called

\* Beale's *Todd and Bowman*. Part I.

† The term structureless has been objected to as applied to the shapeless semi-fluid protoplasm, whether in tissue-bioplasts or germs, because, if vital properties are material, their differences must depend on molecular structure. The objection is reasonable. The word structureless is applied only to what is not the *visible* structure of tissue and organs. But it is also objected by Clerk-Maxwell, that there is no room in a germ for the requisite complexity of molecular organisation, if the atomic theory be true. The accuracy of this calculation may reasonably be doubted, when we see that the minuteness of the ultimate molecules is infinitely greater than the least of living particles visible to the microscope, as shewn in Mr. Sorby's



vital, but correlative with the physical forces, by playing on a compound of fibrin, albumen, gelatine, and the rest, is capable of endowing it with vitality, is altogether absurd.\*

paper in the *Microscopical Journal*, vol. xv. Professor Clerk-Maxwell also forgets that a germ is not a boxed-up copy of every part of the adult and all his descendants, as was once imagined, but a complex piece of molecular organisation, in which the position of the atoms and molecules is such that, with the interaction of the environment, growth in such or such a *direction* will take place. And, if people object to the transcendent marvel of such a substance, what is the alternative that is not far more marvellous? To say that a spirit is added which does the needful, is only to pronounce a word to which science can attach no meaning.

\* The authors of the *Unseen Universe* have put forward a theory of the nature and origin of life, which demands attention, from the authority of the quarter from which it comes, if not from its intrinsic merits. They start first with the idea that what characterises life, viz., the "peculiar grouping of particles that would not naturally, and in virtue of their own forces, have united themselves together as we find them in the body," is derived, in one sense at least, from the food which is eaten. "If animal food is eaten, it is, of course, derived from the body which is consumed." Here we have, evidently, the old notion of a diffused principle of life; but it is also evident to those conversant with the recent history of the matter, that it is more immediately derived from a mere slip on the part of Mr. Huxley, in his popular lecture on "Protoplasm." Mr. Huxley, it may be remembered, spoke of recruiting the protoplasm that had been consumed by talking, by taking in the protoplasm of sheep and lobsters. Mr. Huxley would be the last man to sanction the notion put upon his words, used merely colloquially, as he is opposed to the theory of any specially vital principle or force being required for life; he must have merely meant that the organic compounds, representing protoplasm in dead animals, were more assimilable as pabulum, than the charcoal, ammonia and water which furnish the elements. Nevertheless, pursuing the same train of reasoning, the authors trace back the source of life through food to plants, and in them to the sun, "the great and ultimate physical source of that high-class energy and delicacy of construction which characterises vegetable products." And again, "We have now, therefore, arrived at the conclusion that the delicacy of construction which our frames require is ultimately derived from the sun, so far, at least, as the visible universe is concerned." (146.) Life, therefore, becomes a force. Now, a very little observation of plant life would have shewn our authors that the protoplasm is in them fully formed, and possessed of all properties of life, before it can derive any use from the force of the actinic rays, and that it uses that solely to decompose binary compounds, and obtain pabulum for growth thereby—not for any constructive purpose. The source of this notion is also not far to seek, and, no doubt, it originated in a pardonable mistake of Dr. Carpenter's, who was the first to make known to the English medical public the marvellous work of J. R. Mayer, on *Organic Movement*. In those early days only, Carpenter (but not Mayer) spoke of a "constructive force" being derived by organised beings from the energy transferred from the sun's rays, etc. So, for a time, it became fashionable to speak of the sun building up organisms by its constructive force, and the like. Such language is erroneous and misleading, and the conception of a constructive force entirely unphysical. You might as well speak of the force evolved by the combustion of coals, not only doing the work of a steam engine, but constructing the engine itself!

I take it, therefore, as established, that the requirements of a materialistic theory of life will be satisfied if we have a

Accordingly, it could not long mislead men versed in physical science, like our authors, who, by the time they reach page 178, say: "It is some time since we gave up the idea that life could generate energy; it now seems that we must give up the idea that energy can generate life." And they formally give up the idea that life can be a species of energy. Our authors, then harking back from these two false starts, without, however, any apology or even notice of their change of front, now try a new departure, viz., from interpretation of the Bible. This has always been thought, by men of science, to be a departure from sound principles, and the results have almost, if not quite, uniformly been unfortunate. Nevertheless, they found, upon the words "the Lord and Giver of Life," the theory that the Holy Ghost is the originator of life. Not in the spiritual sense hitherto put upon these words, but ordinary life, common to us and the beasts, plants and protists. Not that He created it *de novo*, "for creation of life in time is inadmissible," but He developed it in the indefinite series of invisible universes. "The Third Person of the Trinity is regarded in this system as working in the universe, and, therefore, in some sense as conditioned, and as distributing and developing this principle, which we are forced to regard as one of the things of the universe, in the same manner as the Second Person of the Trinity is regarded as developing that other phenomenon, the energy of the universe." (79.) Life is thus not a force, but again becomes a principle—not matter indeed, but "a thing," and, no doubt, in some way related to the ether of the invisible universes, in which it has been present in the whole endless chain of conditioned existence. Nevertheless, there is just the same apparent break of continuity in the passage of life from the invisible into our visible universe, when it curdled into union with matter to form protoplasm, for that could not possibly take place till the nebular mass had cooled sufficiently. They speak of this and the other two breaks, viz., creation of matter, and the filling up the prodigious gap between man and the nearest beast, as only apparent breaks, and as if they were going to explain it; but I am unable to find in the book any explanation by continuity—perhaps others may be able to understand better. We have thus got back to the old notion of a vital principle; an abstract essence diffused through all the series of invisible universes, and communicated miraculously to our own, as soon as an orb was cool enough. But of the nature or the proofs of the existence of this essence, nor how it can explain a single phenomenon, they tell us nothing more than Dr. Beale, who holds the same notion, as far as its being an entity is concerned. How is it multiplied indefinitely in growth and generation, and what becomes of it at death? Was the original stock inexhaustible, like the widow's cruise, or was the original mode of communication a pipe or conduit, through which no end of quantity can flow backwards and forwards, to and from the invisible world, at the birth and death of living beings, plants and animals? Of these and a hundred other questions they tell us nothing. What a contrast between this fanciful creation of an entity, which raises fifty questions and settles not one, and the simple view above given, whereby the potentiality of life is assumed to lie in the unknown substratum of matter originally; but life itself does not come into actual existence until the special form of combination manifesting it is brought about, and the mere fashioning of which, for the first time, would be the origin of life in our planet! Our authors have, of course, long since abandoned the notion of imponderable fluids or particles as the physical cause of the Forces of Nature; but apparently they have not yet grasped the idea of life being nothing but an action of a peculiar chemical character.

material compound capable of self-renewal and certain concomitant modifications by interaction with ordinary matter and force. The simplest definition of life would therefore be the interaction of this peculiar substance or protoplasm with the environment. To discuss at length this vast subject is, of course, impossible; but a few words must be said of the environment as bearing on a subsequent part of our subject. If we imagine a piece of protoplasm removed from all external influence, it would not be living, but possess the peculiar *properties summed up as "vitality,"* in the static state, as it were; and it is only when some interaction takes place with the surrounding medium that life can be said to exist. The environment is often vaguely spoken of as conditions, and the protoplasm as undergoing its changes spontaneously by its inherent power, although these conditions may be required for it to work with. Such is not the case. The environment and the protoplasm are two factors in the process equally essential. It is not everything in the environment which can interact with the living matter; on the contrary, a vast variety of things are indifferent. But what does act may be divided into three categories—Conditions, Pabulum, and Stimuli. The conditions are those, such as heat and moisture, which are essential for the mobility and play of the affinities, but do not take part in the process; the pabulum is that from which the living matter is renewed, and force evolved; and the stimuli afford the initiatory impulse, without which the foregoing agents and conditions would be ineffectual. In the inorganic world the stimulus is not necessarily represented, although its action is capable of illustration from what takes place on the application of a spark to gunpowder. The stimuli in organised bodies are either force or matter—thus physical or chemical—the latter differing from pabulum only in the degree of molecular disturbance they produce, compared with the quantity of matter

they furnish for assimilation. Thus, in all stimulation, either force must be consumed and transferred, or matter of the environment must enter for the time into the living matter.

For the harmonious working of a complex self-acting mechanism, it is essential that spontaneous activity should not occur; accordingly, all parts are so differentiated as only to enter into activity on the application of their proper stimulus. This is so important a characteristic, that it is taken by Fletcher as the one which may stand for life itself. Accordingly, "irritability" is used as synonymous with "vitality,"\* and the co-operation of stimuli is held as so

\* Fletcher's definitions—"Vitality or irritability—The property which characterises organised beings of being acted on by certain powers, otherwise than either strictly mechanically or strictly chemically.

"Life—The sum of the actions of organised beings resulting directly from their vitality so acted on."—(*Op. Cit.*, p. 2.)

I think Mr. G. H. Lewes does not do justice to Fletcher, when he speaks as follows in his recent work, *Physical Basis of Mind*:—"Not only is it inexact to speak of vitality as a force, it is almost equally inexact to speak of it as a property, since it is a term which includes a variety of properties; and when Fletcher assigns the synonym of irritability, this at once reveals the inexactness; for, beside this property, we must place Assimilation, Evolution, Disintegration, Reproduction, Contractility, and Sensibility—all characteristic properties included in vitality." (30.) All these properties are included by Fletcher in irritability, which is intended to express the sum of all the properties of living matter which are special and different from physical and chemical properties. The word irritability had been, and is still, used in a more restricted sense, but the reasons for the retention of it by Fletcher, given in full by him at p. 51 of his *Rudiments of Physiology*, will, I think, satisfy most persons on the grounds of mere common sense. So I must conclude that Mr. Lewes has not referred to the original, but merely criticised the definition as standing alone, and cited in another book. (In fact, he quotes it from *Life and Equivalence of Force*. London: Baillière.) Nevertheless, Mr. Lewes's opinions are much modified by it, for the cardinal point in his present definition of life is now, "it is the sum of functions which are the resultants of vitality; vitality being the sum of the properties of matter in the state of organisation." (31.) This is very different from his former definition, and is very like Fletcher's. Unfortunately, while he adds, like Fletcher, that the interaction with the environment is essential to life as dynamical, contrasted with vitality as statical, he wishes, like H. Spencer, to comprehend the whole of the actions of an organised individual, under the definition of its life, asserting that "everything done in an organism, or by an organism, is a vital act, although physical and chemical agencies may form essential components of the act." Thus he also is cramped by definitions—a thing he protests against in his *History of Philosophy*—and hindered in the unprejudiced study of nature. To this cause I attribute this unwillingness to receive the grand generalisa-

essential for all vital action, that he frequently speaks of life as irritation. But what I wish to direct attention to at present is the influence of stimuli on nutrition, as that is generally regarded as spontaneous in the presence of pabulum and conditions; while the necessity for stimuli in nerve and muscular action is palpable. Quite recently, the first of living experimental physiologists, Claude Bernard, has adopted the very language of Fletcher in this respect, and speaks of the ultimate elementary property of organised matter as "l'irritabilité nutritive," and points out that, although this property is congenital, it requires the continual impulse of stimuli. He goes back to the development of the ovum, and shows that in its several stages it is dependent on successive stimulations; that nutrition itself throughout life, he lays down, in agreement with some other biologists, is of the same nature as generation; and that, in fact, the whole life of individuals is nothing but a series of fissiparous generations, of the different orders of plastids of which they are built up; and, as this process is incapable of infinite prolongation without reversion to a sexual mode, ultimately the individual dies.\* Also, what concerns us chiefly here, this whole process is under the dominion of stimuli, or, as we may say, stimuli act directly on, and are essential factors of, the germinal faculty, or the self-renewing and developmental faculty, and hence must help to determine the result. Thus stimuli may be not only excitants of vital activity, but *modifiers*, more or less profound, of the *qualities* of the living matter for the future.† Numerous special examples could be given;

tion of Beale, "*nihil vivum nisi protoplasma.*" The distinction between essentially vital actions and all ordinary chemical actions is so enormous, and almost so absolute, that no definition of life which does not mark it as the prominent feature, can stand.

\* *Revue Scientifique*, 1876.

† It was the distinguishing merit of John Brown (1780) that he recognised the co-operation of two essential factors to the production of life, viz., "stimulus" and "excitability." But it was his great error to regard the latter as something uniform

but here we must be content with pointing to the influence of habit in adapting the organism to the action of external agents, and to the fact that this may become hereditary, and ultimately cause varieties of race, and thus, finally, become an important factor in evolution. Thus, proceeding from the simplest case, we have the acquisition of tastes for certain articles which are midway between stimuli and food, such as tea, wine, spices, &c., and which in time become essential to health and comfort. Then proceeding to purely preternatural mineral stimuli, we have examples, such as the now well-authenticated instances, where arsenic has been consumed regularly by persons habituated to it, in doses that would be fatal at first, not only without danger, but with benefit.

and substantial, though imponderable, given to each individual, and when used up, then life also came to an end. Fletcher (1836), while adopting the necessity of stimuli to all vital processes, perceived that irritability was the property of a material renewable by its own very operation—itsself dependent on stimulation—and, therefore, on consumption of its substance. Hence consumption and regeneration are contemporaneous and inter-dependent. Also, the living or irritable matter differs specifically everywhere, and the stimuli being qualitatively different, produce more or less modification of the living matter regenerated under their influence, and this modification lasts for a longer or shorter time, and may even be permanent. Trousseau and Pidoux use the term modifiers to designate the specifically different stimuli, such as medicines and poisons, or causes of disease. Claude Bernard (1875) assimilates nutrition to continued fissiparous generation, and recognises the essentiality of stimuli to the process, terming it *irritation nutritive*. G. H. Lewes (1877) recognises radically the same principles in his statement, "An organism is radically distinguishable from every inorganic mechanism, in that it acquires, through the very exercise of its primary constitution, a new constitution with new powers." (*Physical Basis of Mind*, 325.) From these principles we may deduce the possibility of the positive cure of diseases by specific stimuli, if such can be found, to act on the germinal faculty, as modifiers, and regenerate the protoplasm, or living matter, in a state of germinal degradation or disease. This would be the explanation of specific cures. At present, the aims of scientific medicine, as currently interpreted, in despair of finding such specifics, profess to be confined to supplying suitable pabulum, and removing hindrances to the reversion of the germinal matter to its natural state or health, if it *pleases so to revert*. It professes to do nothing directly to make the germinal matter do so, but practically trusts to not a few specifics which really tend so to act. In addition, the object of scientific medicine should be to discover, by experiment in health, the action on the germinal faculty as modifiers of those stimuli we call medicines and poisons, and then to discover a therapeutic law whereby we can adapt the particular kind of modifier to the germinal degradation, or disease already existing.

And we can readily see how such stimuli may ultimately so modify the living matter in the course of generations, that it may become an indispensable constituent of the living organism, with variation in its properties and powers. It is probably thus we may account for the presence of certain abnormal elements in certain organisms, such as copper in the blood of many invertebrates, such as the *Limulus cyclops* and *Helix pomatia*, whose blood becomes sky-blue when exposed to oxygen, and pale to carbonic acid. Copper occurs also in the chocolate nut, and in the feathers of the touraco. Zinc is found in the ashes of a pansy, and lead in the *Fucus serratus* and *nodosus*. In these and similar cases the accidental presence of the mineral ingredient has, no doubt, at first acted as a stimulus and modifier of the germinal faculty, and thus, in process of time, become pabulum and an essential constituent, with, no doubt, a modification of properties of the organism. Now, as the bulk of our globe is made up of about ten chemical ingredients, although there are above fifty-six, and the organised world contains, in palpable quantity, in general, seven, and, in small quantity, up to seventeen or nineteen, which may vary as to the ingredient, we may presume that there is no special potency of life in the so-called organic elements, and that all matter might take part in the living state if circumstances allowed. These small deviations of composition into the rarer elements may give a hint as to how the variations lying at the root of evolution are produced—for all variation must have its adequate causes. And thus, in circumstances very different from those obtaining in our planet, we can imagine that a protoplasm of a totally different composition, and with correspondingly different developmental power, might exist.

All that seems essential is an indifferent liquid medium, like water, and chemical conditions for evolution of force, not necessarily implying oxidation, and a sufficient constancy

of absolute temperature, while, according to the degree of that last will depend the actual elements which can enter into the protoplasmic state. It might be practicable to construct tables of possible elements of a protoplasm where water was in the state of solid rocks, or of a permanent gas. These considerations must enlarge very much our ideas of the habitability of other worlds. Apart from the last merely curious though interesting speculation, I think we may conclude that the materialistic theory of life is most consonant with the data of sound science. And, in answer to the question at the head of our Paper, it is difficult to see how it can be supposed to have any bearing adverse to dogmatic theology, except on the vague notion that to "rob life of its mystery" in some way tends to shake our belief in the immortality of the soul. No doubt, if life merely depends on a peculiar mode of association of the particles of matter, it is gone at once and for ever when that association is dissolved; but to look upon it as a function of matter does not necessarily imply any doubts as to its origin by the will of a Creator, for the origin of the first protoplasmic mass, or masses, is just as much a problem, whether it is merely *fashioned* from ordinary matter, or originates from a spiritual substance infused into matter and organising it. At the same time it leaves our minds more open to receive it if any natural process of originating natural life should be discovered, than if we held the latter hypothesis. Any way, it is difficult to see how man's immortality can be affected by the nature and history of a property which he shares in common with the lowest fungus.

#### MIND.

We now pass to the central point, the core of the difficulty, the touchstone of all Materialistic theories, and the supposed foothold of Natural-Spiritualism, on which Dogmatic



Religion may stand without resting entirely on Faith,—I mean Consciousness. All the marvellous functions of life hitherto spoken of may, without improbability, be comprehensible by the exalted Intelligence imagined, on the Mechanical theory (including Chemistry) of the æther and the atoms. But here that confessedly fails. “The thread of our intelligence,” says Dubois-Reymond, “of the material universe, which goes back to an infinity of mere calculable movements, now breaks, and we stand on an abyss impassible—in a word, we touch the other limit of our intelligence.” This new incomprehensible phenomenon is thought, and the highest creations of the mind are not more incomprehensible than the simplest act of consciousness. “When in the world the simplest animal first experienced a sensation of pain or pleasure, the world from that moment had become doubly incomprehensible. What is the conceivable connection between certain motions of certain atoms in my brain, on the one hand, and, on the other, the original, undefinable, yet undeniable facts, that ‘I feel pain or pleasure, that I taste something sweet, or smell the fragrance of a rose, or hear the sound of an organ, or see a red object,’ and the consequent conclusion and immediate certainty that ‘I exist’? It is absolutely and for ever incomprehensible why it should not be a matter of entire indifference to themselves how a given number of atoms of carbon, hydrogen, nitrogen, oxygen, etc., are situated and move, or how they have been situated and been moving, or how they shall be situated and move in the future. In no way is it conceivable how consciousness could originate by their combined action.”\*

What need of further words? Let us grant at once, to the full, that nothing in our *previous* experience of matter, either in its physical movements, or in its elementary, chemical, or even protoplasmic properties, gives us the

\* Emil Dubois-Reymond, *Ueber die Grenzen des Naturerkennens*, Leipzig, 1872.

smallest clue to, or expectation of, such a phenomenon from any collocation of matter. But observe the word previous. Have we not thus the same right to study mind physiologically now, and reason back inductively to the nature of the substratum of matter and force, as we had in respect to the simpler physical and chemical states of matter, even though it may be necessary to postulate something more than the movements of æther and atoms (including their chemical difference)? Let us, therefore, examine whether the phenomena of mind can be explained if we postulate the potentiality of consciousness to lie in the original constitution of matter. For it is a mere rhetorical artifice on the part of Dubois-Reymond to place in contrast two limits of comprehensibility. Matter, in its essence, is not more comprehensible than mind, nor is mind less comprehensible than matter. What is meant is simply that from our other knowledge of matter we had no reason to expect that a conscious material being could be made out of matter; but that does not justify the conclusion that it cannot be. Have not hundreds of chemical compounds been made by the hand of man which we have every reason to believe have never before existed since the Creation, and yet were not the properties of these predetermined to the minutest reaction from the very nature of the elements? or, in other words, that the potentiality of these resided in the ultimate substratum of matter? In like manner, if mind could not exist till the requisite organisation came into being, from whatever causes, this argument, from its non-existence in any other material collocation than the highest form of nerve-protoplasm, is worthless.

The mind, looked at in its complete state; in its unity, personality, obedience to laws of its own, apparent spontaneity of action and controlling power over the body; and in the total dissimilarity of all its phenomena from all known bodily and material effects, has been almost universally

ascribed to the working of an immaterial substance added to organised matter. But such a substance is quite as hypothetical as the potentiality of mind lying in matter, and hence it explains nothing; whereas, if we grant the possibility of consciousness as a concomitant of certain material changes, the peculiarities of mind as an action or function, and, therefore, as such, immaterial, require no further explanation than the conditions of those changes. And, if it can be shown that the unity, personality, will-power, and other characteristics of individual minds can be explained by the harmonious working of a complex of different organic parts of the nervous system, in inter-action with the external world, just as the unity of the bodily organs is produced without a single substantial *anima*, so there will be no more need for a similar principle for the mind. What is the mind? "That which thinks, reasons, and wills," says Reid—a definition which serves well as the basis of a treatise on Psychology, but explains nothing of its nature. "The sum total of subject-experiences, that which has not extension," says Bain; and this we might accept but for the latter part of the sentence, which throws ambiguity over the whole, as it might admit the Substantialist doctrine. We must, therefore, fall back on the purely physiological definition of Hermann:—"The term mind may be applied to the combination of all the actual and possible states of consciousness of the organism." Consciousness is thus, as will be readily admitted, the characteristic of mind, and—granting this as a possible material function—we may presume that all the other phenomena connected with the operation of the mind can be referred to vital actions which are here ranked as material. The mind is thus not an object capable of existence *per se*, apart from the mechanism of the function, but is an abstract idea of a great number of complex functional processes, and it has only been erected into an entity by the unconquerable ten-

deney of human beings to personify their abstractions. That was the first and easiest apparent solution of the problem, and was laid hold of by our forefathers, and retains its hold on us just as the notion that the movements of the sun are the cause of its rising and setting. The proofs of all this cannot, of course, be here given in full, but a bare enumeration of the chief of them may be interesting. The first is, the complete correspondence of the development of mental power and the different parts of the nervous system throughout the whole of nature, from the zoophyte up to man ; this is complete and unquestioned ; the second is, the extreme complexity of the anatomical structure of the organs of mind, corresponding to the complexity of the mind ; a cubic inch, for example, of the convolutions of the human brain contains several hundred thousand nerve-cells and fibres, and the whole surface of the hemisphere is calculated by Meynert to contain six hundred million such. Likewise, of these cells, none are apolar, but all contain several branches, some as many as twelve, so that the complexity of the apparatus, as a whole, overwhelms the imagination, like the number of the stars of heaven. Doubts have been cast on this proof, owing to the apparently small difference between the visible aspect of the brain in creatures of inferior intelligence and that of man. But, unjustly ; for any difference of quality must, of course, be cognisable to the microscope, or in any other way except by its functional activity, only to a very limited extent. As far as that goes, however, it is in favour of a difference between the cells of man and those of the animals nearest to him in intelligence.\*

\* A striking instance of this is shown in the minute anatomy of the island of Reil, which is peculiar to man and the higher apes, and which, though in general structure exactly similar, in man is larger, not only absolutely, but in proportion to the cerebrum, and contains larger and more numerous cortical cells, with more numerous inter-communicating branches. (See Herbert Major, *Lancet*, July, 1877). Another good example is given by Lange (*Geschichte des Materialismus*, II., 559), which may be abridged as follows :—It is to be remarked that it is the paths of the motor-fibres which run parallel in development with that of the hemispheres, and

Thirdly, the evidence in favour of the localisation of the different mental organs given by cranioscopy, physiological experiment, and pathology. The proofs in this category are as yet defective; for cranioscopy, though following strictly the boasted inductive method, is to a large extent inapplicable, from anatomical hindrances, and it shares, with the other two departments, in the difficulty that the brain-functions are so excessively complicated, that we cannot yet get to what are the ultimate elements of thought, the very simplest we know being themselves complex, and involving numberless cells in different parts of the whole organ. Experiment and pathological observation are thus vitiated to such a surprising degree, that it would seem, from the recent observations of Brown-Sequard, that almost any lesion of any part of the brain and its appendages will produce excitement or paralysis of almost any mental or motor function. And it would seem that elementary psychical, sensory, and motor centres are diffused through the whole brain. Nevertheless, as we see that vaso-motor centres are widely distributed through the spinal marrow and sympathetic ganglia, yet that that does not preclude the existence of a single controlling centre in the medulla oblongata, so we may imagine that similar compound controlling centres may be discovered in the brain forming the separate organs of the mind, which are unquestionably inherited and developed in different proportions in different individuals.

In fine, it may be held as proved in physiology, that for

reach their highest development in man. It might appear that, considering the extreme agility of some animals, such as the apes, and the necessity for delicate sensations for man, it should have been the sensorial paths of cerebral nerve-fibres which should have been most developed. But consider the extraordinary complexity of the nerve-stimulation, both excitory and inhibitory, which go to produce the co-ordinated movements of speech; also, the equally delicate and manifold natures of the stimuli which shall direct the hand, so that it shall execute the purpose and thoughts of the musician, the artist, the artisan, and the surgeon!

every feeling, every thought, and every volition, a correlative change takes place in the nerve-matter; and, given this special change in every respect identical, a similar state of consciousness will always arise; that this process occupies time; that it requires a due supply of oxygenated blood; that it is interrupted or destroyed by whatever impairs the integrity of the nerve-matter; and, lastly, that it is exhausted by its own activity and requires rest. The supposed proof of the existence of a spiritual essence given by the power of mind over body, exhibited by the suppression of signs of emotion, or resistance to instinctive movements under the power of will or strong emotion, is now explained by the existence of inhibitory nerves and centres; and these are not confined to the higher mental operations, but form a necessary part in the reflex rhythmical actions of the lower functions. The clearness of mind before death, also one of the popular proofs, is nothing more than a sign that the brain escapes disorder in many fatal diseases, as do all the other organs in their turn. It also arises from the removal of inhibitory and disturbing influences upon the brain, which sometimes (though rarely) happens at the approach of death. All these facts are directly in favour of the Materialist view. But we cannot reduce the difficulties of the question to those of mere plant life. We may, and must, it is true, reduce mental acts to the interaction of two factors; the stimulus on one hand, and the susceptible living nerve-matter on the other; the former acting through excitement of the centripetal nerve-fibres, while the result of mental activity is expressed by excitation of the ideo-motor efferent-fibres. Mind, therefore, consists in the complicated reflex activities which are the link between centripetal and centrifugal excitations, and which are attended with the incomprehensible phenomenon of consciousness, which is the cardinal distinction of animal from plant life. Not, however, the necessary dependence of

mental as well as organic life on the interactions of the living matter with the environment, including the stimuli. This is as essential to the existence of mind as of life in its lower forms. Without the stimulus of sensation there would be no mind. There are no innate ideas. This may be stated absolutely. There are innate capacities which, with the concurrence of the external stimuli, give rise to ideas, but without them would have remained dormant; and, although *mentality* may be said to be innate, yet *mentation*, which is the equivalent for mind, cannot exist without the other factor. If Beethoven had never heard musical sounds, he would never have had a musical idea; but hardly one in many hundred millions of human beings who hear musical sounds all their lives have the connate capacity of a Beethoven. In fact, the operation of the stimulus of the senses for the first time may be compared to conception in rousing and setting a-going a train of actions, which continue without necessary recurrence to the original stimulus for an indefinite time. Thus the word conception, as applied to ideation, may have a closer analogy with its other sense than one thinks at first.

The external world, through the special senses, is not the only source of the stimulus factor, which is furnished also by the whole bodily organs, connected as they are through the nerves of organic sympathy with the cerebrum. Thus the whole body may, in one sense, be considered the seat of the mind, and the reciprocal action which takes place between the great viscera, the heart, the stomach, the liver, and the reproductive organs, form a most important feature in the moods and emotions of the mind, and, ultimately, of its pathological states. And there is another source of internal stimulation in the cerebral cells themselves, viz., *memory*, whereby they interact upon each other, and produce that continuity of conscious thought which distinguishes the cerebral

from the sensori-motor reflex actions.\* It is, however, not solely to the protoplasmic molecular positions on which memory depends that this is owing, but to their union with consciousness and to the implied knowledge which that confers. For the physical basis of memory, if we may so express ourselves, is not exclusively a mental phenomenon, but is found also in simple reflex organs, and even in organic life. And thus, in fact, we may explain the instinctive movements, desires, and intuitive thoughts which were supposed to be the stronghold of the Natural-Spiritualist theory of the mind. I have already said that the germinal faculty of the living matter is not spontaneously active, but is also under the dominion of its proper stimuli. Just as a special stimulus to any of the bodily organs may modify its nutrition, so that it shall re-act differently in its function for an indefinite time, so the proper stimuli to the sensori-motor reflex centres promotes their germinal development in such manner that, with repetition, the co-ordinated movements, at first imperfect, become at last complete; and, the thus acquired *automatic activity* may be defined as *organised past experience*. This may be termed memory without consciousness, and the same process, no doubt, explains mental memory, with the addition of the unfathomable mystery of consciousness. Now, although the organisation of past experience will account for a large part of our mental acquire-

\* If we consider that conscious perception and ideas are always the resultant of two factors, and that this very resultant constitutes mind, it is difficult to understand how the celebrated contest about the existence of the external world can be still waged. The fallacy of the belief in a spontaneously active mind, in which the whole idea of the external world may be formed, lies in this:—1st. That the excitation from the senses persists for a time after the stimulus is withdrawn. 2nd. The internal stimuli continue always in action. 3rd. Memory. "We believe in the existence of matter only by a process of memory, whereas this very process furnishes intuitive evidence of the existence of mind." (Fletcher.) The argument from spectral illusions is also a fallacy, for here there are always internal stimuli adequate to account for the excitation of the ideational cells, preternatural though they may be.



ments, still it will not account for them all, and there still remain a number of instincts and intuitions which cannot possibly have been acquired in the life-time of the individual, and in the short time before they are displayed in perfection, although, as is shewn by the admirably ingenious experiments of Mr. Spalding, they still require some stimulus of sensation.

In the chick, for example, the instinctive movements become perfect under the stimulus of sensation in less than twenty-four hours ; whereas, a human child is not similarly master of its movements in as many months. In the former, it is as if a skilled musician out of practice re-acquired in a few days the skill painfully gained in as many years. Here the organisation of past experience is fixed by hereditary influence in the embryonic stage. A similar process, no doubt, takes place even in the higher faculties of man, and men of exceptional genius appear to learn as if a reminiscence was roused in them, so great is their connate aptitude for particular ideas.

We are, therefore, thrown back on the *hereditary* organisation of past experience for this phenomenon ; and as the transmission of acquired habits is a fact known to occur, we have thus an explanation of the alleged innate ideas on which the Natural-Spiritualists rest so much of their theory. And, as before said, nutrition being a kind of fissiparous generation, may we not in this see an analogy with parthenogenesis ? In the hereditary organisation of past experience do we not see, in the influence of stimuli upon the plastids of certain organs and tissues, that the modification of germinal development extends into the next generation, and that thus an individual is born with the results of germinal stimulation without that stimulation, just as in parthenogenesis ? It is also to be remembered that propagation by parthenogenesis and fission cannot go on to infinity, and that the cycle becomes exhausted,

and that recurrence must be made to sexual generation in some form in all creation. So, also, the acquired habits of animals in their wild state are apt to die out in a few generations of domestication.

With respect to the merely organic part of memory, it is not more wonderful in mental operations than in bodily states; for if it is marvellous to see the memory of a long-forgotten language revived during a fever, is it not equally, or more so, to see a bodily disease or malformation not only transmitted to offspring, but skipping one generation and re-appearing in the next? And yet we do not invoke any spiritual essence to explain the latter. When we thus admit the influence of germinal stimuli upon the cerebral basis of mentality, without full activity of mentation, that may help partly to explain the unconscious, or rather sub-conscious, processes of thought which are admitted to exist by both psychologists and physiologists. The phenomenon is no doubt a fact; but, I think, we can hardly admit the total absence of consciousness and the knowledge that implies, and which are essential to a train of thought. It is probably rather to be explained by the mode in which the reflected feeling of attention is engaged predominately by one train of thought, while several can actually be carried on at once almost unregarded.

It is now necessary to touch on the relation of consciousness to force. If consciousness is a concomitant of the complicated reflex actions which are the link between certain centripetal and centrifugal excitations, how do these differ from reflex action not attended with consciousness? In the latter case, does a portion of the energy evolved in vital change disappear for the moment from the physical world, and act as mind, to return again to an equivalent amount of heat when conscious activity ceases? Is there a mechanical equivalent of consciousness? I apprehend not. It is impossible to conceive

mere force, energy, or, in fact, motion, to be or become mind any more than life, and there is no peculiar or special mode of force called vital, nor the possibility of such a force. Proof, also, is entirely wanting that any additional energy is ultimately evolved in reflex action, attended or not with consciousness; nor is there proof that the same amount of energy would not be transformed in the material changes, whether the feelings were felt and the thoughts thought or not. This we are compelled to acknowledge, and consciousness must be held to be a passive concomitant inseparable from the extremely peculiar vital or protoplasmic changes of matter which are taking place in this variety of organised matter. It is, therefore, a property of this very peculiar substance, and not a force evolved during its vital changes. It is true that a certain degree of vital activity of change and complexity of co-operation is essential to its manifestation, and a corresponding amount of transformation of force takes place; but the latter is all accounted for in the molecular movements and satisfaction of affinities essential to any vital as well as chemical changes. We must imagine that in the very act of the changes and involutions of this peculiar species of self-renewing protoplasm, the incomprehensible phenomenon of consciousness takes place, just as changes of colour or other properties are the indispensable concomitant of chemical reactions, which cannot occur without them, although they contribute nothing to the result, being, in fact, nothing but different manifestations of the inherent properties of the substance reacting. Consciousness thus corresponds to no evolved energy, but to the fabled element of fire, once attributed to combustion. The whole sum of the matter and force of the combustible elements comes out weight for weight and measure for measure in the products, and in the light and heat and noise, while nothing remains to be counted for fire. But not so here; a subjective phenomenon accompanies the satisfaction of affini-

ties involved in the protoplasmic changes of this one peculiar form of living matter. Consciousness is, therefore, a property of this one kind of matter in the world while in rapid action, and not a phenomenon which may be displayed by other combinations, as evolutions of energy may be; and, moreover, it must attend the required activity of this particular matter.\* If all this be true, then we strike at once on a tremendous difficulty, which is, How can a mere passive concomitant influence the process itself? in other words, How can the knowledge implied by consciousness, or the feeling of pain or pleasure, affect the efferent nerve-fibres, and thus the manifestation of the *will*? Here we are at once in the middle of that most intricate and perennially debatable question—the Freedom of the Will. Not to alarm my hearers, I may say at once that, although I believe in it practically to the extent of a qualified amount of moral responsibility in us all, I renounce any attempt to explain it physiologically, except in as far as I may say that it is more likely to be explained, if ever, on the Materialist view than on the Spiritualist, when we reflect that the pain and pleasure of simple sensations undoubtedly depend on material conditions of the nervous matter; so we may con-

\* The argument in the *Unseen Universe*, at p. 49, 2nd edit., against consciousness being the concomitant of a peculiar material interaction, rests on points which are assumptions. 1st. That there are two distinct kinds of sensations, the one purely subjective, such as a pain in the head, and the other produced by an objective external reality. There is no such difference; both are subjective, and both require stimuli, but the one depends on internal and the other on external stimuli. 2nd. That there is a radical difference between the material elements which may enter into the living state; this is not warranted, as I have said at page 28. No doubt it is true, as a matter of fact, that in the protoplasm of our planet no element of higher atomic weight than iron habitually takes part, but, as far as we know, in permanently different conditions, each of the elements might take part in living action. That the particles of the components of the brain are in an extremely different state of combination when these reactions are attended with consciousness is here asserted; and it seems that the authors of the above work do not really controvert that in the passage referred to, although their meaning is not quite clear. The admission of the protoplasmic state of matter as one *sui generis*, would probably remove the obscurity from their minds.

clude that knowledge through consciousness, and from which consciousness is not separable, must react in some way on the protoplasm whose function constitutes thought.\* If, however, we cannot satisfactorily explain the difficulty on the Material theory, we have a right to show that the Natural-Spiritualist theory fares no better.

Descartes, who held the mind to be an immaterial substance, without extension, and who also believed in the constant quantity of motion in the universe, felt the difficulty to the full. He says: "The soul can determine only the direction of motions, but can neither increase nor diminish the quantity." Hence his celebrated pineal-gland theory, whereby, by that single point of contact, the soul directed the "animal spirits" towards the muscles to be moved. But to direct motions requires extension which the soul does not possess; so, no doubt dissatisfied with the pineal-gland theory, he adds: "The action of the soul on the body, and of the body on the soul, demands the concurrence of God." But as this was awkward in respect to the lower animals, a soul was denied to them, and they were described as sensitive automatons. However, his disciple, Geulinx, pushes Descartes's theory to its legitimate conclusion in the doctrine of Occasionalism, which is, that, "on the occasion of bodily change, God calls forth the corresponding idea in the soul, and that, on the occasion of our willing, God moves the body in accordance with our will."† The concurrence of God here is not to be confounded with the attempt of

\* In fact, when we reflect that ideas are not mere spontaneous activities, but always the product of two factors, *i.e.*, the stimulus and the living matter acted on, and even the simplest idea is the result of very many cells simultaneously interacting on each other, it is not inconceivable that the mode and direction of molecular activities in the parts may be influenced without expenditure of force, seeing that the quality of the idea is itself dependent on a mode of molecular activity, and the extended molecules in certain positions, may deflect the movements of others without expenditure of force.

† *Ueberweg*, II., 54.

Descartes, Malebranche, and others, to assimilate philosophy with the higher Pantheism shadowed forth in Christian Dogmatics, whereby all things are declared to be comprehended in God, "in whom we live and move and have our being," and by whom all things are sustained and governed, without infringing on His Personality, on the one hand, or on the sufficiency of Second Causes and the freedom of the Will on the other. This is a conception which no human, and probably no created, mind can adequately grasp; it can only be received as a dogma on sufficient authority. It has, however, no connection with a particular hypothesis which brings in the concurrence of God as an exceptional link in the chain of certain natural phenomena, and the explanation of which is for the time wanting. As such we may term it here simply a wild and improbable hypothesis. No improvement upon this wild and improbable hypothesis has been made down to our own day, when, since the discovery of the law of conservation of force, Sir J. Herschel roundly declares that the initiatory power of the will depends on a creation of force.\* In this he is followed by no other physicist; and another explanation has been put forward by the authors of the *Unseen Universe*, as follows:—"It is a principle in mechanics that a force acting at right angles to the direction in which a body is moving, does no work, although it may continually and continuously alter the direction in which the body moves. No power, no energy is required to deflect a bullet from its path, provided the directing force acts always at right angles to that path." On this principle, the same author suggests

\* This is contrary to the testimony of experiment, for an animal or a man, shut up in a calorimeter, and performing *voluntary* movements, produces exactly the amount of heat corresponding to the carbon and hydrogen oxygenated. There is no surplus for the will. But if any one shall assert that there is still a creation of force for the will, but that it is so small that it is impossible to measure it, we cannot disprove the assertion; still, it remains a mere assertion, destitute of proof, and which you might as well make of any other instance of the law of conservation of force, and thus abolish the law by making exceptions everywhere.

that the will may act in deflecting the atoms of the brain without expenditure of force, and thus would add nothing sensible to, nor take anything sensible from, the energy of the universe. Apparently, the author has no great faith in this theory himself, for he continues: "We must add that possibly the deflecting action does but result from some smaller subtler stream of circumstance"; and concludes: "We cannot hope that natural science will ever lend the least assistance towards answering the Free Will and Necessity question."

This theory has met with favour in some quarters, but I fear it helps very little, for you must assume a power not subject to the mechanical movements, and, to this extent, master of them. If this power is spirit, that will not do, for it requires extension and resistance to deflect a moving body or atom. If it is the matter of the brain, that is just what we want explained, viz., how the atoms get into the position to deflect others.\*

Science, therefore, can give no countenance to the theory of interference of spirits with natural phenomena, and mind is surely a natural phenomenon. Many persons forget that immaterial and spiritual are not necessarily identical terms; and it is often on the simple assumption that they are so,

\* Perhaps we may look upon Empedocles, with his loves and hates of the elements, as the precursor of the metaphysical Theists of our day, who, deducing the principle of Causality from the dependence of the conscious effort of our will on a supposed spontaneous energy, trace the cause of phenomena to the exercise of a universal will, identical with the One Power which is the cause of all things. This confounds efficient with phenomenal causes, and assumes the power of animals to create force out of nothing by their wills; if so, it is as easy to move a ton as an atom, and it is difficult to see the use of all the cumbrous apparatus of muscles to transform, and digestive organs to store up potential energy. Surely, also, if the force of the will were only bounded, as Isaac Taylor supposed, by the strength of the materials of the body, the bones and ligaments should have been made of brass and iron. But if the will is merely phenomenal, and can only be manifested by the transformation of pre-existing force, the argument fails. James Martineau tried to answer this (*Contemporary Review*, 1876, p. 587) by repeating the Materialistic difficulty as acknowledged above, but not giving any better Spiritualistic explanation than Descartes.

that is founded the substantiality of the mind, and the possibility of its personal continuance after bodily death. For example, in the excellent address of my predecessor, Mr. Mott, in 1874, we read :—" The philosophy on which all our habits of thought are founded assumes as its first postulate that two different kinds of being actually exist, and are apprehended by us as existing. We call them matter and mind ; body and spirit ; the material and the immaterial. We never question the fact that, in using these words, we are naming two orders of things essentially unlike each other, or that their existence and their difference are intelligible to us."

Now, the Materialist certainly recognises the distinction, and mind is to him really immaterial in the strictest sense, just as an event is immaterial, and the function of an organ is distinct from the mechanism, and a force is the movement of or some affection distinct from matter, though not, therefore, capable of existing without it. Nevertheless, in the case of mind, it is tacitly assumed that immateriality implies substantiality, and upon this Mr. Mott founds the permanent identity of the mind as contrasted with the shifting nature of the components of the body, and its final destruction. If I understand him rightly, he admits it is contested that the identity of the mind is anything different from or greater than that of the body. But he simply puts that objection aside, and repeats that the notion is ineradicable, and continues to base his whole paper upon it. At present, I merely wish to point out that, true or not, it is an assumption. The notion that mind and matter are necessarily two independent entities, capable of separate existence, is similar to the rhetorical artifice by which Dubois-Reymond makes two boundaries of the knowable, or to the other argument already noticed, that because matter in *no other* case can display mind as a function, therefore it cannot in the



peculiar organism always in question. For my part, I am no disbeliever in the existence of spiritual beings; on the contrary, I accept to the full all that is made known of them by the supernatural revelation contained in our Scriptures. I am willing even to regard as plausible the theory of Isaac Taylor,\* that the place of spirits, or the unseen world, is in our midst, and that we are surrounded by spiritual beings and intelligences. But I believe also that between them and us a great gulf is fixed, so that, from their nature and the law of conservation of force, they cannot operate on us or take any part in natural processes—contrary to the opinion of the *Unseen Universe*, where a natural bond between the spirit world and the material is imagined (p. 43), but not a shadow of intelligible proof is adduced. Besides, they push the invisible world from one æther to another, each more perfect as a fluid, and with less the property of mass; but we never get the least nearer to a substance with the properties of a spirit—intelligence and power without extension. Spirits are to us altogether supernatural beings, and of which any knowledge we can possess is also altogether supernatural. The nature of any spiritual or immaterial substance is wholly inconceivable to our minds; but if that does not disprove its existence, we know, at least, that it can have no influence on us without a creation of force or assumption *de novo* of the impenetrability of matter, which we have no warrant to believe exists as a power belonging to any natural cause. The smallest rap of the Spiritualists, so-called, would be as great a miracle as any recorded in Scripture. Let us,

\* And, before him, the celebrated Thomas Young wrote:—"We know not but that thousands of spiritual worlds may exist unseen for ever by human eyes; nor have we any reason to suppose that even the presence of matter in a given spot necessarily excludes these existences from it." And before him again Milton perhaps meant to express more than a poetical image in the words—

"Millions of spiritual creatures walk the earth  
Unseen, both when we wake, and when we sleep."

*Par. Lost*, Book iv.

therefore, dismiss spirit from natural processes ; Science can give no evidence of the existence of such, and for her it exists not. Besides, it explains nothing, and only brings greater difficulties than at first sight it appears to remove, as witness the theory of Descartes. The truth is, the theory of a spiritual substance taking part in a natural process like mind, merely retains its hold from the commonplace notion that it seems to give a plausible explanation of the phenomena, because, as we know a good deal about matter, chemically and physically, and that gives no clue to the explanation of mind, and as we know absolutely nothing about spirit, we are able to clothe it with any properties we please, and thus explain everything to our satisfaction.\* Here, if anywhere, J. Martineau's objection applies, rather than to the Materialist theory, which, he says, only gets out of the atoms just as much and no more than we put into them by hypothesis.

To conclude this subject with the application to our title. If the mind is merely a function of the material organism, it must necessarily perish with it. If mind and life are a compound of matter, and some diffused ætherial spiritual substance, then, at death, a personal continuance is equally impossible. If mind is a spirit at all, it must be a definite indivisible piece, as it were, of spiritual substance ; and, if naturally indestructible and immortal as the personal human individual, it must be equally so in all material beings which display mind. Now, it is too late in the day to require a single sentence in proof of the essential identity of the mind,

\* It is sarcastically said by Bonnet, in 1796 :—"Souls are very convenient. They are always ready to perform everything. As we cannot see them, cannot touch them, and know nothing about them, we may confidently attribute to them whatever we please, since it is impossible to demonstrate that they cannot effect what we say. With the idea of a soul is usually attached the idea of a very active substance—one continually active. That is enough to give it ample credit. The difficulties of investigation do all the rest."—(Quoted by Lewes on *Spiritualism and Materialism*.)

as mind, of the animals with that of man ; therefore, if the possession of mind naturally involves the immortality of the soul, the latter must be shared equally with the animals, who certainly also possess the conscious Ego. This conclusion, although its logical force was admitted by Butler,\* carries such stupendous consequences, and is so utterly unwarranted by Scripture, that I do not think any human being can be found to believe it. Remember, that it is the Natural-Spiritualist theory which brings us into this tremendous dilemma. The only escape from it, it seems to me, is by the Materialist theory, which absolutely denies the identity of the mind and the immortal soul, as thus expressed by the physiologist, Fletcher, who may be called a Christian Materialist. "As often as it shall be said that mind, or the faculty of thinking, is a property of living matter ; that it is born with the body, is developed with the body, decays with the body, and dies with the body, it is to be understood the mind only, and not the soul. The soul is something not material indeed, but substantial—a divine gift to the highest alone of God's creatures—responsible for all the actions of the mind, but as totally distinct from it as one thing can be from another, or rather, as something is from nothing. . . . We cannot conceive, it is said, the nature of the soul distinct from mind. What right have we to presume that nothing *can* exist which is beyond the sphere of our comprehension ? The nature of the soul is probably such as man, in his

\* The bishop's reasons (as given at p. 29 of the Edition of 1824) are short and simple, but must be extremely difficult to rebut by those who insist on the Natural-Spiritualism of the mind as a collateral proof of the immortality of the human soul. They must, however, have embarrassed him if he tried to convert the South African savages, so terrible to bishops in our day. Moffat, the missionary, relates the following anecdote:—"One of the tribe of the Bechuanas asked him one day, pointing to his dog, 'What difference is there between me and this creature? You maintain that I am immortal; why is not my dog or my ox equally so? They die and do you see anything of their souls? What, then, is the difference between man, and animal? None! only that man is a greater rogue.'"

present state, has neither words to describe nor faculties to understand."\*

The author says nothing on the mode of connection of the soul, with the body and the mind, as all such speculations are vain and fruitless, and in the end, all difficulties must be overridden by faith in the Divine promises and in Omnipotence to fulfil them. But I may say that the difficulties of this view are neither greater nor less than those of any of the common notions on the subject, and I shall presently shew that it is probably most in harmony with the words of Scripture.†

\* *Rudiments of Physiology*, III., p. 94-5.

† In harmony with the idea of the distinction between the soul and the mind is the attempt of the authors of the *Unseen Universe* to conceive the nature of a future state. "Thought conceived to affect the matter of another universe, simultaneously with this, may explain a future state. Let us, therefore, begin by supposing that we possess a frame, or the rudiments of a frame, connecting us with the invisible universe, which we may call the invisible body. Now, each thought that we think is accompanied by certain molecular motions and displacements in the brain, and part of these, let us allow, are in some way stored up in that organ, so as to produce what may be termed our material or physical memory. Other parts of these motions are, however, communicated to the spiritual or invisible body, and are there stored up, forming a memory which may be made use of when that body is free to exercise its functions." (159.) This is a very captivating theory, and it would explain how the soul could carry off a memory of the thoughts of the mind while only a passive spectator. But, alas! for the physical basis of this spiritual body! In the first place, How does the process comport with the law of conservation of force? It is plain that a man shut up in a calorimeter, and thinking, would give out so much *less* of the energy evolved by oxidation as is transformed to the storage of the soul or spiritual body; just as an animal, performing voluntary movements, should give out so much *more*, if volition is an efficient or Creative Cause, as some assert.

Again, how are we to imagine motions, stored up in a formless æther, however fine, so as to constitute memory? Such a process must surely require an apparatus exactly as complex as the present brain, if made of æther at all. It must thus be an extended body, possessing molecular structure, though without weight or any quality perceptible to our senses. Such a body is not known to us through experience, and is inconceivable to our minds. Indeed, their whole notion of a physical memory, as it were, preserved in the invisible universe by the passage into it of the wasted energy of the visible, founded on the conception of Laplace, and repeated by Babbage, seems nothing more than a repetition of the poetical *jeu d'esprit* of the astronomer Camille Flammarion, who imagines a photograph of all events indelibly stored up, by light dissipated into space. But it is wholly unintelligible as anything more than a poetical fancy, for granting that every molecular movement sends a thrill through the universal æther, yet, for the purpose of thus distinguishing one event from another, you might as well wash off the ink of all the

But first let us briefly notice the attitude in which Materialism places Science towards revelation. The attitude of mind, engendered by the study of science towards dogmatic theology, founded on what purports to be a supernatural Revelation, may be judged of by the deductions respecting God, drawn from the present knowledge of science, without histories in the world, and mix them in a bottle, and then expect therefrom to read the record!

Again, they appeal to the authority of St. Paul, whose "spiritual body" of the resurrection corresponds to this refined material one of theirs, which "may remain veiled, or in abeyance, until the resurrection." But this will hardly agree with the plain meaning of St. Paul, that the spiritual corporeity is only given at the resurrection. We must, therefore, I fear, conclude that all speculations, however well intended, which attempt to explain life after death, without some non-material substance to which no kind of æther or atoms are comparable, and whose nature we cannot conceive, but which we call spirit. "For all I can see," says Mr. Jevons, "there may be intellectual existences, to which both time and space are nullities." Granting, therefore, such, to us, inconceivable spiritual beings, instead of the refined ætherial corporeities of our authors, are we still to suppose the soul to be such, and a passive spectator of the perishing mind, and responsible for its deeds? The strongest reason in most minds who have perfect faith in personal immortality, is the conviction that without an indwelling spirit (almost universally identified with the mind, although they admit many of our strongest feelings are not to be represented in the future life) it is impossible to secure identity and responsibility. So that if mind is not identical with soul, and the former perishes, we are thrown on the dilemma that the latter must remain a passive spectator till death. There is, however, another alternative, viz., that imagined by Priestley, and also held, it is said, by the celebrated preacher, Robert Hall, that the soul is a miraculous reconstitution, in spiritual immortal form, of the mental and responsible individual after death. With the events and thoughts of the lives of all embalmed in the plenary memory of the Almighty, who has no need, as it were, to keep a negative, and with all power, there is no difficulty—as the common idea implies—with Him to reconstitute each individual. To the objection that a reconstituted individual, like in every respect, would still not be the same, it may be said we have already no stronger bond of identity between ourselves to-day and ourselves awhile ago. And if it be in the power of an Almighty Being to reconstruct more than one copy of the individual—that He might, as suggested in a religious periodical, reconstitute ten Judas Iscariots, each to suffer for the crimes of that wretched man—it is needless to say that believers would rest in perfect confidence, that a Holy and Just God would not do so. As, in my opinion, all belief, worthy of the name, in a future life, rests solely on the revelation contained in our Scriptures, the judgment on these theories must lie in the interpretation of passages referring to the intermediate state. But if the Materialist theory of mind be true, then it seems to me we are shut up to the alternative of the soul being a passive spiritual spectator in this life, or to its first constitution after death, and identity with the spiritual corporeity of the resurrection. I make no pretensions to give an opinion on either point.

the help of revelation. These may be arranged under three heads—First, Materialistic Pantheism or Monism ; second, Deism ; and third, Negative or Logical Atheism. Our space will hardly allow more than a bare statement of the line of argument on these extensive subjects.

Monism, as expounded by Häckel,\* sets out with the position that matter and force are eternal and self-existent, and that creation out of nothing is impossible, and the idea of such absurd ; and that we must reject the pitiful idea of a personal Creator. God is the universal Causal law ; He can never act arbitrarily or freely ; that is to say, God is necessity. He is the sum of all force and all matter. "Every conception of God which separates Him from matter, opposes to Him a sum of forces which are not of divine nature ; every such conception leads to Amphitheism ; consequently, to Polytheism." He adds several sentences on the unity of the all-pervading Divine Spirit and Power, which would comport well enough with the omnipresence and omnipotence of the personal and spiritual Being of Christian dogmatics, but which, taken in connection with the foregoing, are mere rhapsody. To make his meaning more plain, he says that the Personal Creator and God of modern dogmatics is an anthropomorphism which degrades God into a gasiform vertebrate ; and with this God he naturally rejects all possibility of miraculous intervention, the personal immortality of man, all supernatural revelation, and all religion founded thereon. Such is the Material Pantheism which possesses the minds of a large number of men of science in our time.

To it I have only to say that, in the absence of plan and purpose in the universe, demonstrable by science, and admitting the material nature of life and mind, it might be put forward as one of the possible solutions of the problem of

\* *Generelle Morphologie.*

the universe, yet it is quite unwarrantable to put it forward as a legitimate deduction from science. It is the height of presumption to do so ; and, in fact, the whole fabric rests on the extravagant assumption that, because human beings whose whole mind is limited within such narrow capacities, and whose conceptions are restricted to ideas the elements of which have been perceived by their five senses, cannot conceive the nature of an omnipresent and omnipotent personal God, therefore such a Being cannot exist ! And the rejection of Revelation here summarily decreed is not a legitimate scepticism, but a dogmatism, and therefore deserves less attention, coming from a professed man of science, than the dogma opposed does from him who rests it on historic evidence.\* This spirit of presumption is rebuked by Tyndall

\* The Pantheism of Hæckel, instead of being a scientific deduction, is in reality nothing more than a kind of inversion of the metaphysical Pantheism of Spinoza, mingled with the poetry of Goethe, fitted on to the altered aspect of Nature induced by the Darwinian theory. But the true nature of force was unknown to Spinoza and Goethe, while the mind of the latter was incapable of appreciating the severe simplicity of physical truths. The vague but empty grandeur of Hæckel's phrases imposes on Büchner—surnamed the Crass—who, too happy to clutch at any thing apparently beyond his poor and bald system, bows down to them in admiration, and talks continually of spirit and soul. But we must not be misled by these phrases, for, on closer inspection, the "spirit" of the modern Pantheists has no relation to the same word used by dogmatic theologians. It means either the inherent properties of matter, or it means force, or the state of consciousness which is always allowed to be simply an appanage of material action. Force also has with them a vague significance beyond its simple meaning of motion or differential pressure, and appears to imply a mysterious metaphysical cause of motion.

"One thing," says J. Newman, "might justify him [the denier of Design] ; namely, if there were strong *a priori* reasons for disbelieving that mind exists anywhere but in man." (*The Soul*, p. 82). Now, this notion, apparently spoken of as too preposterous to be really entertained, is just what Hæckel asserts. And, in ridicule of the idea of a personal Intelligence pervading the universe in the form of a Spiritual Being whose substance is generally imagined as something gaseous or ethereal, he says that, inasmuch as thought exists nowhere except as an attribute of the brains of the higher vertebrates, "we thus reach the paradoxical conception of a gasiform vertebrate—a *contradictio in adjecto*." (*Generelle Morphologie*, I., p. 174). On Pantheism, Baden Powell says :—"If Pantheism were asserted more in the sense of a kind of vital or animating principle pervading the material universe, I would admit that such an idea involved no absurdity or contradiction, but still I should regard it as visionary and unphilosophical. I could not but class it with the 'vital forces' which Kepler found necessary for keeping up the motions of the

when he says—"Can it be that there is no being or thing in nature that knows more about these things than I do? Do

planets, with the 'plastic power of nature,' with her 'abhorrence of a vacuum,' and like chimeras." And then he adds, that to elevate such a supposed principle into a Deity would lead to preposterous consequences. (*Spirit of the Inductive Philosophy*, 176). Mr. Huxley writes, "The Materialistic position that man is nothing in the world but matter, force, and necessity, is as utterly devoid of justification as the most baseless of theological dogmas." (*Lay Sermons*, p. 158). In addition to these considerations, Monism halts in its physics. Matter and Force are two distinct objects not necessarily interdependent, and, therefore, a duality of self-existences *ab origine* must be postulated, even if the whole sixty-three elements can be built up from one kind of matter. Force is not an object capable of existing *per se* but only an affection of matter—in fact, simply a mode of motion of matter, including the æther. Force, therefore, cannot exist without matter, for motion is impossible without something to be moved. It is otherwise with matter, for although we may only know it through forces attached to it, yet it is quite easy to conceive it without them. Confusion exists on this point in quarters even where we should least expect it; because we know, as a fact, of no matter existing separate from force, and also, because property has often been confounded with force. "Matter is not like a carriage, to which the forces, like horses, can be put or again removed from. A particle of iron is, and remains, the same, whether it crosses the horizon in the meteoric stone, rushes along in the wheels of the steam-engine, or circulates in the blood through the temples of the poet. These qualities are eternal, inalienable, and untransferable." (Büchner, *Matter and Force*, p. 1). We read this with surprise as a quotation from Dubois-Reymond. The inalienable, intransferable qualities are the essential properties—not forces—of each kind of matter. Matter is, in fact, just like a carriage to which force can be attached, but which could quite well exist without force. Heat, for example, which is a mode of motion, can be transferred to iron in any quantity; but it may also be utterly withdrawn,—for is not the absolute zero admitted?—and it would not be the less iron. In like manner it is easy to conceive every force withdrawn, and still iron or any other kind of matter would remain with its essential qualities just as before. Force is in no sense a property of matter, and the latter can only manifest force as a vehicle of pre-existing force communicated from without, i.e., from other matter or the æther. Accepting the canon of Newton, that "no other qualities can be attributed to the least parts of bodies than sensible qualities, those, namely, of which we have become cognisant by sensation and experience relative to masses," why should any property of matter originate motion? The discovery of the mechanical equivalent of heat has given the death-blow to all theories of inherent powers of attraction and repulsion. Inertia is the universal attribute of all matter. A top at rest is as much a top as while spinning, but no consideration on earth will induce it to get up and spin of its own accord without an adequate force from without. Imagine two atoms placed in free space void of æther; why should each draw the other towards it, as is asserted in the common notion of gravitation as an inherent property of matter? Any such notion is distinctly repudiated by Newton, and the physical cause of gravitation is referred to some affection of an intermediate substance. Agitation in the universal æther by the translative wave theory of Challis; or the perpetual movements of the ultra-mundane corpuscles of Le Sage, are the most probable of the causes of gravitation and the motion of bodies thereby caused. But both these are already



I, in my ignorance, represent the highest knowledge of these things existing in this universe?" (Speech at Manchester, 1874.)

2nd.—Deism; or a belief in the existence of a single benevolent and just God and Creator, and in the immortality of man, but which denies a supernatural revelation.

All that need be said in this category is, that the theories of Evolution, abolishing the Direct Design argument, and of the materialism of life and mind, with the consequent denial of all proof in the natural existence of any immortal spirit, deal such tremendous blows against it, that we are forced to give it up entirely as a scientific deduction, and the belief in it is pushed back wholly on the metaphysical and intuitional arguments. Of these, the strongest, viz., the argument from the causal power of the conscious human will to a divine will, the first Cause of all things, loses all force if the human will is not causal, but purely phenomenal after all. And, although I do not deny a certain weight and reality to the arguments from intuition and instinct, yet, as these are not universal, the argument is only to be taken in connection with others of a totally different nature, and are of themselves wholly incompetent to demonstrate the theorem here under consideration; and whoever wishes to fill up the blank with metaphysical speculations, he is free to make the attempt, but he must not expect thereby to solve the doubts of any

themselves movements, and imply no production of motion as an inherent property of the ether or the corpuscles; why should an ethereal ocean begin spontaneously to be agitated by waves any more than the liquid or the aerial oceans, which we know never are except by force from without? Therefore, if matter and ether were self-existent from all eternity, and still more, if molecular matter were merely vortex-motions of the ether, we should still require that celebrated "push from without" which should furnish the sum of all the existing forces required to animate the otherwise inert and chaotic material universe. The assertion of Büchner (*Matter and Force*, p. 52), that "eternal matter must have been capable of eternal motion," is nothing but a *petitio principii*. Hence a duality, at least, of primordial self-existing objects not naturally interdependent. Where, then, is the unity of Hückel's Pantheistic Deity?

intellect, or to still the fears or satisfy the longings of any heart. "If," says Bacon, "any man shall think, by word and enquiry into these sensible and material things, to attain to any light for the revealing of the nature and will of God, he shall dangerously abuse himself." And again, "I have searched the heavens," says Lalande, "but have nowhere found the traces of a God." These will, I apprehend, be the utterances of every man of science who honestly answers, from science alone, the momentous question in the oldest book in the world—"Canst thou by searching find out God?"

These two categories show an attitude of mind which, humanly speaking, shall not see God, for they are, like the Pharisee, standing erect in the pride and presumption of intellect—the one declaring that no God or intelligent being better than himself can exist, the other requiring nothing but his own intellect to find out God, whereby he merely finds a magnified projection of himself, with the arbitrary restriction that He who created all nature must not temporarily alter one of its laws for any reason (miracle), nor make known to us aught of His purpose or will (revelation). Will it fare any better with the third category?

The true principles of science are determined by the law of Causation. It is a universal law of the succession of phenomena, that every phenomenon which begins to exist arises from some cause or combination of causes which it invariably and unconditionally follows. What an efficient Cause may be, or whether it exists at all, cannot be learned by logic, which deals only with causes which are themselves phenomena. "To determine," says J. S. Mill, "the effects of every cause and the cause of all effects is the main business of induction." And in respect to complex causes, though we must make use of deduction, yet, for that purpose, we must first ascertain by induction the laws of each of the causes;

the causes sought being always, as said, themselves phenomena. "All phenomena, without exception, which begin to exist," says Mr. Mill, "that is, all except the primeval causes, are effects either immediate or remote of those primitive facts, or of some combination of them. There is no thing produced, no event happening in the known universe, which is not connected by an uniformity, or invariable sequence, with some one or more of the phenomena which preceded it; insomuch that it will happen again as often as those phenomena occur again, and as no phenomenon, having the character of a counteracting cause, shall coexist. These antecedent phenomena, again, were connected in a similar manner with some that preceded them; and so on until we reach, as the ultimate step attainable by us, either the properties of some one primeval cause, or the conjunction of several. The whole of the phenomena of nature were, therefore, the necessary, or, in other words, the unconditional consequences of some former collocation of the Permanent Causes."\*

The method of science is thus essentially sceptical, and continually tends to reject all interference of Causal powers not themselves phenomena, till we reach a point where analysis can go no further, and we are compelled to admit a primordial Cause, or Causes, of whose nature Logic and Science can tell us nothing. Therefore, it cannot tell us whether Matter and Force are self-existing or were created by another self-existing power. And if we say everything must have a cause, and therefore matter, what then was the cause of the cause of matter? and so on *ad infinitum*. Thus we are conducted to a blank wall by a method which is wholly powerless to penetrate the mystery which lies behind. This we may term Logical or Negative Atheism. And

\* Mill's *Logic*, I. 385. See also an excellent compendium of the subject, entitled "*Logic and Utility*," 8vo, pp. 133. Truelove, London.

although this conclusion agrees with Hume's definition of the sceptical among arguments, that it admits of no answer and produces no conviction,\* still I cannot but regard it as the true outcome of science, and the legitimate attitude of the mind of the man of science towards any solution of the mystery. But when the scepticism becomes a dogmatism, as it does in the hands of the so-called Secularists, it is then that we have a right to object. When they say that because there is no proof that consequents spring from any other than the natural antecedents, and no evidence, scientifically accessible, exists of the interference of a divine power, therefore, practically for us, no such power exists, there is no God and no future life.

This also, like Pantheism, I hold to be totally unwarranted, and all that can legitimately be deduced from science

\* Most of us, therefore, will say that we are not convinced that no self-existent Creator exists, but wait for further light on the mystery. But what say the authors of the *Unseen Universe*? They hold the Law of Causation to be the true method of science, under the name of Principle of Continuity, thus defined: "that we shall never be carried from the conditioned to the unconditioned, but only from one order of the fully conditioned to another" (188). Nevertheless, they violate the principle at the very threshold thus: "Let us begin by stating at once that we assume, as absolutely self-evident, the existence of a Deity who is the Creator of all things" (47). But they refine down the assumption to a very small point by stating that the present universe was not created *de novo*, but merely developed out of a former or unseen universe, and that again from another, and so on indefinitely; there being no creation in time, but only in eternity, and that we must regard the universe as a whole [i.e. the universes] "as an illimitable avenue that leads up to God" (86). They expect thus to explain, without breach of continuity, not only all natural phenomena, but the existence of Angels, the immortality of man, "the events which took place in Judea," &c. But with a Creator who cannot create any thing in time, and who is precluded from interfering with existing matter and æther, for fear of a breach of continuity which should "put to confusion intelligent beings," and whom they nevertheless call a "Governor," one is really at a loss to distinguish such a system from Atheism. Especially when, in respect to the cardinal practical point affecting ourselves, viz., man's immortality, we remember what Bishop Butler says: "For that we are to live hereafter is just as reconcilable with the scheme of Atheism and as well to be accounted for as that we are now alive is." The truth is, the authors do themselves injustice, for they really believe in the facts of revelation and miracles, but are throughout pursued by a somewhat pedantic desire to make them out no breach of the principle of continuity, which, of course, they may not be to God, though they certainly are to us; else where would be their force as evidence?

is simply that we cannot by it prove the existence of God, a conclusion entirely negative, and which by no means excludes knowledge from other sources. If some are willing to accept negative Atheism as their creed here, and feel no repugnance to the prospect of annihilation hereafter, others are far differently constituted. To them the idea of a universe without plan and moral purpose, and the sight of a being like man, with such transcendent mental capacities, weltering on from age to age in sorrow and suffering, with nothing at the end but a meaningless extinction, is perfectly overwhelming, and they are irresistibly impelled to escape from it. Even the bloody and pedantic Robespierre was fain to fall back upon his ridiculous and theatrical rehabilitation of the *Etre Supreme* when he saw speculative atheism translated from the easy chair of the philosopher to the anarchy of an ignorant and starving populace. And J. S. Mill recoiled in the latter part of his life from the outcome of his own teaching; and to this is no doubt owing his revulsion into Deism. It was probably owing to still existing early prejudices against Christianity that a man of such profound intellect and candour of heart should have been compelled to be satisfied—though, had he lived, we may imagine it would not have been for long—with a God mutilated in power, and with the conclusion, in respect to ourselves, “there is no assurance whatever of a life after death, on the grounds of Natural Religion.”\*

Of the three categories, then, I think the most legitimate is the negative Atheism, as the outcome of Materialism, and, in fact, of the strict methods of science; and I hold that it is not incompatible with dogmatic theology, and not even unfavourable for the reception of it. Our attitude in this category may be compared to that of the humble publican who prostrates himself on the floor of the Temple, and cries

\* Mill's *Essays on Religion*, p. 209.

aloud in agony, overwhelmed by the cruel and crushing power of natural laws, and the blank emptiness of all visible signs of the presence of God in nature. Is the cry to go up to Heaven for ever, and no answer to be vouchsafed? No! a thousand times, No! For, from the depths of the unseen world, the voice of the Almighty himself has been heard, declaring His will, and His nature, and purpose, so far as seemed to Him good, and as we are fitted to comprehend. Surely, therefore, even altogether apart from the transcendent importance of the purpose fulfilled by the Divine interposition, the very knowledge the revelation brings, to fill up the fearful gap in natural science, must make it a message indeed of glad tidings.

It is only in the external bearing of revelation, in contrast to science, that we are at present concerned, and therefore we must speak of it explicitly, as the special revelation bound up with the history of Moses and of Christ. Whatever may be the defects of historic evidence in comparison with the proofs, repeatable at will, of the facts of physical science, it is obviously all we have to depend on, and, by it, the whole of dogmatic religion, as something apart from all other knowledge and truth, must stand or fall. For the—to us—supernatural revelation is inseparably bound up with the historic truth of the persons and miracles of Moses and of Christ, the so-called internal evidences of the truth of the teachings of Christ, valuable as they may be, are wholly insufficient of themselves; and no rational thinker can accept the Gospels without accepting the miracles, which form an essential part of the same narrative, or, rather, they are the essence of Christianity itself. This is conclusively shewn by the destructive criticism of the German school represented by Strauss and Baur. That the moral elements of Christianity could survive the destruction of the historic personality of Christ, and the whole supernatural element, is a mere chi-

mera; the notion never had any rational foundation, and if any belief in it ever existed, it must have been dispelled by Strauss's last book. It is only, therefore, as a supernatural element of actual knowledge that Christian dogmatics can take a place in our knowledge, and prevail over, or rather supplement, the conclusions of scientific materialism. Without the supernatural element there is, as far as I can see, no choice except between Pantheism and Negative Atheism; for the flimsy barrier of Deism is swept away at once whenever the hold on the supernatural is abandoned, as we see with Strauss and Miss Martineau.\*

If Scientific Materialism is to rob us of the Optimistic Natural Theology of Socrates, with its picturesque polytheism and superstitions, who can believe that an Anthropomorphic Deism, which is nothing but the Jewish and Christian Monotheism truncated, will survive?†

The interpretation of the books purporting to contain the revelation is naturally the field of conflict between science and dogmatic theology; and again, on this large question, I can only touch on one point. In the present generation, the theories of conservation of force, evolution, and protoplasm,

\* With Strauss there is no personal God, nor future state of man. Instead of God, he gives us the All, or Universum, which has neither consciousness nor reason, but represents law and order. The miracles of the historic personality of Christ, and all the supernatural, are not merely relegated to the unknowable, but are impossible. Of the cardinal fact of Christianity he says (with, it is to be hoped, only an imperfect appreciation of the bad taste of the remark), "Historically considered—i. e., taking together the enormous effects of this belief with its complete baselessness—the story of the resurrection of Jesus may be designated as only a world-historic humbug."—(*Alte und Neue Glaube*, p. 72.)

The very interesting autobiography of Harriet Martineau must be too fresh in the memory of every one to need recalling the passages where she describes her progress to complete Atheism, after she had given up all belief in the supernatural authority of the Scriptures.

† "According to Schopenhauer, revelation and the idea of a personal God originated in one people only, the Jews, and was transferred from Judaism to Christianity and Mahommedanism." (Büchner, *Force and Matter*, p. 189.) It is an opinion widely held by competent scholars, that the purer parts of all known religions are derived from imperfect traditions of the Jewish or other anterior revelations. (See also *Argo*, by Lord Crawford.)

and the discoveries of the spectroscope, have appeared almost simultaneously, and must cause some considerable change of interpretation, if we are to reconcile dogma with science. To decide on what principle that is to be done, we cannot do better than go back to the seventeenth century, when a similar great advance in physical science had not long taken place, and hear the advice of Galileo. In his letter to Elie Diodati, in 1688, Galileo contrasts the works and the word of God as of equal authority and in ultimate harmony. But he appeals to the letter of Scripture and to the universal testimony of the Church, as to whether, in the Word, familiar exposition, directed to the unlearned vulgar, is not constantly preferred to scientific accuracy. Then he continues: "If so it be, why, if we wish to become acquainted with the world and its constituent parts, should we prefer, for the guidance of our investigations, the word of God to the work of God? Is the work less perfect and less noble than the word? \* \* \* Consent, on the contrary, to *assign only the second place to the word* wherever the *work* appears to diverge from it; you will thereby do no wrong to the Scriptures." \* Here we have the simple and rational principle of interpretation in all cases where the Scripture deals with matters of observation and experience, therefore with all scientific truth. And it is universally admitted that, although these are and must be touched on more or less incidentally, yet we are not expected to go to the Bible for information on anything that is capable of discovery by the unaided faculties of sense. And as science is progressive, it is not only possible but certain that misinterpretations respecting matters of science must be made by theologians in each generation.

\* "S'il en est ainsi, pourquoi donc, voulant connaître le monde et ses parties constitutives, irions nous préférer, pour régler notre examen, à l'œuvre même de Dieu la parole de Dieu? L'œuvre est elle moins parfaite et moins noble que la parole? \* \* \* Consentes, au contraire, à *n'assigner que la seconde place à la parole*, toutes les fois que l'œuvre semble l'éloigner; vous ne faites aucun tort à l'Écriture."



Criticism and revision of dogmas in such matters become, therefore, not only permissible, but are the bounden duty of all living churches. Such criticism can always be undertaken reverently, and in full confidence that the true meaning of the word can never really conflict with the works of God.

In this spirit I think we may examine the letter of Scripture, in reference to the Materialist theory of life and mind.

We have seen that conscious mind, *per se*, is essentially of the same nature in animals and in man, although of indefinitely higher and wider scope in the latter, and that both are a function of organised matter, and necessarily perish when that organisation ceases. How is this to be reconciled with that cardinal doctrine of Christian dogmatics, the immortality of the soul of man, as contrasted with the perishing nature of the mind of animals? Here science can give us no help, inasmuch as it can tell us nothing of the nature of spirit, nor even of the very existence of a future life for man. It remains, therefore, to be seen whether the language of Scripture be contradictory of the teaching of science, that life and mind are perishable, and not identical with the immortal soul, which is a divine gift to man alone. The popular idea attached to the word soul is, that it is an independent entity which thinks, and wills, and constitutes the real and responsible man. For the present it is said to live in the body as in a house, but it is capable of living elsewhere, and is, in fact, naturally and necessarily immortal. Is this really the meaning of the word soul as used in the Scriptures?

I have no pretension to biblical scholarship myself, and take, therefore, the following points on the authority of well-known biblical commentators. The words *Nephesh* and *Psuche* are the only words (with two exceptions not touching the point) translated "soul" in our version

of the Old and New Testaments. On carefully examining all the instances in which these words are used, it will be found that they are applied—1st, to the conscious living being as a whole, and this equally to man and to all animals, down to the very lowest; 2nd, simply to life, common to man and animals; 3rd, to a state of mind or feeling. These are the senses in which the word is employed, and never in that of a conscious immaterial essence separable from man. They are never once used specifically to denote a separate spiritual essence as the cause of mental phenomena; far less one that is necessarily immortal and capable of independent existence. These last are merely speculative glosses which have since been put upon the words of Scripture, in order to harmonise (in our view) with the promise of the future eternal life to man, plainly and certainly given in the Scriptures as a whole, although only obscurely indicated in the Old Testament. The actual language of Scripture, so far as the word soul is concerned, is therefore compatible with scientific materialism, in as far as that holds the life and mind to be functions of a perishable organism, if, indeed, it does not plainly assert it, when the Psalmist says of the death of man, “His breath goeth forth, he returneth to his earth; in that very day his thoughts perish.” His thoughts; that is all we know of man as a conscious thinking being, and to which alone the word soul is applied in Scripture. Hence the principle of immortality, whatever be its nature, is distinct from the mind; but what that is, and how the connection, identity, and responsibility of the future with the present individual is to be maintained, we are not told.

In like manner, if we analyse the Scripture use of the words *Ruach* and *Pneuma*, which (with also two unimportant exceptions) are always rendered “spirit” in our version, we shall find it may be comprehended under four senses—1st,

breath, air or the atmosphere, or wind ; 2nd, a state of mind or feeling, such as a "proud" or "haughty" spirit ; 3rd, an influence proceeding from a being ; 4th, a being possessing conscious mind, and personality, and power, whose substance is non-material, such as God, the angels, and, I presume, possibly man soon after death, if there is any distinction between that state and the "spiritual body" of the resurrection, which is a point left doubtful.

Scripture gives no countenance to the figurative sense that is so commonly put upon the expression, "breath of life," viz., that it denotes a spiritual essence, infused into man and animals by the Creator, and the cause of their life. It always means, simply and literally, the air for respiration, which, being a necessary of life, is often, by a figure of speech, put for the whole life itself, just as bread, blood, and other things are.

The word *Pneuma* is never rendered "soul" in the New Testament. There is a distinct difference between the words soul and spirit, although they are often taken to mean the same things. The soul is always applied to something belonging to man, the body and conscious mind together, while the word spirit must be admitted to denote the existence of independent non-material beings, possessing a conscious mind, whether such an essence be the cause of man's mind in this life or not. But in none of the examples of the use of the word spirit in the Bible, does it convey distinctly the doctrine that the mind and life of man and animals consists in a spirit separable from the organism, capable of living without it, and leaving the body dead when it departs.\*

\* I have submitted these conclusions on the interpretation of the words *nephesh*, *ruach*, *psuche*, and *pneuma*, in Scripture, to a profound scholar, who, as an orthodox divine, is a member of the Old Testament Revision Committee. I allude to the Rev. J. D. Geden. He kindly permits me to say that these words, strictly construed, bear no other meaning than that given above. In particular, the word

In the immense variety of the uses of the words *nephesh*, *psuche*, *ruach*, and *pneuma*, or soul, spirit, breath, and ghost, we must remember that the inspired writers were not blank sheets of paper, but men who were allowed to express themselves in the language of the generation in which they lived, and whose minds were moulded in the knowledge of the time, and that this extended over a long period of years. Hence we must expect much variety in the popular and philosophical mode of thought and expression on the part of the writers. Therefore, in psychology, we cannot, any more than in geology, chemistry and other departments of science, expect precision in knowledge beyond that of the age in which the writer lived. If, therefore, the inspired writers, influenced by the prevailing Egyptian and Greek philosophies, confounding life and mind in one immaterial, though substantial but not immortal, entity, use the common language of the day in describing death,—for example, as giving up the ghost, or the departure of a spiritual principle from the body,—that is not to be taken as the revelation of a scientific fact. On the contrary, I think we may safely conclude that here, as elsewhere, we can expect no revelation in Scripture on what properly belongs to science, viz., the nature of life and mind, so far as it is discernible by observation and experiment. To reconcile science and religion, it is sufficient for the whole scope of Christian Dogmatics, that the man of science may accept, on supernatural authority, the knowledge of the existence of personal

*nephesh* has no other meaning than the *self*, or the conscious personality of the individual. So far on Dr. Geden's authority; but I may add, that it is not a new doctrine that the literal construction of the Bible does not bear out the natural immortality of the human mind. It seems to have been held by the early Christians generally; was revived by Luther; and it has been maintained in this country by a party, since the latter part of the seventeenth century, when the works of William Coward, Dodwell, and others attracted much attention, and gave rise to long controversy. Milton, also, held that the body and soul were inseparable, and one individual.

conscious thinking beings other than human, and whose substance is non-material, and that man, in a personal, conscious, and responsible state, shall live again for ever. As to how this last is to be brought about, science can tell us nothing whatever, and Scripture gives extremely little that is distinct and positive, while, probably, it gives all that our faculties are able to comprehend. If these points can be received, as I maintain they can be, by one holding the doctrines of Evolution, and the merely functional nature of life and mind, then is Scientific Materialism compatible with Dogmatic Theology.\*

\* Locke states the question thus:—"Judgments transcending reason are those whose truth or probability we cannot discover by the investigation and development of conceptions which arise from sensation and reflection, as, for example, that the dead are raised." At the same time, he maintained there was no inherent impossibility that matter should be endowed with the power of thinking. Thus, we perceive, he would allow that mind or thought might be within the limits of natural science, contrary to Descartes's dictum, that thought is spiritual; while, in any case, life after death belonged to the things transcending reason. This is contrary, also, to the classification of Thomas Aquinas of the things pertaining to faith and reason. Those belonging to revelation alone, the knowledge of which cannot be arrived at by reason, are, the Trinity, the creation of the world in time, original sin, the incarnation of the Logos, the sacraments, purgatory, the resurrection of the flesh, the judgment of the world, and eternal salvation and damnation. The natural immortality of the soul is, we see, not mentioned among these doctrines, which he thinks above, but not contrary to, reason. In fact, he held, as a philosophical doctrine, that immateriality must be ascribed to the human intellect from its very nature, and that the immortality of the soul follows from its immateriality. He accepts the Aristotilian idea of the soul, but he "ascribes to the same soul, which, as yours, or rational soul, has individual and yet immaterial existence, and is separate from the body, the animal and vegetable functions; so that, for him, the form-producing principle of the body, the *anima sensitiva*, *appetitiva*, and *motiva*, and, finally, the *anima rationalis*, are all one and the same substance" (*Ueberweg*, I., p. 449). Most unfortunately, this merely human speculation—derived, indeed, from heathen sources—was erected into a dogma by the Catholic Church, at the Council of Vienne, in 1311, a body of men, doubtless, quite as ignorant of physiology as Thomas, and intellectually far his inferior. So they could add nothing to the probability of the truth, while they added infinitely to the authority of the doctrine; and this is, no doubt, the chief source of the popular notions still prevalent, which, contrary to sound physiology, jumble up the life common to plants and animals, the sensation and thought of animals and man, and the immortal life of the last, all into one substantial principle.

The dogma negatively asserted by Thomas was reaffirmed positively by Leo X., who decreed that all should be punished as heretics who denied the natural immor-

There remains only a few words to be said on the bearing of the belief in the supernatural on our own minds. Formerly, all freedom of thought was under great difficulties and even danger. But, now-a-days, the tables seem to be turned in so far as that any one expressing his belief in Supernatural Revelation is looked upon in certain circles as a poor contemptible creature, and intellectually little better than a fool! This is strongly shewn in the controversy which has sprung up upon Hackel's *Natural History of Creation* in Germany. Professor Michelis, one of the most notable writers on the theological side, is in his turn attacked by the disciples of Hackel in an unmeasured style of language surpassing, as usual, the master, and shewing an actual fanaticism in infidelity. For example, Posner (in *Im neuen Reich*) declares that Science can pay no attention to the attack of Michelis upon Hackel, because the former, 1st, being a theologian and a Christian, is a believer in a God and Creator; 2nd, the ideal conception aimed at by him is essentially a Non-ens, a something *a priori*, unthinkable, and, therefore, with no sense or meaning in the eyes of a man of science. And he adds, you must deny God and trample the Cross under foot before you can become even a scholar, far less a master in Natural Science.\* What

talities of the soul. This was met by a counterblast from Luther, who classed this theory with "those monstrous opinions to be found in the Roman dunghill of decretals." Notwithstanding, it is still held, not only by Roman Catholics of necessity, and by Deists who of course can have no other hope of immortality, but also by the great majority of Evangelical Christians who follow Luther in other respects.

Perhaps I may be permitted in this place, where we are precluded from entering on theological discussions, to say that the doctrine, "that the soul is not naturally immortal, but that its future existence is simply a gift of God, which is both imparted and announced by supernatural agencies and instruments," does not necessarily bear out the theories of "conditional immortality," etc., which have been put forward along with it, but is equally compatible with the more orthodox tenets. Nor are the difficulties in any way greater than those inseparable from the infusion of an immortal soul into a body born naturally, and which has been the subject of such interminable and fruitless speculation.

\* "Hackelogonie. Ein akademischer Protest gegen," Hackel's *Anthropogenie*, von Professor Fr. Michelis. Bonn, Neusser, 1876. 2nd Edit.

modicum of truth really underlies this extravagant and repulsive statement? It must be admitted that the methods of scientific investigation, directed as they are to the tracing all phenomena to antecedent causes which are themselves phenomena, is essentially sceptical, and excludes thoughts of First Causes. The latter, also, are of no use for the purpose in hand, and must prove distracting; the foregone conclusion of a Creator received by faith is also apt to fill the mind with teleological ideas, which tend to check the progress of investigation at numerous points, which are afterwards passed by an unembarrassed thinker. The thought of the continual presence of God is also, as in the small affairs of life, too heavy for man to bear, and troubles his intellect, even in special scientific investigations. Consequently, as our whole powers, at the very best, are never more than enough to cope with the difficulties of two men of science of medium capacity and equal opportunities, the infidel will have a certain advantage, which, however, will hardly tell with great and exceptional geniuses, while, with most, the counterbalancing good will more than turn the scale. There is no gainsaying the fact that the majority of scientific men are not religious (in the restricted sense in which the term is commonly used), but this really adds little strength to the fanatical-infidel positions above given, for the intellectual requirements of a votary of natural science are very different from those of men whose natural bent of mind leads them to literature, theology, and art; we would, therefore, not expect a man to excel in both fields. Besides, the field of science is now so enormous that a man must not only give himself up wholly to it, but even to a very small part of it, in order to make a new conquest for the domain of knowledge. Hence even an incapacity to judge of religious truths. It is related that the astronomer Halley, desirous of combating Newton's orthodox views on the Christian evidences, received this reply from the

great philosopher:—"I shall be ready and willing to hear you on that subject when I get the assurance that you have given some time and attention to it; I have given both to it, and you have not." On the other hand, Tyndall objects to Newton's meddling with the subject, as, from his life-long devotion to studies of other kinds, he could not be well fitted for it. We may, I think, fairly object to the whole modern Pantheistic school of German scientific men on the same grounds. They mostly can have little knowledge of the subject, and, no doubt, are content to accept, at second hand, the destructive criticism of Strauss and his school.

These, I think, are sufficient reasons in common sense, if not commonplace, to account for the alleged antagonism of men of science to revealed religion, while there is a long roll of illustrious names, from Newton to Faraday, and many now living, which proves that the antagonism is not in the nature of things. There is also something to be said on the other side. For the thought of a Creator is not the only cause of distraction to the mind of the man of science; there are all the numerous temptations to premature hypotheses and speculation, to which the infidel is just as liable as the believer. Nay, more so. For it is possible for the latter to free his mind from all bias, and push back creative interference as far as the search for phenomenal causes can possibly demand, and then he is in a better position for calm judgment than the fanatical infidel Evolutionist, for example, who is compelled to find a natural origin of life, and thus is tempted to fantastic speculation on the spontaneous generation of completely organised living beings, with a distinct life history in a few hours, from fermenting chemical compounds. Even on the descent of man, the believer can rise to a calm and more unprejudiced stand-point than the Hæckelian. Witness G. Henshall, who protests against any *a priori* prejudice such as is embodied in the "*Simia quam similis*,



turpissima bestia, nobis" of the poet against the Darwinian theory. "If God," he says, "adopted such a method, who are we that we should complain? The potter hath power over the clay. I believe, with Mr. Darwin, that the evolution of animals and plants was God's method of creation." But, at the same time, he maintains that there is no sufficient evidence that man was made in that way, but some to favour Wallace's idea of an exceptional process.\* This is a frame of mind far more likely to arrive at truth than the Dogmatic Pantheistic belief of Haeckel. Witness, also, Darwin himself, who has never faltered one moment in the search for natural causes which destroy the evidence of design, and yet is ready to accept a supernatural origin of living matter in default of other, while, no doubt, he would be ready, on sufficient evidence, to push such farther back.

There are also the moral causes of disturbance to be taken into account; for envy, jealousy, hatred, and prejudice are as rife among men of science as among other men, and these dim the pure love of truth, which is the essential condition of all discovery in science. Where are the qualities to counteract these most likely to be found? Surely among the men whose natural development of the higher mental emotions is greatest, that is, those desiring honesty, honour, truth, love, esteem, veneration, and beauty, all which seek an ideal, and to which the highest ideal is presented in Christian Dogmatics. Hence we may expect to find such men among the believers more abundantly than among the non-believers of the scientific body. Whoever thinks that moral causes count for little in the progress of science, has little acquaintance with its history. It would be easy to shew that all the hostility to new truths proceeds from want of self-sacrifice, and want of development of truth to the height of perfect candour, a height which can never be attained by philosophy,

\* *Christian Apologist*, 1877, p. 220.

but only by Christian faith, although seldom indeed reached, even by believers therein. May we not, therefore, rather invert the position spoken of above? and say, No one can truly become a master in science unless he first takes up the cross, and blends indissolubly the perfect love of truth, as a moral duty, with the love of truth in nature, which is the foundation of all true scientific method.