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by Arthur William Robinson**

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**GOD AND THE WORLD**  
**A SURVEY OF THOUGHT**

**BY**

**ARTHUR W. ROBINSON, D.D.,**

**Warden of the College of Allhallows Barking**

**With a Prefatory Note by SIR OLIVER LODGE**

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## PREFATORY NOTE

I have read what Dr. Arthur Robinson has written, and find it a most interesting, singularly fair, and I may add, within its limits, able and comprehensive survey of the thoughts of the past and passing age. I commend it to the coming generation as a useful means of acquiring some notion of the main puzzles and controversies of the strenuous time through which their fathers have lived. Fossil remains of these occasionally fierce discussions they will find embedded in literature; and although we are emerging from that conflict, it can only be to find fresh opportunities for discovery, fresh fields of interest, in the newer age. Towards a wise reception of these discoveries, as they are gradually arrived at in the future, this little book will give some help.

OLIVER LODGE.

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## GOD AND THE WORLD

### INTRODUCTION

A man, so it has been said, is distinguished from the creatures beneath him by his power to ask a question. To which we may add that one man is distinguished from another by the kind of question that he asks. A man is to be measured by the size of his question. Small men ask small questions: of here and now; of to-day and to-morrow and the next day; of how they may quickest fill their pockets, or gain another step upon the social ladder. Great men are concerned with great questions: of life, of man, of history, of God.

So again, the size of an age can be determined by the size of its questions. It has been claimed that the age through which we have passed was a great age, and tried by this test we need not hesitate to admit the claim. It was full of questions, and they were great questions. As never before, the eyes of men strained upwards and backwards into the dim recesses of the past to discover something, if it might be, of the beginnings of things: of matter and life; of the earth and its contents; of the solar system and the universe. We know with what interest inquiries of this sort were regarded, and how ready the people were to read the books that dealt with them; to attend lectures and discussions about them, and to give their money for the purposes of such

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research. It was a great age that could devote itself so eagerly to questions of this importance and magnitude.

{9} But as men cannot live upon appetite, so neither can they be for ever satisfied with questions. Hence it follows that a period of questioning is ordinarily followed by another, in which the accumulated information is sorted and digested and turned to practical account; a time in which constructive work is attempted, and some understanding is arrived at as to the relation that exists between the old knowledge and the new. It looks as if we were nearing such a time, when, for a while at all events, there will be a pause for reconsideration and reconstruction, and the human spirit will gather strength and confidence before again setting out upon its quest of the Infinite. Already we are asked to give attention to statements that are intended to review the whole situation and to summarise, provisionally at all events, the results that have been attained. Each of these attempts will, in its turn, be superseded by something that is wider in its outlook and wiser in its verdicts. This little book is an effort of this nature, and it is offered in the hope that it may serve some such useful and temporary purpose.

Much more competent writers than its author might well apologise for consenting to enter upon the task which he has been invited to undertake. All that he can say, by way of excuse for his boldness in complying, is that for many years he has endeavoured to follow the trend of modern thinking, and that the growing interest with which he has done this encourages him to hope that he may be able to make what he has to tell about it both intelligible and interesting to others. He does not imagine that he can escape mistakes, and he will most gladly submit himself to the correction of others who know better and see more clearly than he does. He only begs that those who disagree with his judgments will try to give him credit for a sincere desire to be true to facts, and to welcome the light, from whatever quarter it may have come.

{10} When we speak of the age that is passing, we shall have in mind what may roughly be reckoned as the last hundred years. That space includes, for those of us who are not in our first youth, the time of our parents, and even, it may be, of our grandparents. The period has a certain distinctiveness of character in spite of superficial diversities. It was marked, as we have said, by the intelligence and vigour of its questionings. It was a time of intellectual movement and turmoil. It witnessed a succession of wonderful discoveries leading on to ever bolder investigations. Rapid generalisations were advanced, to be often as quickly abandoned. Only by degrees was it possible to see the new facts in their proper proportion and significance. Nor was it at all easy for men to keep their discussions free from heat and bitterness, when the most deeply-rooted convictions appeared to be assailed, and the most sacred associations to be regarded as of little account. Looking back, as we can, it is possible to see that in spite of the eddies and backwaters a steady progress was made. And it is of that progress that it will now be our endeavour to speak.

{11} We know how it has happened to us over and over again in our own individual experiences to have been made conscious of a gradual modification of our opinions as new evidence has reached us, and we have had time to relate it to our previous understanding and knowledge. We have had our first thoughts, and our second thoughts, and then there have come third thoughts, which were the ripest and soundest of all. Just such a process of which we can mark the stages in ourselves is to be seen on a larger scale—in bigger print, as it were—in the thought movements of an age. In the case of the period which we are to review, the three stages have been more than commonly clear, as we shall aim to shew in the survey we are to make.

We shall begin with the First thoughts, which were those of what may be termed the older orthodoxy. These were very generally accepted; indeed, they were regarded as for the most part beyond the reach of serious contradiction. Then we shall pass to the Second thoughts, which were forced upon an astonished and bewildered generation by the onslaughts upon traditional views that were made from the side of physical science. For fifty years or more the debate went on, with challenge and counter-challenge, and much noise and dust of controversy. They were great days, and in them great men fought with great courage in great issues. We shall seek to do justice to both sides, to those who dared to proclaim and suffer for the new, and to those who shewed an equal courage in their resolute determination to be loyal to what they held to be the truth of the old.

{12} Then, finally, it will be our difficult task to discriminate between the surging thoughts of that second period and those of the Third stage, through which we are advancing, and to shew what can already be made out of a common ground of agreement and co-operation, now much more likely to be reached than could at one time have been foreseen by the most optimistic imagination.

{13} **CHAPTER I**  
**THE OLDER ORTHODOXY**

{14} Never had there been greater unanimity of opinion in England in regard to the religious interpretation of the world than that which prevailed at the beginning of the nineteenth century. The excesses on the Continent which had accompanied the advocacy of free thought had disposed men's mind to fall back upon authority, and most of all in matters that affected the basis on which the continuance of social order and moral conduct depended. The general position was clearly apprehended, and was accepted as if beyond dispute. Men spoke and thought of the Order of Nature. The world was a Cosmos, a regulated system. Order implied an Orderer. It was regarded by them as obvious that there must have been a First Cause, a great Architect and Maker of the Universe. They agreed with Aquinas that "things which have no perception can only tend toward an end if directed by a conscious and intelligent being. Therefore there is an Intelligence by which all natural things are ordered to an end."<sup>[1]</sup> They were fully prepared to endorse the indignant protest of Bacon: "I had rather believe all the folly of the 'Legend,' and the 'Talmud,' and the 'Alcoran,' than that this universal frame is without a mind."<sup>[2]</sup> In fact no other hypothesis seemed to them thinkable.

{15} If at any time they felt a need for a more elaborate justification of their conviction, they had it ready to their hand in the familiar argument from design. Paley, when he set this out in his famous *Natural Theology* (1802), was only expressing with conspicuous ability the view that was then accepted in all circles from the highest to the lowest. He was preaching to those who were already in the fullest accord with his doctrine. They followed with eager approbation his reasoning about the watch that he supposed himself to have found on the heath. According to his assumption he had never seen a watch made, nor known of anyone capable of making such a thing. He concludes, nevertheless, that it must have been made by someone. "There must have existed, at some time, and at some place or other, an artificer or artificers who formed it for the purpose which we find it actually to answer; who comprehended its structure, and designed its use." "Neither would it invalidate our conclusion that the watch sometimes went wrong, or that it seldom went exactly right. The purpose of the machinery, the design and the designer, might be evident in whatever way we accounted for the irregularity of the movement, or whether we could account for it at all." "Nor would it bring any uncertainty into the argument if there were a few parts of the watch concerning which we could not discover, or had not yet discovered, in what manner they conducted to the general effect; or even some parts concerning which we could not ascertain whether they conducted to that effect in any manner whatever." Least of all could it be sufficient to explain that the watch was "nothing more than the result of the laws of metallic nature." "It is a perversion of language to assign any law as the efficient operative cause of any thing. A law presupposes an agent, for it is only the mode according to which our agent proceeds: it implies a power, for it is the order according to which that power acts. Without this agent, without this power, which are both distinct from itself, the law does nothing, is nothing."

{16} From the watch we are led on to the eye, which exhibits a skill of design not less, but far greater, than that of the man who gave us the telescope. Then follows a detailed examination of the use of the various bodily organs, the contrivances to be met with in vegetables and animals, the marvellous adaptations of anatomical structure, the provisions for the flight of birds, and for the movements of fishes; with instances of arrangements to suit particular conditions—the long neck of the swan, the minute eye of the mole, the beak of the parrot, the sting of the bee—all furnishing an ever accumulating body of irrefutable evidence to attest the existence and operation of an intelligent Author of Nature.

{17} That these arrangements had been expressly intended to meet the circumstances of each particular case was assumed as necessarily involved in the acceptance of any design at all. It is interesting to observe that Paley did not think it improbable that the Deity may have committed to another being—"nay, there may be many such agents and many ranks of them"—the task of "drawing forth" special creations out of the materials He had made and in subordination to His rules. This, he thought, might in some degree account for the fact that contrivances are not always perfected at once, and that many instruments and methods are employed.

{18} Of the goodness of the Creator no manner of doubt was entertained. For proof of it attention was called to the fact that "in a vast plurality of instances in which contrivance is perceived, the design of the contrivance is beneficial," and to the further fact that "the Deity has superadded pleasure to animal sensations beyond what was necessary for any other purposes or when the purpose, so far as it was necessary, might have been effected by the function of pain." Venomous animals there were, no doubt, but the fang and the sting "may be no less merciful to the victim, than salutary to the devourer"; and it was to be noted "that whilst only a few species possess the venomous property, that property guards the whole tribe." Then again, before we condemn the ordering whereby animals devour one another we must consider what would happen if they did not. "Is it to see the world filled with drooping, superannuated, half-starved, helpless and unhelped animals, that you would alter the present system of pursuit and prey?" "A hare, notwithstanding the number of its dangers and its enemies, is as playful an animal as any other." "It is a happy world after all. The air, the earth, the water teem with delighted existence. In a spring noon, or a summer evening, on whichever side I turn my eyes myriads of happy beings crowd upon my view. 'The insect youth are on the wing.' Swarms of new-born flies are trying their pinions in the air. Their sportive motions, their wanton mazes, their gratuitous activity, their continual change of place without use or purpose, testify their joy, and the exultation which they feel in their lately discovered faculties.... The whole winged insect tribe, it is probable, are equally intent upon their proper employments, and under every variety of constitution, gratified, and perhaps equally gratified, by the offices which the Author of their nature has assigned to

them." Where it might have been imagined that there were to be seen miscarriages of the Creator's intentions, these were to be attributed to the presence and influence of mysterious forces of evil. Such attempts to hinder or frustrate the workings of good might be part of a purpose of good because they only afforded fresh opportunities for a display of the Divine wisdom, whose ordinary interventions were accepted as Providences, whilst Miracles supplied the rarer exhibitions of its power.

{19} For the rest, it was our duty to remember that such difficulties as might still be felt must be largely the result of our ignorance. With patience we should learn to know more. A day was coming when much that is now hidden would be made clear, and when the greatness and wisdom and justice of the Almighty Ruler would be wonderfully and fearfully revealed.

It is not intended to suggest that there were no dissentients ready to bring forward objections to these almost unanimously accepted doctrines. We know that there were such, if only because it was deemed worth while to argue against them. Kepler and Newton had stirred men's minds by their account of the prodigious scale upon which the mechanism of the Universe was constructed, and Laplace had already enunciated the theory according to which the cosmic bodies were originally formed in obedience to the law of gravitation by the condensation of rotating nebulous spheres. And there were those who used these discoveries of astronomy to cast doubts upon the likelihood that the Divine attention would be concentrated upon the concerns of so tiny a speck as this planet of ours. There were others who maintained that the unbroken persistency of the order of Nature was evidence enough to shew that it had no beginning and could have no end.

{20} Against both these objectors the irony and the oratory of a Chalmers was directed with what was held to be overwhelming effect. If the telescope had shewn us wonderful things, there was another instrument, he said, which had been given to us about the same time. If by the telescope we had been led to see "a system in every star," it was no less true that the microscope had disclosed "a world in every atom," thus proving to us that "no minuteness, however shrunk from the notice of the human eye, is beneath the notice of His regard."

So again, in an oration upon "The constancy of Nature," the thesis is most eloquently defended that "the strict order of the goodly universe which we inhabit" is nothing else than "a noble attestation to the wisdom and beneficence of its great Architect."<sup>[3]</sup>

Little did men dream at that time of the wealth of other discoveries that was soon to increase enormously the complexity of their problems; or of the inferences that would be drawn from them with an ingenuity and an assurance that would task to the utmost the ability and the patience of the defenders of the old beliefs.

It is of the new facts disclosed and of the further thoughts suggested by them that we must next proceed to tell.

[1] *Summa*, I., ii. 3.

[2] Essay on "Atheism and Superstition."

[3] *Astronomical Discourses* (1817), pp. 80, 211.

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## CHAPTER II

### THE PROGRESS OF DISCOVERY

We find it hard to realise that not so very long ago the steam-engine and the electric telegraph were unknown; and we are right when we say that life must have worn a very different aspect in those days. It is scarcely less difficult for us to realise the change that has been wrought in men's thoughts since the time when the biological cell was unrecognised, and the theory of evolution had not yet been formulated. The rapidity with which advances of knowledge were made in the physical sphere was astonishing, and it was only to be expected that they should have seemed not a little bewildering. We must try to note the main steps of the movement, giving the names of some of the representative workers and thinkers.

{22} It is generally agreed that the foundations of modern chemistry were laid by Dalton (1808). He it was who revived the old atomic theory, and determined the weights of the atoms and the proportions in which they are combined into molecules—the smallest particles which could exist in a free condition. By so doing he prepared the way for the subsequent researches of Faraday and Clerk-Maxwell into the properties of electricity and magnetism, and for the investigations by

Helmholtz and others into the connexion between electric attraction and chemical affinities.

{23} The forerunner of the wonderful advances of modern biology was the French naturalist Lamarck (1809), who, in opposition to the accepted doctrine of separate creations, suggested that all the species of living creatures, not excepting the human, have arisen from older species in the course of long periods of time. The common parent forms he held to have been simple and lowly organisms, and he accounted for the gradual differentiation of types by the hypothesis that they were the results of the inheritance of characteristics which had been acquired by continued use—as, for example, in the case of the giraffe who was supposed to have owed the length of its neck to the efforts of its ancestors to browse upon trees that were just beyond their reach. He maintained that the changes produced in the parents by temperature, nutrition, repeated use or disuse, were inherited so that they reappeared in their offspring. But the evidence adduced was judged to be insufficient, and the balance of scientific opinion was decidedly against his views.

Lyell (1830) gave a new direction to the science of geology by accumulating evidence to prove the certainty of a natural and continuous development in the formation of the crust of the earth, thus opposing the catastrophic idea which had previously prevailed. One outcome of his researches was to make it plain that the history of this development must have extended over enormous tracts of time.

More revolutionary still in its effects was the epoch-making discovery of the protoplasmic cell as the common element of life in the plant and animal world, made by the Germans Schleiden and Schwann (1838). It was this that first bridged over what were held to be the fundamental distinctions of animate nature, and made possible the conception of a vital physical continuity which has since been accepted as an axiom of biological science.

By Joule's great discovery (1840) that the same amount of work, whether mechanical or electrical, and however expended, always produced exactly the same amount of heat—that, in effect, heat and work were equivalent and interchangeable—the way was opened to the conclusion that the total energy of the material universe is constant in amount through all its changes.

{24} A theory to account for the black lines crossing the coloured band of light, or spectrum, which is obtained by passing sunlight through a glass prism, originally suggested by Sir George Stokes, and subsequently reintroduced and verified by the German chemists, Bunsen and Kirchhoff, led to the important discovery that the sun and the stars are constituted of the very same elements as those of the earth beneath our feet. Spectrum analysis, moreover, soon detected new elements, *e.g.*, helium, so-called because first observed as existing in the sun.

But great and stimulating as these discoveries were, their effect upon the thought of the age was not to be compared with that which was to be exercised by a theory which, starting in the domain of biological science, soon passed on to far more extended applications. The theory took its rise from a suggestion made in two papers, by Charles Darwin and Alfred Russel Wallace, which were read before the Linnean Society on July 1st, 1858.

{25} The Darwinian theory—for so it was soon named—undertook to explain the formation of species by the principle of natural selection through the survival of the fittest in the struggle for life.[1] Darwin started from the admitted achievements of artificial selection; from the results attained by nurserymen and cattle breeders, who, by selecting the kinds they wished to perpetuate, had been able to vary and improve their stocks. He conceived that a like process had been carried on by Nature through vast spaces of time, and that it was this picking, choosing, continuing and abandoning of traits and qualities which had resulted in the preservation of the types which it had been best to retain—the reason in all cases being the fitness to correspond effectively to the conditions prescribed by environment.

{26} It is important to remember that Darwin never claimed that his doctrine of evolution could account for the occurrence of variations. That it could do so he expressly denied. "Some," he said, in his great work, *The Origin of Species* (1859) "have, even imagined that natural selection induces variability, whereas it implies only the preservation of such variations as arise.... Unless such occur, natural selection can do nothing." What he saw, and proved by an amazing wealth of illustrative facts, was that any variation in structure or character which gave to an organism ever so slight an advantage might determine whether or not it would survive amid the fierce competition around it, and whether it would obtain a mate and produce offspring. He shewed that all innate variations (which are to be distinguished from the acquired characteristics upon the inheritance of which Lamarck had depended) tend to be transmitted, so that in this manner a favourable variation might be perpetuated, and in time a new species be developed.

Simple as this account of the matter sounds when once it has been clearly stated, the discovery—for such it was—opened an entirely new chapter in the history of science, inasmuch as it completely revolutionised the conceptions which had previously been entertained with regard to the relationships and the progress of all living things.

It was Darwinism, accordingly, that provided the principal subject of the controversy which was waged between the upholders and the assailants of the older opinions during the latter half of the nineteenth century.

[1] The actual phrase "Survival of the fittest" was Herbert Spencer's. Darwin had spoken of "The preservation of favoured races."

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## CHAPTER III

### THEOLOGICAL DIFFICULTIES

We shall not exaggerate if we say that the chief interest aroused by these discoveries was a theological interest. Of course the men of science were keenly concerned to understand the new facts and the new interpretations, and among them there were divided camps and serious contentions. Sir Richard Owen, for instance, was a vigorous opponent of Darwin's views. But we cannot think it surprising that the men of religion should feel that their positions were not only being attacked, but undermined; and that issues were being raised which were more vital for them than for any other students of the problems of existence.

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When we thus speak of men of science and men of religion we do not mean to imply that there were two distinct classes which could be sharply divided. By no means. It was not so much that there were two camps as that there were two positions, with much passing to and fro between them, and the keenest interest and anxiety felt on both sides as to what the future might have to bring of widening divergence or ultimate reconciliation.

There could be no doubt at all that most formidable questions had to be faced and answered. These were the chief of them:—

Is it any longer necessary, or even possible, to insist upon a First Cause for all that exists? Can the argument from Design be said to retain its validity as a proof of the working of a controlling Mind? If we admit the evidence for the existence of a Creator, can we know anything about Him? Can we, in particular, still assert with any confidence that He is good?

Let us take the questions in order and give the replies that were made to them from the different sides. And, first of all, from the side of negation.

The number of those who directly denied that there must have been a First Cause were very few. But there were many who did their utmost to discredit the idea as due to what they held to be an illegitimate deduction from our limited human experiences. Others were disposed to quarrel with the word "Cause" altogether, and to dispute the propriety of its employment.

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They wished to banish it altogether from the scientific vocabulary, and to substitute for the terms cause and effect, antecedent and consequent, reducing causation to conjunction. But it was generally admitted that, where we have to deal with an invariable antecedent followed by an invariable consequent, nothing was to be gained by a change in the common phraseology. John Stuart Mill refused to abandon the word. Speaking of one who had done so, he said, "I consider him to be entirely wrong." "The beginning of a phenomenon is what implies a Cause." [1] There were, he allowed, "permanent causes," but, he added, "we can give no account of the origin of the permanent causes"—which was virtually to abandon the subject as being beyond the domain of science.

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In regard to the second question, it very soon became evident that the old views of Design would be subjected to the most incisive criticism. To many it appeared as if the new doctrine of evolution had supplied an explanation which left no room for the recognition of the particular contrivances upon which Paley had constructed his argument. No one asserted this more strongly than Haeckel, the German biologist. To quote his words, "The development of the universe is a monistic mechanical process, in which we discover no aim or purpose whatever; what we call design in the organic world is a special result of biological agencies; neither in the evolution of the heavenly bodies, nor in that of the crust of our earth, do we find any trace of controlling purpose." "Nowhere in the evolution of animals and plants do we find any trace of design, but merely the inevitable outcome of the struggle for existence, the blind controller." "All is the result of chance." We ought to add that he somewhat qualified this last statement by explaining that "chance" itself must be considered as coming under "the universal sovereignty of nature's supreme law." [2]

It is not to be supposed that anyone was to be found who denied the general intelligibility of Nature. To have done this would have been to reduce science to an absurdity. Science is bound to proceed upon the assumption that there are "reasons" for things. Moreover, there is mind in man, who is part of the order of Nature. It follows that what is in the part cannot be denied to the whole. All this could be freely admitted. But then the question arose, Is mind the originating

source of the movements of matter, or is it not rather itself the product of them?

{31} There were those who did not shrink from affirming that matter produces thought, even as the liver secretes bile. Others preferred to take what seemed to be an intermediate course. They were not prepared to give priority to either mind or matter. Thus Haeckel maintained that matter and thought are only two different aspects, or two fundamental attributes of an underlying something which he defined as "substance." It was to the action of this universal substance that he imagined the "monistic mechanical process" to be due. He went so far as to state his conviction that not even the atom is without "a rudimentary form of sensation and will."[\[3\]](#)

In like manner Tyndall had claimed a two-sidedness for matter, and traced all higher developments back to the side which held in it the element of spirit and thought; while admitting that "the production of consciousness by molecular action is quite as inconceivable on mechanical principles as the production of molecular action by consciousness."[\[4\]](#)

{32} The bearing of all this upon the question of Design was plain, for, if thought and intention are the outcome and result of the mechanical operations of Nature, it might well seem to follow that mind had been removed from its high place as the dominant and directing power.

{33} But these difficulties with which the theologian was thus confronted in respect of a First Cause and the recognition of Design, were even less formidable than those which were arrayed under the other heads that we have enumerated. It was Huxley who invented the term Agnosticism to describe the position of such of his contemporaries as were not inclined to deny that there was a great Power at work behind the phenomena of the Universe, but were not prepared to admit that this Power could be any degree comprehensible by us. The most systematic exponent of this view was Herbert Spencer. He allowed that we are obliged to refer the phenomenal world and its law and order to a First Cause. "And the First Cause," he said, "must be in every sense perfect, complete, total—including within itself all power, and transcending all law." But he insisted that, "it cannot in any manner or degree be known, in the strict sense of knowing."[\[5\]](#) Elsewhere he suggested that it may belong to "a mode of being as much transcending intelligence and will as these transcend mechanical motion." "Our only conception of what we know as Mind in ourselves is the conception of a series of states of consciousness." "How," he asked, "is the 'originating Mind' to be thought of as having states produced by things objective to it, as discriminating among these states, and classing them as like and unlike; and as preferring one objective result to another."[\[6\]](#) It was by a similar line of reasoning that Romanes reached the like conclusions.[\[7\]](#) "In my opinion," he said, "no explanation of natural order can either be conceived or named other than that of intelligence as the supreme directing cause." But "this cause must be widely different from anything that we know of Mind in ourselves." "If such a Mind exists, it is not conceivable as existing, and we are precluded from assigning to it any attributes."

It was obvious that, if no satisfactory reply were forthcoming to such a contention, the very word Theology must be discarded, since there would be no longer any need for it, or justification of its use.

{34} But there was yet a further criticism that was supposed by not a few to complete the discomfiture of those who still clung to the traditional beliefs. We can find it forcibly expressed in one of the earlier writings of Romanes, who in this case was endorsing the verdict of Mill. "Supposing the Deity to be omnipotent, there can be no inference more transparent than that such wholesale suffering, for whatever ends designed, exhibits an incalculably greater deficiency of beneficence in the divine character than that which we know in any, the very worst, of human characters. For let us pause for one moment to think of what suffering in Nature means. Some hundreds of millions of years ago, some millions of millions of animals must be supposed to have become sentient. Since that time till the present there must have been millions and millions of generations of millions and millions of individuals. And throughout all this period of incalculable duration, this inconceivable host of sentient organisms have been in a state of unceasing battle, dread, ravin, pain. Looking to the outcome, we find that more than one-half of the species which have survived the ceaseless struggle are parasitic in their habits, lower and insentient forms of life feasting on higher and sentient forms; we find teeth and talons whetted for slaughter, hooks and suckers moulded for torment—everywhere a reign of terror, hunger, sickness, with oozing blood and quivering limbs, with gasping breath and eyes of innocence that dimly close in deaths of cruel torture!"[\[8\]](#)

{35} Huxley, arguing to the same effect, concluded that "since thousands of times a minute, were our ears sharp enough, we should hear sighs and groans of pain like those heard by Dante at the gate of hell, the world cannot be governed by what we call benevolence."[\[9\]](#)

Haeckel went so far as to propose to describe by the term "dysteleology" that part of the science of Biology which collected the facts that gave direct contradiction to the idea of beneficial "purposive arrangement."

Such were the difficulties which loomed largest before the minds of vast numbers of thinking men and women, and did much to shake the general confidence in religion, in the years that followed the discoveries which culminated in the Darwinian theory of evolution. It must not be supposed that these thoughts were lightly entertained, nor may we imagine that they gave no distress to those who sincerely believed that they were bound to accept what seemed to be their



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inevitable consequences. To quote again from the *Candid Examination* of Romanes, we may take it that he was speaking for many others when he said, "Forasmuch as I am far from being able to agree with those who affirm that the twilight doctrine of the new faith is a desirable substitute for the waning splendour of 'the old,' I am not ashamed to confess that, with this virtual negation of God, the universe to me has lost its soul of loveliness; and although, from henceforth the precept 'to work while it is day' will doubtless but gain an intensified force from the terribly intensified meaning of the words 'that the night cometh when no man can work,' yet when at times I think, as think at times I must, of the appalling contrast between the hallowed glory of that creed which once was mine, and the lonely mystery of existence as now I find it—at such times I shall ever feel it impossible to avoid the sharpest pang of which my nature is susceptible."

[1] *Logic*, Chap. V.

[2] *The Riddle of the Universe*, Chaps. XIV, XV.

[3] Chap. XII.

[4] *Fragments of Science*, p. 222.

[5] *First Principles*, i., pp. 33-39.

[6] *Essays*, Vol. III., pp. 246, f.

[7] In an essay written before 1889.

[8] *A Candid Examination of Theism* (1876), pp. 171, f.

[9] *Nineteenth Century*, February, 1888.

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## CHAPTER IV

### THE COUNTER-ARGUMENTS

It must not be imagined that all the arguments were on one side. Far from it. The defenders of the old faith were many, and not the least able of them were drawn from the ranks of the men of science. The list of scientific leaders who avowedly ranged themselves on the Christian side, if it were made out, would be a long one. It would include distinguished names such as those of Faraday, Joule, the Duke of Argyll, Lord Kelvin, Stokes, Tait, Adams, Clerk Maxwell, Salmon, Cayley, and Pasteur. And others would have to be added who, after contending for a while as materialists or agnostics, ultimately changed their attitude and joined the supporters of Theism. Haeckel frankly admitted that there were such defaulters from his cause in Germany, giving the names of "two of the most famous of living scientists, R. Virchow and E. Du Bois Raymond," amongst others. On the other hand he recommended his readers to study "the profound work of Romanes," without, it would seem, being aware of the transformation that took place in that thinker's opinions towards the end of his life.

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We have now to indicate the nature of the replies that were made to the difficulties of which we spoke in our last chapter. Let us follow the order in which they were presented.

About the necessity for a First Cause not much had to be said. Even if the whole course of organic development could be proved to have been continuous without a break from the first movements of matter, through all the changes of physical life, up to the highest exhibition of human powers—and no one ventured to say that this had been proved—there would still be the necessity for an initial impulse to set the process in action. Spencer, as we have seen, declared that there must have been a First Cause, and Tyndall agreed that "the hypothesis" of Evolution "does nothing more than transport the conception of life's origin to an indefinitely distant past."

[1]

Darwin himself never hesitated on this point. "The theory of evolution," he insisted, "is quite compatible with the belief in God." [2] The words which he expressly added to the conclusion of the *Origin of Species* are well known. After describing once again the production of the innumerable forms of being as the result of natural selection, he said: "There is a grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one."

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It is well also to keep on record the striking dictum of Lord Kelvin, addressed to the students of University College. [3] "Science," he told them, "positively affirmed creative power."

It will be remembered that we quoted Mill as speaking of "permanent causes." We may be

grateful to him for the suggestion. We could not readily think of a better term than the great "Permanent Cause" by which to describe, in modern language, the "I AM" of the Biblical Theology.[4]

{40} But, if on this point there was no serious conflict of opinion, it was otherwise in regard to the next. Here it did look as if the new discoveries might have changed the whole situation. Huxley acknowledged that what struck him most forcibly on his first perusal of the Origin of Species, was that "teleology, as commonly understood, had received its death-blow at Mr. Darwin's hands." [5] But Huxley was a born fighter, and he could turn his weapons with facility and effect against his friends when he thought they had overstated their case. It is interesting to find him, in 1867, criticising Haeckel for his repudiation of the principle of Design.

"The Doctrine of Evolution," he says, "is the most formidable opponent of the commoner and coarser forms of teleology."

{41} "The teleology which supposes that the eye such as we see it in man, or one of the higher vertebrata, was made with the precise structure it exhibits, for the purpose of enabling the animal which possesses it to see, has undoubtedly received its death-blow. Nevertheless, it is necessary to remember that there is a wider teleology which is not touched by the doctrine of evolution, but is actually based upon the fundamental proposition of evolution." Then, referring to the appeal which had been made to the existence of rudimentary organs as discrediting teleology, he says in his characteristic way: "Either these rudiments are of no use to the animals, in which case they ought to have disappeared; or they are of some use to the animal, in which case they are of no use as an argument against teleology." [6]

Darwin himself felt the grave difficulty in which the ordinary arguments had become involved; but he was most unwilling to abandon his belief in Design.

"The old argument from design in nature as given by Paley," he wrote, "which formerly seemed to me so conclusive, fails now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by a man." On the other hand, he could not shut his eyes to the fact that there are "endless beautiful adaptations which we everywhere meet with," [7] and to the further fact that "the mind refuses to look at this universe, being what it is, without having been designed." [8]

{42} A few years later, when Dr. Asa Gray had sent him from America a review in which he had written of "Mr. Darwin's great service to natural science in bringing back teleology," on the ground that in Darwinism usefulness and purpose come to the front again as working principles of the first order, Darwin replied, "What you say about teleology pleases me especially." [9] Later still, in 1878, Romanes sent him a copy of his *Candid Examination*. Darwin in his letter of acknowledgment wrote more than half seriously, in the person as it were of an imaginary correspondent, to this effect:

"I should like to hear what you would say if a theologian addressed you as follows:

"I grant you the attraction of gravity, persistence of force (or conservation of energy), and one kind of matter, though the latter is an immense addition, but I maintain that God must have given such attributes to this force, independently of its persistence, that under certain conditions it develops or changes into light, heat, electricity, galvanism, perhaps into life.

{43} "You cannot prove that force (which physicists define as that which causes motion) would invariably thus change its character under the above conditions. Again, I maintain that matter, though it may be in the future eternal, was created by God with the most marvellous affinities, leading to complex definite compounds, and with polarities leading to beautiful crystals, etc., etc. You cannot prove that matter would necessarily possess these attributes. Therefore you have no right to say that you have "demonstrated" that all natural laws necessarily follow from gravity, the persistence of force, and existence of matter. If you say that nebulous matter existed aboriginally and from eternity, with all its present complex powers in a potential state, you seem to me to beg the whole question."

"Please observe it is not I, but a theologian, who has thus addressed you, but I could not answer him." [10]

The alternatives to Design, *i.e.*, to the recognition of directive activity, would be Necessity or Chance. From both of these the deepest instincts of humanity—which in such matters are as fully to be relied on as its logical faculty—strongly recoil. No one has spoken out more strongly about the first than Huxley did.

{44} "What is the dire necessity and 'iron' law under which you groan?" he asks. "Truly, most gratuitously invented bugbears. I suppose if there be an 'iron' law, it is that of gravitation; and if there be a physical necessity, it is that a stone, unsupported, must fall to the ground.... But when, as commonly happens, we change *will* into *must*, we introduce an idea of necessity which most assuredly does not lie in the observed facts, and has no warranty that I can discover. For my part, I utterly repudiate and anathematise the intruder.... The notion of necessity is something illegitimately thrust into the perfectly legitimate conception of law; the materialistic position that

there is nothing in the world but matter, force, and necessity, is as utterly devoid of justification as the most baseless of theological dogmas."<sup>[11]</sup>

But a dogma of Necessity would be more tolerable than a doctrine of Chance. In Lord Kelvin's address, to which reference has been made, he declared his conviction that "directive power" was "an article of belief which science compelled him to accept."

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There was nothing, he said, between such a belief and the acceptance of the theory of a fortuitous concurrence of atoms. And, in a letter to the *Times* justifying this assertion, he told how forty years before he had asked Liebig, when walking with him in the country, whether he believed that the grass and flowers they saw around them "grew by mere chemical forces." "No," he answered, "no more than I could believe that a book of botany describing them could grow by mere chemical forces."

Discussions may continue as to whether what Huxley called "the wider teleology," or some other form of the doctrine of Design is to be preferred; but thoughtful men are likely to agree with the judgment given by Sir George Stokes—that recognised master of masters—when he said: "We meet with such overwhelming evidence of design, of purpose, especially in the study of living things, that we are compelled to think of mind as being involved in the constitution of the universe."<sup>[12]</sup>

[1] *Fragments of Science*, p. 166.

[2] *Life and Letters*, I., p. 307.

[3] May 2nd, 1903.

[4] The debate as to the accuracy of the Mosaic account of Creation does not come directly within the scope of our survey; but, nevertheless, it may be worth while to recall the following statement in view of the very confident assertions that have often been made, by no less an authority than Romanes. "The order in which the flora and fauna are said by the Mosaic account to have appeared upon the earth corresponds with that which the theory of evolution requires and the evidence of geology proves."—(*Nature*, August 11th, 1881.)

[5] *Lay Sermons*.

[6] *Critiques and Addresses*, pp. 305, 308.

[7] *Life and Letters*, I., p. 309.

[8] I., p. 314.

[9] *Life and Letters*, III., p. 189.

[10] *Life and Letters* of Romanes, pp. 88.

[11] Essay on "The Physical Basis of Life" (1868).

[12] *Gifford Lectures* (1891), p. 196.

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## CHAPTER V

### THE COUNTER-ARGUMENTS (*continued*)

But though Materialism had to go, there was a time when it seemed to many by no means unlikely that Agnosticism might have to be accepted as its substitute. And if that had been so the case would have been scarcely less desperate. We might have been left with a philosophy of a kind, but we should have been deprived of any object which could evoke within our hearts the trust and affection that are needed to sustain a religion. However, as it proved, there was no great cause for fear. Agnosticism was subjected in its turn to the ordeal of criticism, and the result proved that it had not in it the substance and force that could give it any permanent hold upon the best intelligence of the age.

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If Agnosticism could have been content to confine itself to positive assertions, there might have been less cause to find fault with it. But its name stood for negation, and its temper was in accord with its name. The exponents of Agnosticism were not satisfied with affirming that the Power behind phenomena is beyond all thought mysterious. They insisted that it is unknowable, and that not merely in the sense that it is incomprehensible, not to be fully grasped, but unknowable in the sense that nothing at all can be known about it. And then, having laid down this as their fundamental principle, they proceeded at once, with a strange inconsistency, to assert that we can know what it is *not*. This above all else, they said, it is not: it is not personal.

True, Herbert Spencer maintained that it is as far raised above personality as personality is raised above unconsciousness; but the stress was laid not upon the affirmation of super-personality, but upon the denial and rejection of anything like personality as we understand it.

{48} The position was really untenable. Possibly, if we could detect no more in Nature than power, we might be content, intellectually, to stop at the affirmation of inscrutable force. But if there is also design, then we are bound to go a step further. Bishop Harvey Goodwin expressed this exactly when he said: "Purpose means person." No doubt personality in the Creator must be something far higher and fuller than personality in the creature. The German philosopher Lotze was speaking the truth when he declared that "to all finite minds there is allotted but a pale copy" of personality; "the finiteness of the finite," being "not a producing condition of personality," as has often been maintained, "but a limit and hindrance of its development." "Perfect personality," he said, "is in God alone."<sup>[1]</sup>

To most of us it may sound paradoxical to urge that the full Christian doctrine of the Three Persons in the Godhead is really less difficult intellectually than the doctrine that the Divine Being consists of an isolated unit.

{49} This was the contention of the Greek Fathers of the Church, whose acute and subtle minds anticipated not a few of the objections which we have had to encounter in our days. We cannot elaborate the statement here,<sup>[2]</sup> but it is to the point to observe that the doctrine of the Trinity in Unity removes from the Christian believer that which to Spencer was one of the greatest obstacles in the way of the acceptance of the idea of a Divine Personality; for it relieves him from the necessity of imagining a subject without an object, since in the Christian view the highest life in the universe is a social life, in which thought is for ever communicated with unbroken harmony of feeling and will.

But the inadequacy of Agnosticism was to be seen not only on the intellectual side. Its practical effects were necessarily determined by its negations. Since we could know nothing of the ultimate power, it was plainly our wisdom to turn our attention elsewhere. It followed that, if morality was to be upheld, it must be based upon other than the familiar sanctions. For awhile it was enthusiastically promised that this could and should be done. But the event proved otherwise. Towards the end of his life, Herbert Spencer was constrained to admit this. "Now that ... I have succeeded in completing the second volume of *The Principles of Ethics* ... my satisfaction is somewhat dashed by the thought that these new parts fall short of expectation. The doctrine of Evolution has not furnished guidance to the extent that I had hoped."<sup>[3]</sup>

{50} And this moral failure of the system pointed yet deeper to its essential weakness. It deliberately ignored the profoundest needs and capacities of our nature. The need is the need for God, and for One who, though greatly above us, is yet within our reach, and ready to give us His friendship. "Thou hast made us for Thyself, and our heart is restless until it rests in Thee." That cry of St. Augustine has found its echo in unnumbered souls, and our humanity will never be satisfied while it is offered no more than an impalpable abstraction for the contentment of its craving.

{51} Allusion has been made to the fact that Romanes in his latter days was led to abandon the negative attitude which he had taken in his earlier life. The story of the change is to be found as told by himself in the volume of *Life and Letters* edited by his widow, and in the *Notes* which he left behind him. These he had written in preparation for a book which was to have been entitled: *A Candid Examination of Religion*.<sup>[4]</sup> It is evident that no consideration weighed more with him than this witness of the deeper needs of the soul. We have seen with what sorrow he had accepted as a young man the conclusions to which he had found himself driven when Theism seemed no longer a possible belief. After his change he admitted that he had failed to recognise an important element in his treatment of the problem. "When I wrote the preceding treatise I did not sufficiently appreciate the immense importance of *human* nature in any enquiry touching Theism. But since then I have seriously studied anthropology (including the science of comparative religions), psychology, and metaphysics, with the result of clearly seeing that human nature is the most important part of nature as a whole whereby to investigate the theory of Theism."<sup>[5]</sup>

{52} The outcome of his study was to convince him of two things. The first was that, "if the religious instincts of the human race point to no reality as their object, they are out of analogy with all other instinctive endowments. Elsewhere in the animal kingdom we never meet with such a thing as an instinct pointing aimlessly."<sup>[6]</sup> And this first conviction was only the preparation for a second. Speaking again of his *Candid Examination of Theism*, he says: "In that treatise I have since come to see that I was wrong touching what I constituted the basal argument for my negative conclusion ... Reason is not the only attribute of man, nor is it the only faculty which he habitually employs for the ascertainment of truth. Moral and spiritual faculties are of no less importance in their respective spheres, even of everyday life; faith, trust, taste, etc., are as needful in ascertaining truth as to character, beauty, etc., as is reason."<sup>[7]</sup>

He put the same thing with even more of the note of personal experience when he wrote to Dean Paget of Christ Church within three months of his death: "Strangely enough for my time of life, I have begun to discover the truth of what you once wrote about logical processes not being the only means of research in regions transcendental."<sup>[8]</sup> In all this he was following, as he knew, in the steps of Pascal, who had devoted the whole of the first part of his treatise to the argument

from the condition of man's nature without God, and then had appealed to that nature for its positive testimony to the reality of the spiritual. "The heart has its reasons that the reason does not know."

Agnosticism appeared dressed in the garb of an exceeding reverence, but, on closer acquaintance, it became evident that its acceptance would mean the cheapening of life by banishing from it the Divine personality, and robbing the human of the qualities that give it its greatest worth. Happily the disaster has been averted, and there are not many now who would seriously undertake its defence.

[1] *Microcosmus* (E.T.), II., p. 688.

[2] Those who may desire to see the matter clearly and ably handled would do well to read the Essay on "The Being of God," in *Lux Mundi*, by Aubrey Moore.

[3] Preface, Vol. II. (1893).

[4] These notes were sent by Mr. Romanes' desire after his death, in 1894, to Bishop Gore, and have been published by him in a sixpenny volume under the title of *Thoughts on Religion*.

[5] P. 154.

[6] P. 82.

[7] Pp. 111, f.

[8] Life and Letters, p. 375.

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## CHAPTER VI.

### THE COUNTER-ARGUMENTS (*continued*)

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We have still to see how the last of the difficulties of which we have spoken was treated. It was a difficulty which could not be regarded with indifference. For what would it avail to shew that men had a right to cherish the belief in Power, and Purpose, and Personality, unless they could also be assured that the Orderer of the world is good? Nay, might they not feel, if there were no such assurance, that it would be better to be altogether without His presence and influence? On a matter so vital to happiness and well-being the mere possibility of a doubt was torment enough. What was there to be said to bring relief to the mind and heart when charges were made against the benevolence and beneficence of Nature's ways? What satisfactory account could be given of the waste and cruelty which were seen to abound on every hand? The more clear the certainty that there is design in the Universe, the more urgent became the question as to the character of that design, and of the motives that prompt it.

So long as the difficulty remained unrelieved, the thoughts of many of the most sensitive minds in regard to Theism were held in suspense. The shadow of misgiving was felt to be creeping over the mind of the age, like the gloom of an approaching eclipse, even before the arrival of the Darwinian hypothesis. In words too well known to need repeating, Tennyson had given utterance to the half-realised anxiety of his contemporaries in the stanzas of his *In Memoriam*, published in 1850.

What the finer spirits were already beginning to feel was soon to be proclaimed, in terms which could not fail to be understood by the multitude, as an inevitable truth brought to light by scientific enquiry. We have seen how it was stated with the passion of eloquence by Huxley and Romanes. And Darwin, with all his detachment and philosophic calm, was at times deeply affected by the seriousness of the problem which he had done so much to bring into prominence. It is plain that he did his very utmost to retain the hopeful view, and to put the most consoling interpretation he could upon the disquieting facts.

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He had no difficulty in shewing that the wholesale destruction of living organisms was imperatively necessary. "There is no exception to the rule," he said, "that every organic being naturally increases at so high a rate that, if not destroyed, the earth would soon be covered by the progeny of a single pair."<sup>[1]</sup>

The truth of this has been demonstrated again and again. A pair of rabbits, for example, would in the most favourable circumstances increase in four or five years to a million. The roe of a cod may contain eight or nine millions of eggs. More appalling still, the female of the common flesh fly will at one time deposit 20,000 eggs. At this rate of increase it has been calculated that, in less than a year, a single pair would produce enough flies, if these were not devoured by their

natural foes, to cover the whole surface of the globe to the depth of a mile and a quarter! But all this does not, of course, make it clear why in a beneficently ordered world such a necessity of slaughter should ever have been allowed to arise.

{56} Darwin, as we have said, tried hard to take the most favourable view of the whole process. He thus concluded his chapter on the struggle for existence; "When we reflect on the struggle, we may console ourselves with the full belief that the war of nature is not incessant, that no fear is felt, that death is generally prompt, and that the vigorous, the healthy, and the happy survive and multiply." And these are the words with which he concluded the *Origin of Species*: "Thus from the war of nature, from famine and death, the most exalted object we are capable of conceiving, namely the production of the higher animals, directly follows."

But a year or two later he shewed that his mind was by no means at rest on the matter, by writing in this strain to his friend Asa Gray:

"I own that I cannot see as plainly as others do, and as I should wish to do, evidence of design and beneficence on all sides of us. There seems to me too much misery in the world. I cannot persuade myself that a beneficent and omnipotent God would have designedly created the *Ichneumonidae* with the express intention of their feeding within the living bodies of caterpillars, or that a cat should play with mice.... I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call chance. Not that this notion *at all* satisfies me.... Let each man hope and believe what he can. Certainly I agree with you that my views are not at all necessarily atheistical."<sup>[2]</sup>

{57} Happily there were others who were able to see their way somewhat further than this. Romanes, in a paper which he read before the Aristotelian Society in 1889, shewed that he was reconsidering his position. He questioned whether the assertion, made by a speaker in a previous discussion, that "the fair order of Nature is only acquired by a wholesale waste and sacrifice," could be accepted as strictly true, for "how can it be said that, in point of fact, there *has* been a waste, or *has* been a sacrifice? Clearly such things can only be said when our point of view is restricted to the means (*i.e.*, the wholesale destruction of the less fit); not when we extend our view to what, even within the limits of human observation, is unquestionably the *end* (*i.e.*, the causal result in an ever improving world of types)."<sup>[3]</sup>

{58} He had intended to write more fully on the subject, but did not live to do so. We only know that on the Sunday before his death he did express to Bishop Gore his entire agreement with a statement that had been made a short time before by Professor Knight, in his *Aspects of Theism*, to the effect that "A larger good is evolved through the winnowing process by which physical nature casts its weaker products aside, etc."<sup>[4]</sup> We cannot suppose that, if he had lived, he would have been content to have left the argument thus. That the end justifies the means, is scarcely a doctrine which can be accepted as the last word of an ethical defence of the constitution of the world.

{59} No doubt there were further pleas to be put in, and we shall do well to give them their full value. There is the contention that the pleasures of life as a whole outweigh the sum of its evils. This was maintained, and we need not hesitate to say successfully maintained, by Lord Avebury, and not by him alone. Indeed Darwin had emphatically said, "According to my judgment happiness decidedly prevails."<sup>[5]</sup> Then there has always been urged the undoubted fact that pain, if an evil, is yet the minister of good. Browning's optimism may have carried him too far when he laid it down that "when pain ends gain ends," but it is not to be questioned that men have profited by sufferings, and that they have had to thank their pains, if only because these have served to protect them from yet greater misfortunes. There is a true wisdom in the moral of the old fable of the blacksmith, who prayed to heaven that the fire might not burn his fingers, to discover that as a result it had charred his hand to the bone. Medical science has had much to say with regard to the salutary office of pain. It has gone so far as to assert that, "the symptoms of disease are marked by purpose, and the purpose is beneficent." Nay more, "the processes of disease aim not at the destruction of life, but at the saving of it."<sup>[6]</sup> None the less, with what might seem a splendid inconsistency, the medical profession devotes itself untiringly to the alleviation of the symptoms and to the eradication of disease.

Again, we may be thankful to be assured that, whatever be the case with man, the lower organisms feel pain less than he does, and much less than he is often wont to imagine that they feel it. This has been argued again and again by the veteran naturalist Wallace, whose right to speak on the subject no one is likely to dispute. In his recently published book, *The World of Life*, he has devoted a whole chapter to answering the question, "Is Nature cruel?" and it is due to him, as well as to the importance of the problem, that we should carefully note what he has said. The following quotations may be taken as sufficiently indicating his position.

{60} "The widespread idea of the cruelty of Nature is almost wholly imaginary."<sup>[7]</sup> "Our whole tendency to transfer *our* sensations of pain to the other animals is grossly misleading."<sup>[8]</sup>

"No other animal *needs* the pain-sensations that we need; it is therefore absolutely certain—on principles of evolution—that no other possesses such sensations in more than a fractional degree of ours."<sup>[9]</sup>

"In the category of painless or almost painless animals, I think we may place almost all

aquatic animals up to fishes, all the vast hordes of insects, probably all mollusca and worms; thus reducing the sphere of pain to a minimum throughout all the earlier geological ages, and very largely even now."[\[10\]](#)

"The purpose and use of all parasitic diseases is to seize upon the less adapted and less healthy individuals—those which are slowly dying and no longer of value in the preservation of the species, and therefore to a certain extent injurious to the race by requiring food and occupying space needed by the more fit."[\[11\]](#)

{61} Speaking of "the vicious-looking teeth and claws of the cat tribe, the hooked beak and prehensile talons of birds of prey, the poison fangs of serpents, the stings of wasps and many others," Dr. Wallace writes; "The idea that all these weapons exist for the *purpose* of shedding blood or giving pain is wholly illusory. As a matter of fact, their effect is wholly beneficent even to the sufferers, inasmuch as they tend to the diminution of pain. Their actual purpose is always to prevent the escape of captured food—of a wounded animal, which would then, indeed, suffer *useless* pain, since it would certainly very soon be captured again and be devoured." "All conclusions derived from the house-fed cat and mouse are fallacious."[\[12\]](#) Finally he concludes by inveighing against "the ludicrously exaggerated view adopted by men of such eminence and usually of such calm judgment as Huxley—a view almost as far removed from fact or science as the purely imaginary and humanitarian dogma of the poet:

"The poor beetle, that we tread upon,  
In corporal sufferance finds a pang as great  
As when a giant dies.'

{62} Whatever the giant may feel, if the theory of Evolution is true, the 'poor beetle' certainly feels an almost irreducible minimum of pain, probably none at all."[\[13\]](#)

We may add to all these considerations the further fact that we are constantly finding out that things have their use which had been too hastily assumed to be mere blots upon Nature. The desert and the volcano, for instance, have often been regarded in that light. But we have lately been assured that both are needed for the supply of atmospheric dust, which is a necessary condition of the rain-fall; so that they are really essential to life upon the planet. Beyond question, then, there is very much to be said in mitigation of the terrible difficulty occasioned by what appear to be the havoc and the prodigality of Nature.

And yet—when all has been said—a residuum does remain of inexplicable misery and distress, and there are times when we are all of us constrained to cry out with Darwin that it is "too much," and to ask whether there is not some further clue to the mystery. And then it may well be that there comes to our mind an answer that has been given from the very first moment at which human beings have thought at all. It is an answer which has seemed inevitable alike to the simplest and the wisest.

{63} Carlyle once told of two Scottish peasants who found themselves for the first time at Ailsa Crag. They stared in astonishment at the great sea-precipices. At last one said to the other: "Eh, Jock, Nature's deevilish!"[\[14\]](#) That was the view taken by the primitive races of the world, as their worships and incantations bore witness. It is a view which cannot be lightly dismissed as having nothing at all in its support. We may minimise the evil that is at work around and within us as we will, but, when we have done our utmost, we shall be unlike the vast majority of our race if we are not compelled to admit that there is that in the world which it is quite impossible to ascribe to the immediate action of an entirely good and beneficent God.

{64} Is it then to be thought incredible that the order of the world should have been interfered with, at an early stage in its development, in such a way that the disarrangement was left to work out its fatal mischief by means of the very constancy of the great system of laws which make for a regular development? How this might conceivably have occurred has been set out by an anonymous writer in a remarkable book which ought to be better known than it is. It was published some years ago,[\[15\]](#) and bears the suggestive title of *Evil and Evolution*. The author maintains that the original motive in all living things was self-preservation for self-realisation; and that this elementary law was in itself necessary and good, the essential condition of progress. But just as we to-day know well how hard it is to draw the line which distinguishes a right self-seeking from the wrong, so it has been from the outset. The distinction is a fine one, and the balance is easily upset. We have but to suppose that this perversion of the right and lawful happened at an early stage, to see that nothing more would have been required to account for the subsequent heritage of woe.[\[16\]](#) After speaking of the innocent "kind of comparative strife that we see in the fields and forests around us," in which "there may be nothing that we cannot reconcile with the perfect beneficence of the Great Designer and Creator," this writer goes on to say: "But the moment that evolution has attained that point at which the struggle begins to involve pain and unhappiness, it becomes quite another matter. The moment that rudimentary but happy and congenial life begins to be overshadowed by fear, or debased by conscious cruelty, the moment that process of evolution begins to evolve not only cruel selfishness in its most odious forms, but deceit and artifice and treacherous cunning in the warfare which one animal wages with another, then I think you may be certain of one of two things—either the Creator is not all-benevolent, or that that scheme is somehow working out as He never intended it should:

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there must have been some disturbing and hostile influence."[\[17\]](#)

{66} This is well put, but the interest of the book chiefly consists in its attempts to show in detailed instances how things that are evil may have been made so. The author boldly argues that, if the normal course had been followed, "birds and beasts of prey and venomous reptiles would never have been evolved." "Evolutionists," he says, "are agreed that it is just the fierce struggle of created things that has produced these birds and beasts of prey, and that there can be little doubt that it is the malignity of the struggle that has produced the venom of so many reptiles."[\[18\]](#) Instances are given in which such venom may now be developed as the result of rage or terror in an otherwise harmless animal.

"A few years ago it was reported that the late M. Pasteur 'cultivated' the poison of human saliva to such a point that he was able to produce with it many of the effects of the most virulent snake poisons."[\[19\]](#) Had they not been inflamed by the terror of the struggle for existence, "tigers and hyaenas, vultures and sharks, ferrets and polecats, wasps and spiders, puff-adders and skunks" might have turned their undoubted abilities in other more desirable directions.[\[20\]](#) Again, "it is the perpetual effort, generation after generation, through long ages, to repair the mischief inflicted by enemies," that accounts for "the fecundity of the codfish and other creatures. The more prolific it becomes, the more enemies it can feed; and the more they multiply, the more prolific it grows." A vicious circle indeed! Even "earthquakes, storms, droughts, deluges," are explained as due to a certain want of balance and failure in adjustment.[\[21\]](#)

{67} Certainly, if we had to choose between the idea of a careless or indifferent God, and the belief in a God who has given us ample proofs of a generally beneficent purpose, but who has, for reasons of the meaning of which we as yet can have only the vaguest conceptions, allowed Himself to be hindered and thwarted on the way to His goal, with results of suffering to Himself even greater than those endured by His creatures; if these were the alternatives before us, there can scarcely be one of us who would hesitate to say towards which of them his reason and conscience would confidently point him.

[\[1\]](#) *Origin of Species*, Chap. III.

[\[2\]](#) *Life and Letters*.

[\[3\]](#) *Thoughts on Religion*, pp. 92, f.

[\[4\]](#) p. 94.

[\[5\]](#) *Life and Letters*, I., p. 309.

[\[6\]](#) Address by Sir Frederick Treves at the Edinburgh Philosophical Institution, October, 1905.

[\[7\]](#) p. 380.

[\[8\]](#) p. 377.

[\[9\]](#) p. 381.

[\[10\]](#) p. 375.

[\[11\]](#) p. 383.

[\[12\]](#) p. 377. Among the illustrations that have been adduced of the insensibility of the lower organisms, none perhaps is more extraordinary than this: "A crab will continue to eat, and apparently relish, a smaller crab while being itself slowly devoured by a larger one!"—(*Transactions of Victoria Institute*, Vol. XXV., p. 257).

[\[13\]](#) p. 384.

[\[14\]](#) William Allingham's *Diary*, p. 226.

[\[15\]](#) In 1896, by Messrs. Macmillan.

[\[16\]](#) In one instance, at least, Darwin had pictured in his imagination the steps by which a "strange and odious instinct" may have been developed from comparatively innocent beginnings. He was referring to the ejection by the young cuckoo of its companions from the nest. "I can see no special difficulty in its having gradually acquired, during successive generations, the blind desire, the strength and structure necessary for the work of ejection." "The first step towards the acquisition of the proper instinct might have been mere unintentional restlessness on the part of the young bird."—*Origin of Species*, p. 200.

[\[17\]](#) Pp. 135, f.

[\[18\]](#) P. 142.

[\[19\]](#) P. 143.

[\[20\]](#) P. 144.

[\[21\]](#) P. 232.



## CHAPTER VII

### LATER SCIENCE

The position, as we have described it, was that which may be said to have existed up to about twenty years ago. Since then much new light has come. Indeed, Lord Kelvin, speaking at Clerkenwell on February 26th, 1904, is reported in *The Times* to have said, referring to the extraordinary progress of scientific research, that it "had, perhaps, been even more remarkable and striking at the beginning of the twentieth century than during the whole of the nineteenth."

Let us take first that which he had more particularly in mind, the advance in the knowledge of the constitution of Matter.

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In an address delivered before the British Association at Bradford in 1873, Clerk Maxwell had stated the conclusions to which science had, up to that time, been led in its investigations of matter. Throughout the natural universe it had been shewn, by Spectrum Analysis, that matter is built up of molecules. These molecules, according to the most competent judgment, were incapable of sub-division without change of substance, and were absolutely fixed for each substance. "A molecule of hydrogen, for example, whether in Sirius, or in Arcturus, executes its vibrations in precisely the same time." The relations of the parts and movements of the planetary systems may and do change, but "the molecules—the foundation-stones of the natural universe—remain unbroken and unworn."

As a result of this, it was maintained that "the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel has well said, the essential character of being a manufactured article, and precludes the idea of its being eternal and self-existent." "Not that science is debarred from studying the internal mechanism of a molecule which she cannot take to pieces ... but, in tracing back the history of matter, science is arrested when she assures herself, on the one hand, that the molecule has been made, and on the other that it has not been made by any of the processes we call natural."

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So the case had stood for some while until science, through its indefatigable inquirers, shewed that it was in very deed "not debarred from studying the internal mechanism of a molecule," nor, perhaps, from taking it to pieces. In 1895 came the discovery of the X-rays by Röntgen in Germany, to be followed in a year by Becquerel's discovery of spontaneous radio-activity, and in a couple of years by the remarkable further discovery, made by Madame Curie, of what was termed "radium," a substance that went on producing heat *de novo*, keeping itself permanently at a higher temperature than its surroundings, and spontaneously producing electricity.

This in itself was a new fact of extraordinary interest. For long, discussion had been waged between two departments of scientific inquirers. The geologists and biologists had demanded hundreds, and perhaps thousands, of millions of years to allow for the developments with which they were concerned. The physicists, led by Lord Kelvin, refused to admit the demand, claiming that it could be proved mathematically that it was impossible that the sun could have been giving out heat at its present rate for more than a hundred million years, at the very outside. The appearance of radium robbed this argument of its cogency. It is true that an examination of the sun's spectrum has not, as yet, revealed any radium lines, but it is well known that helium, a transformation product of radium, is present in it.

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And this modification of our views as to the probable age of our solar system was far from being the only result of this latest discovery. Investigations which followed into radio-activity led the Cambridge professors, Larmor and Thomson, to conclude that electricity existed in small particles, which were called "electrons."<sup>[1]</sup> These seem to be the ingredients of which atoms are made. A molecule is composed of two or more atoms. That of hydrogen, for example, has two; that of water three; and so on up to a thousand or more.

Molecules are very small. If a drop of water were magnified to the size of the globe, the molecules would be seen to be less than the size of a cricket ball!

Atoms are much smaller. "The atoms in a drop of water outnumber the drops in an Atlantic Ocean." Electrons are much smaller still—about "a thousand-million-million times smaller than atoms."<sup>[2]</sup>

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Within the atom thousands or tens of thousands of these electrons are moving in orderly arrangement, at terrific speed, round and about one another. The amount of energy required to build up a molecule of any degree of complexity is very great, and it is by the breaking down of complex molecules into simple ones that all our mechanical work is done. And this is not all, for not only can the molecule be thus broken in pieces, but the atom itself is capable of disintegration. "Although we do not know how to break atoms up, they are liable every now and

then themselves to explode, and so resolve themselves into simpler forms." "Atoms of matter are not the indestructible and immutable things they were once thought."<sup>[3]</sup> The idea of the amount of energy thus revealed as available for all kinds of active work is so vast as to baffle calculation and even imagination. It has been said that there is energy enough in fifteen grains of radium, if it could all be set free at once, to blow the whole British Navy a mile high into the air. The thought that we are thus encompassed on every side by pent up potentialities of force, which if uncontrolled might at any moment work our destruction, may well deepen in us the sense of the need, not only for an originating, but for a continually directing mind to superintend the conduct of the universe.

{73} We have referred to more than one change of view to which the new discoveries have led. We shall doubtless find that there are other scientific theories which will have ere long to be modified. Already it is recognised that the arguments of Lord Kelvin (he was then Sir William Thomson) and of Clerk Maxwell, which were based upon calculations as to the "dissipation of energy," can scarcely remain unaffected by what we now know, and suspect, of the crumbling and re-forming of atoms.

And there are hints abroad of even more revolutionary suggestions. If there has been one principle more imperatively and unanimously insisted upon than another, it has been the uniformity of Nature's laws. What then are we to make of a remark like the following, made by Professor J. J. Thomson, perhaps only half-seriously, to the British Association at Cambridge, in 1904? "There was one law," he said, "which he felt convinced nobody who had worked on this question"—the radio-activity of matter—"would ever suggest, and that was the constancy of Nature."

{74} Not less startling is it to be told that a question may yet be raised which will challenge "the conception of a luminiferous aether, which for half a century has dominated physical science. It is possible," so we are informed, "that the field of electro-magnetic energy surrounding an electric charge in motion moves with it, and that the vibrations of light travel through this moving field, instead of through an ocean of stagnant aether."<sup>[4]</sup>

One further quotation of singular interest may be added. It is taken from an address to students by the President of the Institution of Mining and Metallurgy.<sup>[5]</sup>

{75} "Twenty years ago," he said, "the idea held that inorganic chemistry was almost a dead science—dead in the sense of being apparently completed in many of its aspects, and that its records could be safely confided to the encyclopaedia.... A modified conception of life is now becoming co-extensive with the whole range of our experience. Even a simple inorganic crystal does not spring ready formed from its solvent, but first passes through phases of granulation and striation comparable with those which characterise the beginnings of vital growth. Metals exhibit in some respects phenomena similar to those possessed by organised beings. Thus, they show fatigue under long continued stress, and they recover their strength with rest. They are also susceptible to certain of the poisons which destroy organic life. Matter, broadly, is no longer merely dead masonry from which the edifice to shelter life is constructed, but also appears to be the reservoir of that energy which is developed, altered and drawn into vitality itself.... The indestructibility of matter bids fair to become relegated to the museum of outworn theories; and with it will probably go our present conceptions as to the conservation of energy."

It is clear, then, that the tasks awaiting the students of physical science are likely to be as arduous, and we may hope as full of reward, as they have been at any time in the past. Meanwhile, it does look as if there were truth in Mr. Balfour's remark that "Matter is not merely explained, but is explained away."<sup>[6]</sup>

[1] The weighing and measuring of the electron were first announced by Professor Thomson to the British Association meeting at Dover, in 1899.

[2] Sir Oliver Lodge.

[3] Sir Oliver Lodge. *Life and Matter*, p. 28.

[4] Whetham. *The Foundations of Science*, p. 50.

[5] H. L. Sulman, at the Sir John Cass Institute, November 29th, 1911.

[6] Presidential Address to British Association, 1904.

## LATER SCIENCE (*continued*)

We have spoken of what science has recently been doing in the investigation of the constitution of matter; we have now to talk of its researches into the nature of Life.

{77} The discovery that all plant and animal life is developed from living cells was made, as we have already stated, more than seventy years ago. Since then our knowledge of the formation and history of these cells has been continually growing. The size of cells varies, but as a rule they are very minute. They consist of what is termed protoplasm. At one time it was supposed that protoplasm was structureless. Now it is known that the protoplasmic cell contains a nucleus and a surrounding body. Moreover, the nucleus, or small spot in the centre, has within it a spiral structure of a very complicated kind. Every cell is derived from a pre-existing cell by a process of division, the two resulting cells being apparently identical with the parent cell. The cells possess the power of assimilating other cells or fragments of cells. As they grow they move and go in search of food and light and air and moisture. They exhibit feeling, and shrink as if in pain. Spots specially sensitive to vibrations become eyes and ears; and thus the various organs and faculties are evolved under the stimulating influence of environment. The progress, so far as it is physical, can be traced from the lowest blue-green algae right up to man. And all throughout, in so far as their chemical composition is concerned, the constituent elements of the living structure are the same. It is said to be practically impossible to distinguish between the cells of a toadstool and those of a human being.

{78} But when all this has been explained, we have still left one great question unanswered. How is the protoplasm made? Is there any connexion of development to be traced whereby life can be shewn to have arisen from inorganic matter? Protoplasm, under analysis, is found to consist of some of the commonest elements on the earth's surface, such as carbon, hydrogen, oxygen, nitrogen, and phosphorus. Apart from its very complicated structure, its contents are not hard to provide. And we know that there was a time when it must of necessity have been formed out of that which was not living, for there was a time when our globe was in a state of incandescent heat in which no life that we know could possibly have existed. More than this we cannot say. Sir William Thomson, as President of the British Association in 1871, suggested that a germ of life might have been wafted to our world on a meteorite; but to say that is obviously only to banish the problem to a greater distance.<sup>[1]</sup>

Huxley had, in 1868, invented the name "Bathybius" to describe the deep-sea slime which he held to be the progenitor of life on the planet. But later on he frankly confessed that his suggestion was fruitless, acknowledging that the present state of our knowledge furnishes us with no link between the living and the not-living.

{79} And so the problem remains. Sir Edward Schäfer, indeed, has laid it down that "we are compelled to believe that living matter must have owed its origin to causes similar in character to those which have been instrumental in producing all other forms of matter in the universe; in other words, to a process of gradual evolution,"<sup>[2]</sup> but he can throw no further light on the process and its stages.

Sir Oliver Lodge is but speaking the admitted truth when he says that "Science, in chagrin, has to confess that hitherto in this direction it has failed. It has not yet witnessed the origin of the smallest trace of life from dead matter."<sup>[3]</sup>

No doubt there are many who are hopeful that it may yet be possible to discover a way by which a cell, discharging all the essential functions of life, can be constructed out of inorganic material; or, at least, that it may be possible to frame an intelligible hypothesis as to how this might have been done under conditions which long ago may have been more favourable than our own. But, on the other hand, there are not a few who have quite deliberately abandoned any expectation of the kind. This was made plain by some of the expressions of adverse opinion which were elicited by Sir Edward Schäfer's address. Of these the following may be given as specimens: "The more they saw of the lower forms of life, the more remote seemed to become the possibility of conceiving how life arose."<sup>[4]</sup>

{80} "He could not imagine anything happening in the laboratory, according to our present knowledge, which would bring us any nearer to life."<sup>[5]</sup>

"Living protoplasm has never been chemically produced. The assertion that life is due to chemical and mechanical processes alone is quite unjustified. Neither the probability of such an origin, nor even its possibility, has been supported by anything which can be termed scientific fact or logical reasoning."<sup>[6]</sup>

"The phenomena of life are of a character wholly different from those which are presented by matter viewed under any other aspect, mechanical, electrical, chemical, or what not. It is beside the question to point to the fact that in Nature 'new elements are making their appearance and old elements disappearing,' for though we may speculate as to the manner of formation of uranium and thorium, and though the production of radio-active matters in Nature at the present time and always seems to be a well-established fact, such phenomena have not even an analogy with those of a living being, however humble."<sup>[7]</sup>

{81} It cannot be surprising that those who believe the door to be shut, so to speak, in the

direction of any theory of development through mechanical and chemical agencies alone, should look elsewhere for the solution of a problem which science is bound to do its very utmost to solve. This is what, as a matter of fact, is happening; and it is of the very deepest interest to observe the nature of the suggested explanation. It is no other than a revived form of the ancient doctrine of a "vital force," which we had imagined to have been finally discarded. There is this difference, however, and it is all-important. The force is not, as formerly supposed, some unique kind of energy; is not, indeed, energy at all. But we shall do best to state the new doctrine in the words of its leading exponents.

{82} Professor Anton Kerner, one of the most distinguished German writers on Botany, in his *Natural History of Plants*, speaking of the chemical explanation, says: "It does not explain the purposeful sequence of different operations in the same protoplasm without any change in the external stimuli; the thorough use made of external advantages; the resistance to injurious influences; the avoidance or encompassing of insuperable obstacles; the punctuality with which all the functions are performed; the periodicity which occurs with the greatest regularity under constant conditions of environment; nor, above all, the fact that the power of discharging all the operations requisite for growth, nutrition, renovation and multiplication is liable to be lost."

And then he gives his opinion thus: "I do not hesitate again to designate as vital force this natural agency, not to be identified with any other, whose immediate instrument is the protoplasm, and whose peculiar effects we call life."

Sir Oliver Lodge is, perhaps, the most uncompromising advocate of the newer vitalism in England. The following striking quotations will set forth his views:

Life, he maintains, is no more a function of matter "than the wind is a function of the leaves which dance under its influence."[\[8\]](#)

{83} "If it were true that vital energy turned into, or was anyhow convertible into, inorganic energy, if it were true that a dead body had more inorganic energy than a live one, if it were true that 'these inorganic energies' always, or ever, 'reappear on the dissolution of life,' then, undoubtedly, *cadit quaestio*, life would immediately be proved to be a form of energy, and would enter into the scheme of physics. But, inasmuch as all this is untrue—the direct contrary of the truth—I maintain that life is not a form of energy, that it is not included in our present physical categories, that its explanation is still to seek."

"It appears to me to belong to a separate order of existence, which interacts with this material frame of things, and, while there, exerts guidance and control on the energy which already exists."[\[9\]](#)

"Life does not add to the stock of any human form of energy, nor does death affect the sum of energy in any known way."[\[10\]](#)

"Life can generate no trace of energy, it can only guide its transmutations."[\[11\]](#)

"My contention then is—and in this contention I am practically speaking for my brother physicists—that whereas life or mind can neither generate energy nor directly exert force, yet it can cause matter to exercise force on matter, and so can exercise guidance and control; it can so prepare any scene of activity, by arranging the position of existing material, and timing the liberation of existing energy, as to produce results concordant with an idea or scheme or intention; it can, in short, 'aim' and 'fire.'"[\[12\]](#)

"It is impossible to explain all this fully by the laws of mechanics alone."[\[13\]](#)

{84} "On a stagnant and inactive world life would be powerless: it could only make dry bones stir in such a world if it were itself a form of energy. It is only potent where inorganic energy is mechanically 'available'—to use Lord Kelvin's term—that is to say, is either potentially or actually in process of transfer and transformation. In other words, life can generate no trace of energy, it can only guide its transformation."[\[14\]](#)

"Life possesses the power of vitalising the complex material aggregates which exist on this planet, and of utilising their energies for a time to display itself amid terrestrial surroundings; and then it seems to disappear or evaporate whence it came."[\[15\]](#)

{85} To these voices from Germany or England we can add that of M. Bergson from France. In many respects, as he says, he is at one with Sir Oliver Lodge. If he goes beyond him, it is mainly in these ways. He emphasises the element of Freedom, the power of choice as shewn by every living thing. It appears, he says, "from the top to the bottom of the animal scale," "although the lower we go, the more vaguely it is seen." "In very truth, I believe no living organism is absolutely without the faculty of performing actions and moving spontaneously; for we see that even in the vegetable world, where the organism is for the most part fixed to the ground, the faculty of motion is asleep rather than absent altogether. Sometimes it wakes up, just when it is likely to be useful."

And this is not all. What is specially characteristic of M. Bergson is the insistence that this power of choice is an evidence of Consciousness. "Life," he declares, "is nothing but consciousness using matter for its purposes." "There is behind life an impulse, an immense

impulse to climb higher and higher, to run greater and greater risks in order to arrive at greater and greater efficiency." "Obviously there is a vital impulse." [16]

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"Life appears in its entirety as an immense wave which, starting from a centre, speeds outwards, and which on almost the whole of its circumference is stopped"—that is, as he explains, by matter—"and converted into oscillation; at one point the obstacle has been forced, the impulsion has poured freely. It is this freedom that the human form registers. Everywhere but in man consciousness has had to come to a stand; in man alone it has kept on its way. Man continues the vital movement indefinitely, although he does not draw along with him all that life carries in itself. On other lines of evolution there have travelled other tendencies which life implied"—the reference is more especially to powers of instinct as distinguished from those of intelligence—"and of which, since everything interpenetrates, man has doubtless kept something, but of which he has kept only a little." [17]

Perhaps the most astonishing thing about M. Bergson's philosophy is his unreadiness to allow that the consciousness, which he says is everywhere at work, has any deliberate purpose in its working. Mr. Balfour has called attention to the unsatisfactoriness of what he described as "too hesitating and uncertain a treatment." [18]

But, in spite of so serious an omission, we may be glad to believe, with our acute statesman-critic, that "there is permanent value in his theories." If they indicate at all the direction in which scientific thinking is to move, we shall soon have travelled a very long distance from the days in which it was imagined that all vital phenomena might be accounted for on merely materialistic and mechanical lines.

[1] "To this 'meteorite' theory the apparently fatal objection was raised that it would take some sixty million years for a meteorite to travel from the nearest stellar system to our earth, and it is inconceivable that any kind of life could be maintained during such a period."—Schäfer.

[2] Presidential Address to British Association, at Edinburgh (1912).

[3] *Man and the Universe*, p. 24.

[4] Prof. Wager.

[5] Dr. J. S. Haldane.

[6] Dr. A. R. Wallace. Article in *Everyman*, October 18th, 1912.

[7] Sir William Tilden. Letter to *The Times*, September 9th, 1912.

[8] *Life and Matter*, p. 106.

[9] Pp. 132, f.

[10] P. 158.

[11] P. 160.

[12] Pp. 164, f.

[13] P. 166.

[14] P. 160.

[15] P. 198.

[16] Lecture at Birmingham, May, 1911.

[17] *Creative Evolution*, p. 280.

[18] *Hibbert Journal*, October, 1911.

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## CHAPTER IX

### LATER SCIENCE (*continued*)

The leaders of the scientific thought of last century would have been vastly surprised if they could have foreseen the results of the investigations which were to be made into the constitution of matter and the nature of life; but not even these would have amazed them so much as would other investigations that were to be carried out in a yet deeper and more mysterious region of experience. Perhaps it was because science had been so busy about the more external things, that it had seemed to have no time to spare for the thorough consideration of that which is more

truly vital to man than the matter which obeys or opposes him, or even than the physical life which enables him to act, in so far as he can, as its master. It was strange that the last thing to be thought of should be his own personality, himself; the innermost workings of his soul.

{88} But if this profoundest problem has been neglected, it is to be neglected no longer. Psychology has already made good its claim to be respectfully regarded as one of the sciences. It is too early to speak with any great certainty of the results that it has achieved, though these are probably more substantial than is commonly supposed.

Anyhow, it will be best that, as before, we should give some characteristic statements of the investigators themselves, rather than attempt to make unauthorised summaries of our own.

And, first of all, Sir Oliver Lodge shall tell us what he understands by the Soul. "The soul is that controlling and guiding principle which is responsible for our personal expression and for the construction of the body, under the restrictions of physical condition and ancestry. In its higher developments it includes also feeling and intelligence and will, and is the storehouse of mental experience. The body is its instrument and organ, enabling it to receive and to convey physical impressions, and to affect and be affected by matter and energy."<sup>[1]</sup>

How the soul acts by means of the body is thus explained.

"The brain is the link between the psychical and the physical, which in themselves belong to different orders of being."<sup>[2]</sup>

{89} "A portion of brain substance is consumed in every act of mentation."<sup>[3]</sup> "Destroy certain parts of brain completely, and connexion between the psychic and the material regions is for us severed. True; but cutting off or damaging communication is not the same as destroying or damaging the communicator; nor is smashing an organ equivalent to killing the organist."<sup>[4]</sup>

{90} M. Bergson does not differ from this when he says that, "the soul—essentially action, will, liberty—is the creative force *par excellence*, the productive agent of novelty in the world." He goes on to speak of the way by which souls have been differentiated and raised to self-conscious existence. "The history of this great effort is the very history of the evolution of life on our planet. Certain lines of evolution seem to have failed. But on the line of evolution which leads to man the liberation has been accomplished and thus personalities have been able to constitute themselves."<sup>[5]</sup> Like many another, M. Bergson cannot bring himself to believe that death is to be the end of all that has been thus painfully achieved during this process of attainment. "When we see that consciousness is also memory, that one of its essential functions is to accumulate and preserve the past, that very probably the brain is an instrument of forgetfulness as much as one of remembrance, and that in pure consciousness nothing of the past is lost, the whole life of a conscious personality being an indivisible continuity; are we not led to suppose that the effect continues beyond, and that in this passage of consciousness through matter (the passage which at the tunnel's exit gives distinct personalities) consciousness is tempered like steel, and tests itself by clearly constituting personalities and preparing them, by the very effort which each of them is called upon to make, for a higher form of existence?"<sup>[6]</sup>

{91} But the psychologist has yet more to tell us about the nature of personality. Although helped to distinctiveness of self-conscious expression by means of its experience of the struggle under present material conditions, it is not the whole of it that can be thus expressed. In fact its present physical embodiment is but partially adequate to the task. In other words, "cerebral life represents only a small part of the mental life." "One of the rôles of the brain is to limit the vision of the mind, to render its action more efficacious"<sup>[7]</sup>—more efficacious, that is to say, for such uses as are of value for survival and success under our existing conditions.

It is to Frederick Myers that we have chiefly owed the conception of the subliminal or subconscious mind. The full report of his researches is given in the two volumes of his work on "Human Personality and its Survival of Bodily Death" (1901). He it was who invented the word "telepathy" to express the fact that mental action can be exerted at a distance. And it was he who brought for the first time the phenomena of clairvoyance and apparitions under thorough examination by the employment of the most exacting tests. Along such lines he was led to the conclusion, now largely accepted, that the conscious self is only a fraction of the entire personality, the fraction being greater or less according to the magnitude of the individual.

{92} By means of this subconscious part of our being we are, he held, brought into touch with one another and are capable of attaining a knowledge which may greatly transcend that which comes to us through our ordinary channels of communication. In the case of genius we watch the emergence of exceptional potentialities, which may serve as the promise and pledge of what the future has in store for us all. One day like some winged insect we shall pass to a condition beyond that of the life we now know, and then we may hope that what we "can regard as larval characters of special service in the present stage of existence," will prove to have been "destined to be discarded, or modified almost out of recognition, in proportion as a higher state is attained."<sup>[8]</sup>

This recognition of the existence within human nature of such capacities and powers, however imperfectly developed and understood, would greatly help us to deal with many mysteries of experience that have hitherto seemed completely beyond the purview of a strict

scientific research. The American psychologist, William James, has done good service to this highest department of critical inquiry in his well-known work on "Varieties of Religious Experience." A single extract may suffice to illustrate his position, and to shew what may yet lie before those who are prepared to press on in the direction in which he was able to point.

{93} "The further limits of our being plunge ... into an altogether other dimension of existence from the sensible and merely 'understandable' world.... So far as our ideal impulses originate in this region (and most of them do originate in it, for we find them possessing us in a way for which we cannot articulately account) we belong to it in a more intimate sense than that in which we belong to the visible world... When we commune with it, work is actually done upon our finite personality, for we are turned into new men... I call this higher part of the universe by the name of God."<sup>[9]</sup>

<sup>[1]</sup> *Man and the Universe*, p. 78.

<sup>[2]</sup> P. 91.

<sup>[3]</sup> *Life and Matter*, p. 107.

<sup>[4]</sup> *Man and the Universe*, p. 93.

<sup>[5]</sup> Lecture at University College, October, 1911.

<sup>[6]</sup> Birmingham Lecture, May, 1911.

<sup>[7]</sup> Bergson. Presidential Address to Society for Psychical Research, May, 1913.

<sup>[8]</sup> *Op. cit.*, I., p. 97.

<sup>[9]</sup> Pp. 515, f.

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## NOTE

Since the preceding chapters were written, the meeting of the British Association has been held at Birmingham (September, 1913). Its interest was unusually great inasmuch as the President's address and the principal discussions were occupied with the most critical and debatable scientific questions of the present moment. The following extracts will give a general idea of the line taken at the outset by the President, Sir Oliver Lodge.

"Theological controversy is practically in abeyance just now." "It is the scientific allies, now, who are waging a more or less invigorating conflict among themselves, with philosophers joining in." "Ancient postulates are being pulled up by the roots." "The modern tendency is to emphasise the discontinuous or atomic character of everything." "The physical discovery of the twentieth century, so far, is the electrical theory of matter." "So far from Nature not making jumps, it becomes doubtful if she does anything else." "The corpuscular theory of radiation is by no means so dead as in my youth we thought it was." "But I myself am an upholder of *ultimate* continuity, and a fervent believer in the aether of space."

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"I have been called a vitalist, and in a sense I am; but I am not a vitalist if vitalism means an appeal to an undefined 'vital force' (an objectionable term I have never thought of using) as against the laws of chemistry and physics." "There is plenty of physics and chemistry and mechanics about every vital action, but for a complete understanding of it something beyond physics and chemistry is needed." "No mathematics could calculate the orbit of a common house-fly." "I will risk the assertion that life introduces something incalculable and purposeful amid the laws of physics; it thus distinctly supplements those laws, though it leaves them otherwise precisely as they were and obeys them all."

"The Loom of Time is complicated by a multitude of free agents who can modify the web, making the product more beautiful or more ugly according as they are in harmony or disharmony with the general scheme. I venture to maintain that manifest imperfections are thus accounted for, and that freedom could be given on no other terms, nor at any less cost."

"I will not shrink from a personal note summarising the result on my own mind of thirty years of experience of psychical research, begun without predilection—indeed, with the usual hostile prejudice." "The facts so examined have convinced me that memory and affection are not limited to that association with matter by which alone they can manifest themselves here and now, and that personality persists beyond bodily death."

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Of the debates on the subsequent days those on "Radiation" and "The Origin of Life" were, perhaps, the most remarkable. At the former the point at issue was the amount of truth contained

in Planck's "famous hypothesis that energy was transferred by jumps instead of in a continuous stream." Sir Joseph Larmor evidently expressed the prevailing opinion when he said that "some advance in that direction had become necessary, and old-fashioned physicists like himself had either to take part in it or run the risk of becoming obsolete."

{97} For the discussion about "Life," the three sections of Physiology, Zoology, and Botany were combined. Professor Moore stood stoutly for the older views, and "believed that he could demonstrate a step which connected inorganic with organic creation." Then he gave an abstruse and highly technical account of a process by which in "solutions of colloidal ferric hydroxide, exposed to strong sunlight," compounds could be formed similar to those to be found in the green plant. With a proper grouping of molecules it might be imagined how "colloidal aggregates appeared," and eventually "organic colloids" which "acquired the property of transforming light energy into chemical activity." The speakers who followed seemed to be agreed that, even were such "potentially living matter" to be produced, we should have reached, not the discovery of the secret of life, but only the construction of "its physical vehicle." Professor Hartog strongly protested against the notion that there was "a consensus of opinion among biologists that life was only one form of chemical and physical actions which could be reduced in the laboratory." He wished it to be understood that "the preponderance of weight among scientific men" was opposed to such a position.

{98} **CONCLUSION**

{99} It is dangerous to generalise; and, when as in this survey we are attempting to indicate broadly the trend of the thought of an age, we have more than ordinary need to be on our guard lest we should sacrifice truth to the desire for a seeming completeness of logical presentation. For fear, then, of misunderstanding, let it be clearly remembered that in what has been said we have had no wish to suggest that all minds have moved at the same pace, or even in the same direction; but only that certain strong tendencies were observable, which gave colour and character to the mental stream at the particular stages in its course. It is with a full sense of the possibility of exaggeration, and of the necessity of holding the balance even, that we shall now make our final attempt to sum up as concisely as possible what we have been able to gather in regard to the thought-movement of the period we have had under review. There can be no danger of misstatement in saying that, all throughout, the chief thoughts of the time were intensely occupied with the greatest of all questions, those about GOD AND THE WORLD. And, further, it has not been difficult to perceive that there have been three distinct stages in the sequence of these thoughts.

{100} In the *first stage* we can see, as we look back, that the Religious feeling was dominant, while the scientific temper could scarcely have been said to exist; certainly it did not exist upon any extended scale. But, though the desire to be reverent was widespread, we are bound to allow that the ideas about God were somewhat crudely conceived. As a legacy, no doubt, from the Deistic controversies of the preceding century, the general thought did not rise above the notion of a Supreme Mechanist and all-powerful Ruler of all things. The Divine Being was regarded as having originated the universe by a fiat of His will, fashioning its several contents one after another as He pleased, and appointing that each and all should be subjected to the laws He had ordained; always reserving to Himself the right to intervene by some signal display of wisdom and power, when such intervention was required, either to remedy a defect, or yet further to set forth His glory. Men were very ready to admit the idea of the Supernatural, but it was in the merely superficial and popular sense of *power working without means*, rather than what we now feel to be the far truer sense of *superhuman knowledge of means, and power to use them*.<sup>[1]</sup> It followed, and this was the weakest point in the Paleyan system of Natural Theology, that God's action was looked for not in the normal, but in the exceptional processes of Nature. The need of the Divine was only felt when no other explanation was forthcoming; with the result, of course, that as other explanations were found, the necessity for recognising its operation grew ever less and less. And, even apart from such a consequence, the effects of the conception could not be otherwise than injurious to religious faith; for, as it has been truly and reverently observed, "a theory of occasional intervention implies as its correlative a theory of ordinary absence."<sup>[2]</sup>

{101} As to knowledge of the World, there was scarcely any at all, according in our present understanding of such knowledge. Not everybody, of course, accounted for the existence of fossils by supposing that they were the casts from which the Almighty had designed His creatures, or possibly the Devil's attempts to imitate His works; but the prevailing ideas were of the most primitive kind. Even Paley could give us no better explanation of certain rudimentary anatomical organs, than by suggesting that the creature in whom they were found had been so far constructed before it was decided what its sex should be! We can see that if any real progress in knowledge was to be made, a change of a very radical order had to come. And it did come.

The *second stage* was Scientific rather than religious. The thought of God occupied a less prominent place in proportion as men's minds were yielded to the attraction of the new studies.



This was partly due, as we have already explained, to the fact that causes were found to account for the phenomena which had previously, for the lack of the understanding of such causes, been attributed to the immediate exercise of supernatural power. Partly, also, it was due to a growing distrust of human ability, which resulted from the belief that this was nothing more than a recent development from a lower animal ancestry. A mind thus originated was supposed to be debarred from forming any trustworthy notion of the nature of a First Cause which had operated, if at all, at some point infinitely distant in the long succession of ages.

{102} The main work of this stage was to prosecute research into the elaborated mechanism, or as men soon came to prefer to think of it, the developing growth of the world. And wonderful, beyond all anticipation, was the success which rewarded the pains that were lavishly bestowed upon the inquiry. Small marvel was it that some men's heads were well-nigh turned, and that to many it seemed little less than certain that science had dispensed with the supernatural altogether; and that it only required time, and no great length of time, to secure universal acceptance for the materialistic explanations which were destined, as they supposed, to leave no mysteries of life unsolved. But such persons had reckoned with a too hasty and superficial knowledge of the data involved. Little by little the counter-criticisms produced their effect. The idea of a First and Permanent Cause was shewn to be as indispensable as ever; not, indeed, as an influence to be pushed far back, and to be thought of as acting either once or occasionally. A truer reading of the meaning of what had been discovered led to the grateful acknowledgment that "Darwinism has conferred upon philosophy and religion an inestimable benefit by shewing us that we must choose between two alternatives: either God is everywhere present in Nature, or He is nowhere."<sup>[3]</sup> So, again, with Design. The earlier notion of the separate manufacture of species and of special adaptations to particular ends had to give way to a larger conception of the growth and gradual correlation of the parts and functions of a stupendous whole. But for the attainment of this mighty result direction and superintendence are even more imperatively needed. As it was often urged with good reason, to make a world right off would not have been so marvellous an achievement as to make that world make itself.

{103} The problem of Beneficence had, as we saw, come to be so entangled with difficulties as to render it the most serious of all the problems which pressed upon the minds and hearts of the men of this second stage of thinking. But here, also, the fears which were at first aroused were found to have been exaggerated; and perhaps it is true to say that before the end of the century there was a general disposition to conclude that with larger knowledge we should get to understand the utility of much that to uninstructed eyes appears to be lavish waste and needless suffering. The obvious fact that science could not go forward without a loyal belief in the rational intelligibility of nature gave justification to a corresponding belief in its ethical intelligibility, even though in this case, as in the other, the complete proofs might not be immediately forthcoming. And there was, further, the possibility—to some it was more than a possibility—that much in the world which looks contrary to goodness is really to be accounted for as the result of a misuse of liberty on the part of powers and forces whose action has most mysteriously been allowed to thwart and to complicate the task of the beneficent Maker of all.

{104} About the *third stage* it is fitting that we should speak with more hesitation. We are living in it, and are as yet only at its beginning. But we may hazard the prognostication that it will be both Religious and Scientific; and that, "as knowledge grows from more to more," there will be found the "more of reverence" of which our modern poet sings. There is reason to hope that the bitterness of old controversies will not be revived, and that we have before us a time in which Theology and Science will co-operate and no longer conflict. With deepening insight it is becoming plainer than ever that the phenomena of life, and even of matter, are the expressions of a more than physical force. Evolution is a law under which a forward process is moving on, and moving up. There is an impulse of consciousness working from within, and there is a spiritual, as well as a material, environment inviting to correspondence with itself. Freedom and power of choice are admitted to be present in regions where their existence was for long most strenuously denied. Even matter may have its own power of insistence and resistance—how much more mind and will. This consideration may give us a yet clearer clue to the mysteries of failure, miscarriage, and waste. A world that was to produce self-conscious, self-determining personalities needed to have freedom through the whole of its development; and the consequent risk and possible cost were inevitable. Shall we not be led to admire and revere increasingly the wonder of it all, as there grows upon us the sense of the quietness and gentleness, the foresight, and the infinite patience of the Being of beings, who will never obtrude His presence and action upon us, just because He would help us to be our own, not dead but living, selves, and would have us rise with Him to the highest things?

{105} We are far from the end of our learning. There are many enigmas yet to be made plain. We could not wish it otherwise. It has ever been through the narrow gate of difficulty that we have passed into the wider court of truth. We have good cause to be humble, but we have full right to be hopeful. We must not be afraid to face the problems that await us, whatever they may be. We may be confident that we are not to be deceived; but that, under a Guidance that has never failed, we shall at length be brought to see the dawning of the longed-for day,

"When that in us which thinks with that which feels  
Shall everlastingly be reconciled,  
And that which questioneth with that which kneels."

[1] This important distinction was carefully drawn by the Duke of Argyll in his *Reign of Law* (pp. 14, 25), published in 1866.

[2] Aubrey Moore, in one of a series of remarkable articles contributed to the *Guardian* (January 18th, 25th, February 1st, 1888).

[3] Aubrey Moore, *Lux Mundi*.

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