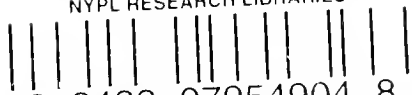


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PRESENT-DAY RATIONALISM

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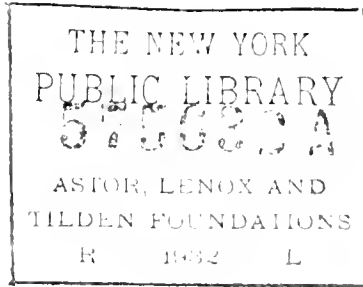
BY THE REV. PROFESSOR

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*Evolution and Religion; Christian Beliefs Reconsidered
in the Light of Modern Thought, etc.*

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P R E F A C E

THE present work is an attempt to point out and refute some of the fallacies of Present-day Rationalism and Materialism.¹

Since the Rationalist Press Association was established in 1899, and has for its object the diffusion of cheap editions of Rationalistic and Atheistic works, it is worth while trying to explain to unscientific readers the erroneous assumptions made in their reasonings.

Of course, many Secularistic and Rationalistic writings are directed against Christian theological dogmas, especially, perhaps, those of the late Mr. Bradlaugh's days in the "Seventies". I do not enter upon this field of controversy, beyond stating the bases of belief in God, Free Will and Immortality.

I particularly emphasise *Inductive Reasoning*;

¹Haeckel in his *Riddle of the Universe* calls it "Monism," but he means Materialistic Monism.

for some Rationalists insist upon "observation and experiment" as the only acceptable kind of proof of God—a method of evidence obviously out of the question—and they moreover assert that whatever cannot be brought within these two things is not to be accepted as science or knowledge.

As Materialistic Monists, such as Haeckel and Büchner, state categorically that "Darwinism" forms the basis of their Atheistic views, it is necessary to discuss the principles of Evolution and its methods. It will be seen that certain distinct assumptions were made by Darwin—upon which his special theory of *The Origin of Species by means of Natural Selection*, known as "Darwinism," is founded—but they have no foundation in fact.

On the other hand, his alternative explanation—which he for the most part regarded as too rarely occurring to be worthy of consideration at any length, *viz.*, by what he called the "Definite action of the Environment" has been now proved to be really the true and only method in the origin of species. This I have called the "True Darwinism," but it has already received in Botany the title of "Ecology".

Then, as Dr. Weismann has asserted, contrary to Darwin's opinion, as also of Haeckel's, that characters acquired by the *soma* cannot be hereditary,

it is necessary to prove by examples that this view is fallacious.¹

After pointing out the absurdities in Haeckel's theory of the origin of living protoplasm, Evolution carries us direct to and inclusive of Man. There does not seem to be any necessity of a "break" in the continuity as some suppose, but *Man alone has acquired the power of making abstractions objects of thought*. This lies at the base of all his superior "God-like" powers. It forms the sharp line of demarcation between him and the animal world.²

Man is thus enabled (1) to be self-conscious; (2) to be conscious of other "selves," hence to be altruistic; (3) to realise the conception of God; (4) to be conscious of having the power to choose, *i.e.*, a Free Will or Volition; (5) to acquire a belief in Immortality.

As inductive evidence accumulates in favour of the belief in God, so does it for a future existence, while *Faith* in spiritual matters is shown to be

¹ I have been accused of insisting upon "Adaptation," *i.e.*, Darwin's alternative method, as if it were my own theory. I have never done so. I would rather insist upon the reader as regarding it as Darwin's, for it will be found clearly stated in his works. What I did was, in reading Darwin's books, to collect all the facts I could read of or observe, coupling them with experimental proofs. Then, after about fifteen years, I published *The Origin of Floral Structures* in 1888, and *The Origin of Plant Structures* in 1895, as well as papers in *Natural Science*.

² While writing this book I found both Locke and Schopenhauer, as well as others, have held their view.

based on inductive evidence, just as *Conviction* is in the scientific world.

This line of argument running through the book was embodied in a lecture delivered before the University College Christian Association on 1st May, 1903.

Lord Kelvin, who kindly proposed a vote of thanks, expressed himself as thoroughly in accord with it, and strongly corroborated my contention that modern Natural Theology or Theism is based on strictly scientific methods of reasoning. His observations will be found following my address (the first of six) in the volume entitled *Christian Apologetics* (J. Murray, 2s. 6d.).

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PART I
NATURE

CHAPTER I

THE OLD SECULARISM OF THE "SEVENTIES"

SOME thirty years ago we heard a good deal of Secularism, when Mr. Bradlaugh was a prominent figure before the world and was promulgating his atheistic views.¹

Mr. G. W. Foote defined Secularism as "Naturalism in Morals as distinguished from Supernaturalism".²

Speaking of Mr. Bradlaugh, Mr. Foote said: "Filled with Republican and Atheistic Faith he stands upon the cardinal assumptions of human greatness and power, and the impossibility of supernatural knowledge; and he trusts in them as eternal and unassailable verities".

"Mr. G. J. Holyoake, although an Atheist, puts forward a philosophic theory of human life and duties, which he terms 'Secularism'.³ From this, three propositions are deducible — Science is the only Providence, Reason the sole guide, Happiness the sole end." "The invariability of Nature's methods of operation, the inviolability of the law of universal causation—belongs peculiarly to Secularism." . . . "In the realm of mind, as in the realm of matter, everything works in accordance with definite laws. The science of psychology is winning a definite place for itself." [Haeckel now merges

¹ Such as *A Plea for Atheism and Is there a God?*

² *Secularism Restated*, 1874.

³ *i.e.*, as concerning this world only.

it in physiology.] . . . “In Secularism Reason is the sole guide.” . . . “Whatever in any of the supposed sacred writings of the world is good, pure, elevating and inspiring, Secularism thankfully accepts and assimilates. Whatever is evil, corrupt, ignoble and degrading it sternly rejects.”

With regard to Happiness as being the sole end of action in Secularism, all sensual pleasures were regarded as degrading, and rational pleasures were to be aimed at. They are “by no means comparable to those of the great-minded philosopher who penetrates into the profoundest mysteries of Nature, or to those of the large-souled philanthropist whose whole life is a loving ministration to wants of suffering humanity”.

“To the utilitarian standard all actions must be made to conform; all other standards are the veriest delusions, as inconsistent as they are misleading. Morality cannot be founded upon the will of God, for no power can decree morality. If God has a claim upon my gratitude, or reverence, or worship, it can only be because he is himself gracious, adorable and worshipful, and not because of his power to exact from me a reluctant prostration. So it is not power but goodness which entitles God to reverence, and therefore, at bottom, goodness and not God is the object of adoration.”

“Secularism is utilitarian, regarding happiness as the aim of action; happiness pursued through Duty, not because Duty possesses a distinctive and inherent sacredness, but because it is the necessary road to happiness. Duty is imperative upon all because it implies the performance of such actions as are absolutely necessary to the preservation of society, and without which retrogression and anarchy would inevitably ensue.”

“Secularism being concerned only with the region of

morals it has no message respecting the great problems of theology.”

With regard to immortality, “The mere naked belief in it may be entertained by a Secularist without any detraction from essential Secularism; but the very moment it interferes with the principles of Secularism, that very moment the doctrine of a future life becomes pernicious”.

“Similarly with the belief in an intelligent controlling Power in the universe, Atheism and Theism are alike distinct things from Secularism. They have no relationship whatever to the practical duties of life.”

“In Secularism there is a mutual platform for Atheists, Theists and Pantheists, for all, in fact, who have fully recognised *the Universality of Causation, the Supremacy of Reason and the Independence of Ethics on theological dogmas.*”

Such is an outline of the main contentions of the older Secularists; and the first question which naturally arises in one's mind is: What is the *motive power* for obedience to Duty spoken of?—for such seems to be no more than the laws of the land or the Decalogue enforced by punishment if they be violated, such being social laws. The answer Mr. Foote gives is: “To the charge that Secularism is cold and dreary, devoid of feeling and imagination, we reply, The history of humanity lies open to us as a rich treasure-house of noble example and generous inspiration. . . . From the history of every heroic martyr to the cause of truth and human deliverance we receive sustenance, inspiration and hope. Our cheeks tingle and flush as we peruse the page which records how noble sufferers have laid down their bodies in the breach in order that others might use them as stepping-stones to final victory over error and wrong.

If men cannot be moved to passionate enthusiasm and ardent hope and heroic daring by these things, they are impervious to all pure and holy influences. . . . The Heavenly Paradise has been dreamed of by imaginative theologians and longed for by the votaries of superstition; for Secularism it remains to realise the Earthly Paradise for men, where the flower and fruit of happiness shall bloom for the delight and sustenance of all."

Two things are herein very apparent. First, whatever moral conduct is upheld by Secularists, it does not differ from what is commonly accepted by Christians. Secondly, the stories of noble heroes of the past have never yet created an enthusiasm for practical goodness in posterity; with the exception of Jesus Christ, who for nearly 2000 years has been a Power for Holiness in all who will accept Him.

Mr. Holyoake averred that Secularism and Christianity could not exist compatibly with one another; but true Christianity is solely the *Christ-like Character*, which Secularism would seem inclined to imitate but cannot improve.

The above quotations will show what Secularism was in the seventies. All that is good in it is borrowed from Christianity and not solely obtainable from Nature or Reason.

We shall presently see its position after thirty years, as described by writers of to-day; but a few more observations by Secularists, in order to point out their illogical character, may be advisable.

There was an expression used by Rationalists: "I cannot believe in that which I cannot comprehend". Such were the words of Mr. Austin Holyoake on his deathbed in 1874, on which the editor of the *Christian Evidence*

*Journal*¹ remarks : “ A vast amount of scepticism is based upon this same idea, yet it is one of the most delusive that can be entertained, and one upon which we do not act in ordinary life nor in science and philosophy. We all believe daily in what we cannot comprehend, and to look for an exception in the domain of religion is a fatal error.”

What does the latest writer on Freethought say? Exactly the reverse of Mr. Austin Holyoake’s assertion.

Mr. G. Forester in his book, *The Faith of an Agnostic, or First Essays in Rationalism*, 1902, observes : “ We are compelled to believe in the reality of that which to us is inconceivable ”.²

“ The Unknowable is not synonymous with the Non-existent.”³

“ In the regions of transcendental thought, far beyond human ken, and for which human language is utterly inadequate, there may be that explanation for which religion and philosophy have ever sought, and ever sought in vain.”⁴

It were easy to show that Mr. Austin Holyoake, and I suppose he only represented many other Secularists in his day, was utterly inconsistent. Did he, and do others now, not believe in Electricity? Yet those who know most about it cannot comprehend it. They can no more answer the question, “ What is Electricity?” than they can tell you what the Ether is ; yet every physicist believes in both. Electricity like Gravity is a *power* ; that is all. So there is a Power behind all Nature, as incomprehensible as Electricity ; yet all believe in it whether they regard it as conscious or not.

¹ Number for May, 1874, p. 80.

² *The Faith of an Agnostic*, p. 177.

³ *Ibid.*, p. 180. ⁴ *Ibid.*, p. 182.

This self-limitation on the part of the Secularist is a perfectly gratuitous one. To summarise the old Secularism we shall see that the sole reliance upon Science and Reason is in agreement with the Rationalists and Haeckelian Monists of to-day, and we shall also see how far this, their prop and stay, is trustworthy.

The proposed means of securing happiness was apparently much the same as now. It is also noticeable that the want of enthusiasm in Secularism is also still existing.

Why Secularism should claim the invariability of Nature's laws as peculiarly its own is not very clear; since that invariability has existed ever since the world began.

Secularism might be called simple morality based on Utilitarian principles of social duties, for the sake of the happiness which Duty brings. Our jails and police courts have something to show in opposition to this.

Secularism differed from Materialism of to-day in that it permitted belief in a God and immortality as harmless ideas, unless "interfering with the principles of Secularism".

On the other hand Monists like Haeckel ridicule both as superstitions.

When the Secularist says, "Theism has no relation whatever to the practical duties of life," the greatest motive power for a good life is gone; and the weakness of Secularism lies in the want of any efficient motive. This becomes at once apparent in the inefficiency of Secularism to gather in the multitude; as it was in the seventies, so, as we shall see, is it now.

To hold up the ideals of goodness and virtue as stimulating abstractions will never appeal to the masses of mankind. Nor will reading the stories in Fox's *Book*

of *Martyrs* have any really moral effect, nor even has it been able to kindle much, if any, enthusiasm ; even allowing for what the actual witness of a martyr's death might have had and undoubtedly did have upon others during times of persecution.

It is interesting to read the expedients to which writers are put for motives. Mr. Mallock thus writes : " In all the annals of intellectual self-deception it would be hard to find anything to outdo or even to approach the fantastic absurdities of Mr. Spencer in search of a religion. He invites each man to consider and to reverence himself as one of the ' myriad causes through which the Unknown Cause works ' . . . ' It is not for nothing that the Unknowable has implanted in man certain impulses.' Surely (says Mr. Mallock) here is anthropomorphism with a vengeance ! . . . What idea could be more inconsistent with the whole teaching of Monism ? " ¹ Huxley said that " Obedience to the moral law is producible only by the prevalence of the idea of Duty. . . . And the motive is to be found," says Prof. Huxley, " in the beauty of conduct which is ' to devote oneself to the service of humanity,' ' to pity and help all men to the best of one's ability, to be strong and patient, to be ethically pure and noble,' and ' to push our devotion to others to the extremity of self-sacrifice'. Religion, in fact, is nothing more than ' that reverence and love for the ethical ideal, and the desire to realise that ideal in life, which every man ought to feel'. ' That he ought to feel it is surely indisputable ; and Agnosticism has no more to do with the matter than it has with music or painting '." ²

But the " man in the street " will not be satisfied with this. He wants a permanent, efficient motive power and

¹ *Religion as a Credible Doctrine*, pp. 265, 266.

² Mallock, *op. cit.*, p. 256.

this can only be found in a *Living Person*,¹ which no one of the atheistic -isms can supply.

No wonder is it that Secularists complain that they cannot “annex the masses,” as we shall see in present-day Secularism of 1903.

¹ Harnack in his *What is Christianity?* in reply to Rationalists who repeatedly ask “What is new in Christ’s teaching?” strongly emphasises His “Personality,” as the source of goodness in the Christian followers of Jesus.

CHAPTER II

THE NEW SECULARISM OF TO-DAY

THIRTY years have nearly elapsed, and we now find Mr. F. J. Gould writing on "The New Secularism" in the *Agnostic Annual* (an ethical review, 1903). He distinguishes present-day Secularism from the old by "the almost complete disappearance of the appetite for theological debate"; and he asks the question: "By what other methods shall Rationalism be propagated?"

He wonders what it has been doing for the last thirty years.

"We need an aim, an organic association, a moral and intellectual solidarity which will supply the appeal, the motive, and the force."

Secularism must be in a poor way if it have none of these three things, all of which are to be found to the full in Christianity.

"The age of analysis is passing and the age of synthesis is demanded."

Mr. Gould proceeds to complain that "those who have been bred in the old school are too content to live as disparate units".

"The supreme test of Secularism is revealed in the question: What will it do with religion?—that is, with all the emotions, habits and ideals which are grouped together under that name in the Churches. . . . Orthodoxy has been defeated in controversy, but it remains in possession of the soul of the million."

Now follows an astonishing remedial proposition: "We ought to give the people a modified and rationalised Church, with all the apparatus of symbol, ceremony, music and parochial institution; and among the parochial activities of the Church I should recognise a systematic effort to encourage the ethical aspect of every political and industrial movement. . . . Religion and the Bible having been rejected on account of their irrational claims to divine origin, must be re-inserted, so to speak, in the secular development of mankind as moral and intellectual factors of high importance."

Surely we have here the Christian spirit reasserting itself in spite of Rationalism! Apparently, then, the masses are to be allowed to have the Bible, perhaps after being carefully annotated—whence all the myths, all the miracles, all of Jesus Christ as a myth too, according to Mr. J. M. Robertson, will be carefully excised!

But the average man, working or not, is now often quite as well able, and perhaps sometimes much better, than the Secularists, to judge for himself.

Secularism, with its "coldness" and "want of reverence," based on pure Reason and Science, will no more raise the masses, much less the submerged tenth, in the twentieth, than it did in any century B.C.

"A common complaint against the meetings of Free-thought societies," continues Mr. Gould, "is that they are cold and that they lack reverence."

Reverence for what or whom, one is inclined to ask? His reply is, Because they are losing sight of "the vital principle of association"; the very basis of Christianity or the Brotherhood of Man.

He is beginning to fear for the masses just as Aristotle did. He suggests "art, literature and education" wherewith to raise "the Human ideal to the same level of honour

as the Divine once occupied, so that human passion, labour, sorrow and beauty shall now be elevated by art and literature to the supremacy formerly held by gods, spirits and the fictions of a remote Beyond”.

It is all a vain delusion! The call for “reverence” comes from a deep-rooted instinct for Some One, greater than himself, whom man can look up to and revere. Art, science, politics, literature, etc., will never fill the void of an aching heart which cannot find a Person to love, pray to and obey.

Mr. Gould suggests as a stimulus, “We do need a larger recognition of the call to municipal and national service”. Why is it that we have not all felt this need before? Such is his substitute for religion! But it will never supersede the call of Jesus Christ to faith and holiness, nor lead men to be religious, for faith is loyalty to the *Person*. Jesus Christ, and He alone, has done this for nearly 2000 years.

One seems to be able to read pretty plainly between the lines of Mr. Gould’s remarkable paper. He is evidently beginning to realise the *weakness* of, and a decided *want* in, Freethought. After thirty or more years what has it done? He complains of a want of *coherence*, a want of *motive, aim*. His remedy is a desperate one: *External*, sensuous paraphernalia, symbols, ceremonies, music, etc. Does he think that these things help to make men really and truly honest, pure and good?

“Music and Morals” is a well-sounding alliteration, but—there they begin and there they end!

It is a fatal error to try and make men moral, much less religious, without an adequate *motive*. Let us hear Aristotle’s pathetic lament: “Is the end in practical matters, not the contemplating and knowing all things, but rather the practising them? If so, it is not suf-

ficient to know the theory of virtue, but we must endeavour to possess and employ it ; or pursue whatever other means there may be of becoming good. Now, if mere treatises were sufficient of themselves to make men good, justly 'would they have received many and great rewards,' as Theognis says, and it would be our duty to provide ourselves with them. But the truth is, that they seem to have power to urge on and to excite young men of liberal minds, and to make a character that is generous and truly fond of the honourable, easily influenced by virtue ; but that they have no power to persuade the multitude to what is virtuous and honourable."¹ The commentator observes : "The very fact of loving virtue for virtue's sake presupposes a proficiency in morals far beyond the general state of mankind. Some other motive was then clearly necessary for men sunk in vice as the heathen world, a powerful motive, which no heathen, no human philosophy could supply."

Sir John Seeley called attention to the same fact after our Lord came. He says : "Stoicism and Christianity existed side by side at the end of the first century. Was their view of the obligations resting upon them similar? It was totally different. The Stoic rules were without sanctions. If they were violated what could be said to the offender? All that could be said was, '*Chrysippus non dicet idem*'. To which how easy to reply, 'I esteem Chrysippus, but on this point I differ from him!' To Christian *lapsi* it was said, 'You have renounced your baptism ; you have denied your Master ; you are cut off from the Church ; the Judge will condemn you'. Is this distinction a verbal or a practical one?"²

¹ *The Nicomachean Ethics*, bk. x., chap. 9. Translated and annotated by R. W. Browne, 1853.

² *Ecce Homo*, Preface, p. xi.

No wonder is there that the meetings of Secularists are cold and lack reverence! It is because they have discarded the only Person who has been able to stimulate mankind to revere Him. That is the secret of true Christianity; which the Secularists have thrown aside as a myth, and now find they have thrown away the one and only motive capable of kindling the hearts of men into warmth and reverence; which, too, could bind them into one Brotherhood instead of their remaining, after thirty years, disconnected units only.

Mr. Gould's paper is most significant, and if he could only see that our evidences for the historical personality of Jesus Christ are as sound and *logical* as he thinks they are *illogical*, he may yet find it necessary not only to come to us for ritual and music, but for the "Motive" for goodness as well.

In Mr. Bussell's admirable account of Socrates, he shows some curious parallels, with differences, to Modern Secularism.

Like the Sophists (he says) Socrates was "as hostile to indolent acquiescence in convention". So are the Secularists to complacent believers in dogmatic theology. "Yet, unlike the Sophists, a *constructive*, a *positive* process of instruction succeeded to this preliminary purgative. . . . He seems to postulate a power for the conscientious student, the earnest thinker, of reaching, of having contact with what was True and Good. This power he thought was inherent in Soul as such."¹

"He strives, as the chief task of education, to make his pupil interested in himself. He appeals to the underlying sense, in each man, of duty, of a love for beauty and goodness, which once fully realised (too sanguine optimist!) cannot but take effect in action."²

¹ *The School of Plato*, p. 84.

² *Op. cit.*, p. 88.

“ He felt sure that if any one could once be brought to consider his own nature ¹ . . . he would never recur to those perilous errors of convention, but would live steadfastly, a law to himself, happy (because self-respecting and trustful) in this world and the next. These principles never came from pure Reason; but rather from an instinct of sonship, a religious instinct, suggesting to the soul as probable far more than it can prove by argument.” ²

“ Pure reason cannot tell him of this: its mission is purgative not dietetic, negative, not constructive. A scientific definition of a *practical* thing only removes error; it does not teach Truth.” ³

Thus, as I have shown above, has it been and is it still with Secularism. The instructive essay by Mr. F. J. Gould on “The New Secularism” proves it; in which he speaks of the old Secularism of Mr. Bradlaugh’s days in the “seventies,” as characterised by “destructive arguments,” not only against theology, but even among themselves. It was all “purgative,” as Mr. Bussell says; but during the last thirty years it appears not to have offered anything substantial in the *constructive* line. Hence Mr. Gould suggests, as a beginning, to build Rationalistic churches with organs and ceremonies and ritualism complete!

¹ Apparently as Bradlaugh and Herbert Spencer did also.

² *Op. cit.*, p. 89.

³ *Op. cit.*, pp. 91, 92.

CHAPTER III

RATIONALISM AND MATERIALISTIC MONISM PROFESSEDLY BASED ON DARWINISM

THE Rationalist Press Association is largely responsible for the present diffusion of Rationalism in England. One of its objects is the issue of "Cheap Rationalistic Reprints".

The "Memorandum of Association" of the R.P.A. (Limited) states the objects for which the Association was formed. They are nine in number. The three most important are as follows :—

(a) To stimulate freedom of thought and inquiry in reference to ethics, theology, philosophy and kindred subjects.

(b) To promote a secular system of education, the main object of which shall be to cultivate in the young moral and intellectual fitness for social life.

(c) To publish and distribute books, pamphlets and periodicals designed to promote the above objects.

"Rationalism may be defined as the mental attitude which unreservedly accepts the supremacy of Reason, and aims at establishing a system of philosophy and ethics verifiable by experience, and independent of all arbitrary assumptions or authority."

The reader will not easily gather from the above objects that atheism, denial of freedom in man, as well as the complete annihilation of man's soul at death, form

the creed of Rationalists; while Christian Theism, the divinity, miracles and resurrection of our Lord are regarded as utterly vain superstitions.

That is the main position of the present-day Rationalism and the question is, Which is most probably right—Rationalism or Christianity?

In considering this recrudescence of Rationalism, I shall have to consider among others such important matters as—the basis of Rationalism and Monism, the origin of the world and life on earth, the evolution of living things, Darwinism and Adaptation, till we come to the Origin of Man. Then follows the sharp line of demarcation between man and animals, seen in his capability alone to entertain *abstract* ideas; animals being limited to objects of sense and reasonings upon them. This leads to human psychology including the Will or Volition and Automatism. Lastly is the survival of Man after Death.

Throughout will appear, as occasion arises, inductive evidence as to the existence of an Omnipotent, Conscious Mind in Nature, or God.

“Rationalism” is also known under the phrase “Materialistic Monism,” with which Büchner adds “Materialism” as a synonym.¹

In order to understand clearly what is meant by Materialistic Monism, I will take Haeckel as the exponent. He says: “All the different philosophical tendencies may, from the point of view of modern science, be ranged in two antagonistic groups; they represent either

¹ Monism as a philosophical term is used in three if not more senses. One is the *materialistic* or that of Haeckel; the second is *idealistic*, regarding all phenomena as spiritualistic, and the third is *pantheistic*, neither mind nor matter being substantial, but both being referred to one original substance.

a *dualistic* or a *monistic* interpretation of the Cosmos. The former is usually bound up with teleological and idealistic dogmas, the latter with mechanical and realistic theories. Dualism in the widest sense, breaks up the universe into two entirely distinct substances¹—the material world and an immaterial God, who is represented to be its creator, sustainer and ruler. Monism, on the contrary (likewise taken in its widest sense) recognises one sole ‘substance’ in the universe, which is at once ‘God and Nature’; body and spirit (or matter and energy) it holds to be inseparable. The extra-mundane God of Dualism leads necessarily to Theism; the intra-mundane God of the Monist leads to Pantheism.”²

Haeckel devotes a chapter³ to a fuller explanation of “the Law of Substance.” “Under this name,” he writes, “we embrace two supreme laws of different origin and age—the older is the chemical law of the “conservation of matter” and the younger is the physical law of the “conservation of energy,” that is to say, the sum of matter and the sum of force are alike unchangeable: so that “the whole marvellous panorama of life that spreads over the surface of our globe is, in the best analysis, transformed sunlight,” and “no particle of living energy is ever extinguished; no particle is ever created anew”.

All the different forces of Nature are reducible to one common original force (*prodynamis*). “This fundamental force is generally conceived as a vibratory motion of the smallest particles of matter—a vibration of atoms.”⁴ In

¹ This word is used here partly in a metaphysical sense, not a concrete or material one, only.

² *The Riddle of the Universe*, Eng. ed., p. 20.

³ *Op. cit.*, xii., p. 214.

⁴ *Op. cit.*, pp. 217, 221.

further elucidation of his views Haeckel says: "The two fundamental forms of substance, ponderable matter and ether, are not dead, and only moved by extrinsic force; but they are endowed with sensation and will (though, naturally, of the lowest grade); they experience an inclination for condensation, a dislike of strain; they strive after the one and struggle against the other."¹

With regard to the metaphorical expression of chemical "affinities," which Haeckel regards as actual, he says: "Every shade of inclination from complete indifference to the fiercest passion is exemplified in the chemical relation of the various elements towards each other, just as we find in the psychology of man, and especially in the life of the sexes. . . . The irresistible passion that draws Paris to Helen, and leaps over all bounds of reason and morality, is the same powerful 'unconscious' attractive force which impels the living spermatozoon to force an entrance into the ovum in the fertilisation of the egg of the animal or plant—the same impetuous movement which unites two atoms of hydrogen to one atom of oxygen for the formation of a molecule of water. . . . Even the *atom* is not without a rudimentary form of sensation and will. The same must be said of the molecules which are composed of two or more atoms."² Hence Haeckel deduces the presence of a universal "soul," both in atoms, molecules and their compounds; and subsequently in living cells up to man.

With regard to ether he says: "Ether is boundless and immeasurable, like the space it occupies. It is in eternal motion; and this specific movement of Ether (it is immaterial whether we conceive it as vibration, strain, condensation, etc.) in reciprocal action with mass-

¹ *Op. cit.*, p. 224.

² *Op. cit.*, pp. 228, 229.

movement (or gravitation) is the ultimate cause of all phenomena.”¹

Haeckel concludes the chapter on “the Law of Substance” with the following words: “Our Monistic view, that the great cosmic Law applies throughout the whole of Nature, is of the highest moment. . . . It marks the highest intellectual progress, in that it definitely rules out the three central dogmas of metaphysics—God, freedom and immortality. In assigning mechanical causes to phenomena everywhere, the law of substance comes into line with the universal law of causality.”

Such is the fundamental position of Haeckel’s monistic theory, and the question to be answered is: Which is the more probable, that the evolution of the universe is worked out by self-acting, blind and unconscious forces, or by an Omnipotent, Intelligent First Cause? If there be no consciousness in the energy at work; whence came consciousness in the product?

Before proceeding further, it will be as well to make a few comments upon this extraordinary theory of Materialistic Monism. It at once gives one the impression that, by starting with a disbelief in a Creator, Haeckel is compelled to try and square the universe with his atheism. He cannot ignore life, for it is in evidence in his own person, therefore, to avoid its entrance into the world in time, he relegates its existence to all matter and ether as a kind of *eternal living essence or substance*.

A true scientist always looks for some kind of evidence in support of his working hypothesis. He is bound to base it on *some* facts, however slight they may necessarily be, where he wishes to bring the “unknown” within the region of the “known”. In this Materialism there are none: everything is assumed. All scientists have always

¹ *Op. cit.*, p. 233.

sharply separated the organic world from the inorganic ; because of the ample evidences of life in the one, and the total absence of such in the other. This difference supplies a stronger basis of such being true, than to assume the inorganic world to be alive, in spite of the total absence of all the familiar phenomena by which we regard the presence of life to be indicated ; such as absorption of food, digestion, growth, development, reproduction, etc., etc. With regard to *prodynamis* or original vibrating force of atoms, one naturally asks whence it arose. The only answer appears to be that, like ether (from which matter is supposed to emerge), it was eternal and that ether never *began* to vibrate ; but always has done so.

In the next place, how did a uniformly vibrating motion become changed into all the forms of energy with which we are familiar ? What determined the first changes of character in this primeval force, while acting on a uniform ether ?¹

“Atoms,” he says, “experience an inclination for condensation and a dislike for strain.” If this idea be based on *our* experiences in physics ; then we find that “inclination” varies with temperature ; for example, water shows a decided “inclination” for condensation at about 39° F. ; but at 212° the “inclination” is all the other way ; for it goes off as steam by expansion.

How, too, came chemical forces into existence as shown by their so-called “affinities” ? Here, again, we have Haeckel’s process of fitting the Cosmos on to his atheism. Man loves, therefore love must have been an eternal property of matter. Therefore, it is seen in all chemical affinities and so on backwards till it is traceable

¹ We shall see later what has to be said on “Vortex-rings”.

into ether. He conveniently fits on traits of character observable in man and animals to molecules and atoms. But if he compares the love of Paris for Helen with the "affinity" of one atom with another, how does he account for the extreme rarity of *one atom only* of one kind of element uniting with *one atom only* of another kind? By far the commoner process is for a molecule to be composed of more than one, often many times more than one atom. Thus with water, two atoms of hydrogen are *always* in "love" with one atom of oxygen. While in living albuminous protoplasm the number of elementary atoms in love with each other are represented by the formula $C_{60}H_{100}N_{16}O_{20}$. Can absurdities gravely put forth in the name of science go further?

Then comes the question of the soul. Once more, starting from his own (he only allows psychology to be a branch of physiology), how did he get it? As there is only one substance in the universe, the soul, like everything else, must be referred back, first to the primitive living cell, thence back again to inorganic molecules of some sort, then to atoms and finally to ether; as being "the ultimate cause of all phenomena".

Any idea of the advisability, not to say necessity, of looking for evidence, seems to be quite unnecessary to Haeckel. Let us now compare this Monism with Secularism.

We have seen that Mr. Bradlaugh, Mr. Foote, Mr. Holyoake and others were at least Secularists, if they repudiated the actual title of Atheists; but Mr. Bradlaugh said that Secularism was on the high road to Atheism. They were what Huxley subsequently called Agnostics; for as Mr. Foote said, there might be a God, but he knew nothing about Him, and therefore the moral life is entirely bound up with *this* world and un-

influenced by any belief in a God or a hereafter ; hence the term "Secularism".

If we ask why they assumed this attitude, it would seem, as far as Mr. Bradlaugh was concerned, from his treatises *Is there a God?* and *A Plea for Atheism*, etc., that it was the study of metaphysics which led him astray. Thus, after a long discussion as to the nature of God—in whom he did not believe—he emerges with the following conclusions: that "God cannot be intelligent," "can never perceive anything," "He cannot recollect or forget," "He cannot have the faculty of judgment" and "He cannot think".

It is generally considered to be impossible "to prove a negative"; but Mr. Bradlaugh did it to his own satisfaction, although he professes not to know what one means by the word "God".

It seems that the absence of anything of the nature of objective proof of the existence of God was the cause of the atheistic view in the seventies; and this is still maintained to-day. Thus the anonymous author of *Mr. Balfour's Apologetics*, to whom I shall refer again, says nothing can come under the head of Knowledge which does not fall within observation and experiment.

This demand is obviously unreasonable, nor is it fair; for no force or energy comes within "observation". Gravitation, heat, electricity, etc., are unknown in their nature, but recognisable only by their effects. Moreover, one man's consciousness is only inferred by another, by his acts. It is *inductive* not *experimental* evidence upon which such "knowledge" is based. Consequently in "proving" the existence of God from Nature's works we have no other than inductive evidence or the accumulation of coincidences and probabilities; so that when they are fully grasped by the mind they form a

“moral conviction” which is equivalent to a demonstration.

The presence of Law and Order is obvious everywhere now in the universe; yet this same universe, we are told by scientists, was originally a homogeneous fiery vapour. This “proves” to most minds the necessity of a “Law-giver” and “Order-maker”.

But, strange as it may seem to those who knew Darwin in the fifties, Materialistic Monists have seized upon “Darwinism” as the very basis of their Monism. “Darwin gave us the clue to the monistic explanation of organisation . . . mechanism alone can give us a true explanation of natural phenomena; for it traces them to their real efficient causes, *viz.*, to blind and unconscious agencies.”¹

So, too, Büchner says in his *Last Words on Materialism*: “Darwinism is the chief support of Materialism or Monism”.²

It is, therefore, necessary to consider how it came about that Darwin’s theory—which he himself thought when he wrote it to be perfectly compatible with a belief in the Creator—came to furnish the very groundwork of the most uncompromising Atheism ever known.

Some may think that I spend too much time over Haeckel’s “puerile argument for Atheism from Darwinism,” as it has been called; but Haeckel is an eminent biologist, and by no means stands alone in making this deduction.

Darwinism has led many scientists to refer all phenomena, both of the organic and the inorganic worlds, to physico-chemical forces only. Such a conclusion has landed them in Agnosticism if not Atheism; because the

¹ Haeckel’s *Riddle*, etc., pp. 264, 265.

² *Ibid.*, p. 139.

legitimate *philosophical* inference of a Conscious Power in Nature is ignored as being outside the province of science; which Rationalists claim as the sole source of knowledge.

Thus Prof. Karl Pearson says: "An *explanation* is never given by science. The whole of science is *description*, mechanism explains nothing."

"The *Grammar of Science* confines the sphere of knowledge to the world of perceptions and the conceptions drawn from it."

"The mind is absolutely confined within its nerve-exchange; beyond the walls of sense-impression it can logically infer nothing.¹ . . . Briefly, Chaos is all that science can logically assert of the supersensuous—the sphere outside knowledge, outside classification by mental concepts."²

"No human concept, such as order, reason or consciousness can be logically projected into it."³

But it is not merely an academical question whether Haeckel and other biologists are right or wrong. His books, especially the *Riddle of the Universe*, are eagerly read by young men of the lower orders, who boldly proclaim atheism in the London Parks, etc., on the supposition that Haeckel is an infallible authority! Haeckel's theories may seem wild enough, it is true, to all who *know*; but it is not so to those who only take their "science" second-hand from him.

I feel, too, that it is unfortunate that I have to contest a purely scientific deduction from "Darwinism" in a work, the purport of which is to contravene such abstract conclusions as atheism, disbelief in man's free will and immortality; but the burden must rest on the shoulders

¹ *The Chances of Death and other Studies in Evolution*, ii., pp. 381, 382.

² *The Grammar of Science*, p. 108.

³ *Ibid.*, p. 112.

of the Rationalists and Haeckel. It is they who go out of their way to deny the existence of any scientific proof of a God, of freedom and of immortality ; because these things cannot be brought within the range of observation and experiment.

Moreover, as Haeckel and others avowedly base their Materialism on Darwinism, I cannot avoid discussing this latter subject on the present occasion.

In order, however, to preserve more continuity in what is intended to be apologetic, I propose relegating my purely scientific discussion of Darwinism to an appendix.

If the reader prefer to do so, he might read that appendix at this point of the argument with advantage.

CHAPTER IV

MATERIALISTIC AND THEISTIC VIEWS OF THE EVOLUTION OF THE INORGANIC WORLD

IN anticipation of what Haeckel has to say about the evolution of animals and plants as well as the psychological phenomena of man's "soul," he is obliged to look somewhere for a natural source of life in organisms. But besides this he must also find a source of *sensation* and *will*, and generally for a *soul*.

He starts with the fundamental ether filling all space and permeating all bodies, being infinite and eternal. He says: "The existence of ether as a real element is a *positive fact*. . . . As we assure ourselves of the existence of ponderable matter by its mass and weight, by chemical and mechanical experiments, so we prove that of ether by the experiences and experiments of optics and electricity."¹

The reader will observe that the nature of the proofs is not identical. The former is experimental verification, the latter induction, the ether being *assumed* to exist in order to account for the transmission of light; the probabilities of its existence being of such a high order, that its absence becomes unthinkable.

Let us now follow his assumptions and we shall then be able to form some estimate of the probabilities of their being true or otherwise.

¹ *Op. cit.*, pp. 230, 231.

Ether and force appear to constitute his primary "Substance".

With regard to the origin of evolution in ether, Haeckel thus describes the process: "This universal movement of substance in space takes the form of an eternal cycle or of a periodical process of evolution.

"The phases of this evolution consist in a periodic change of consistency, of which the first outcome is the primary division into mass [matter?] and ether—the ergonomy of ponderable and imponderable matter.

"This division is effected by a progressive condensation of matter as the formation of countless infinitesimal 'centres of condensation,' in which the inherent primitive properties of substance—feeling and inclination—are the active causes."¹ Of course this theory of a homogeneous ether forming local thickenings by some spontaneous "feeling and inclination" at certain "centres of condensation" is an hypothesis without a shadow of even a hint of a proof, much less explanation how they came about. When condensation is going on physicists call it gravity; but what sets up a centre of attraction, as in our sun, is not known. And there we must leave these speculations as involving at present insoluble problems.

Haeckel does not seem to have heard of vortex-rings in ether as the origin of matter; about which something will be said below, as well as of the very latest hypothesis of the present year (1903). Two great questions, therefore, arise at once. How had the inorganic universe, to which our earth belongs, a beginning in time and space; and how did Life appear upon this earth?

What has modern science got to say, first, as to the

¹ *Op. cit.*, p. 248.

former question of the two? We start with the hitherto accepted belief in the universal existence of ether, imponderable and immaterial, pervading all space and all material objects. Prof. Dolbear says that from experiments in a vacuum "one is led to infer that matter is not the agent that transmits light". Hence the universal ether is hypothecated to account for the transmission of the waves of light, magnetism, electricity and gravitation.

"Ether is not atomic in structure, presents no friction to bodies moving through it, and is not subject to the law of gravitation, it does not seem proper to call it 'matter'. We might speak of it as a 'substance' if we want another word than its specific name for it. As for myself, I make a sharp distinction between the *ether* and *matter*, and feel somewhat confused to hear any one speak of the ether as matter." ¹

Similarly, Tait says: "If we adopt Sir W. Thomson's [Lord Kelvin] supposition that the universe is filled with something which we have no right to call ordinary matter (though it must possess inertia) but which we may call a perfect fluid; then, if any portions of it have vortex-motion communicated to them, they will remain for ever stamped with that vortex-motion; they cannot part with it; it will remain with them as a characteristic for ever, or at least until the creative act which produced it shall take it away again. *Thus this property of rotation may be the basis of all that to our senses appeals as matter.*" ²

It is thought that "atoms" of matter are made out of ether.

The artificial manufacture of "vortex-rings" (such as may be sometimes seen in smoke-rings from a tobacco-

¹ *Matter, Ether and Motion*, p. 35.

² *Lectures on Some Recent Advances in Physical Science*, by P. G. Tait, 1876, p. 294.

pipe or in the vapour from the funnel of an engine, or from the smoke in firing a cannon, etc.), shows how it is conceivably possible that they can be formed in ether. "If such a ring could be produced in a material not subject to friction, none of the motion it possesses could be dissipated, and we should have a permanent structure, possessing several properties, such as definite dimensions, volume, elasticity, attraction, and so on, all due to the shape and motions involved."¹

"Imagine, then, that *vortex-rings* were in some way formed in the ether, *constituted of ether*. If the ether be, as it is generally believed to be, frictionless, then such a thing would persist indefinitely: it would have just that quality of durability that *atoms* seem to possess."

"It may be asked how one vortex-ring can differ from another, so that there could be so many as seventy or more different kinds of atoms [elements]. To this it may be said that such rings may differ from each other not only in size but in their rates of rotation; the ring may be a thick one or a thin one, may rotate relatively fast or slow, may contain a greater or less amount of the ether."²

"Motion is the chief characteristic of matter. Chemists have discovered that both the chemical and physical properties of all kinds of matter are functions of their mass or relative atomic weights, and that they may be arranged in a harmonic series. Harmonic relations may imply relations either of position or of motion. But the fundamental properties of matter do not change by a change of its position, and one is therefore led to the conclusion that one must look to the various kinds of motion involved among atoms for the explanation of all their properties and all their phenomena."

¹ *Op. cit.*, p. 39.

² *Op. cit.*, pp. 40, 41.

“One, however, must not infer that this represents knowledge of a demonstrated kind, for it does not.” Yet Prof. Dolbear finally observes: “It is either that theory or nothing. There is no other that has any degree of probability at all.”¹ Though Prof. Dolbear here writes somewhat decidedly, one must add that it is not all physicists who accept the theory of atomic vortex-rings. Writing to Lord Kelvin to ask him how far, if at all, the discoveries about radium affected the theory, he has been so good as to reply as follows: “In answer to your letter, radium has nothing to do with vortex-rings. About 1886 I utterly abandoned the idea that atoms of matter could be vortex-rings; or that the theory of vortex-rings (a beautiful and admirable result of mathematical work in the dynamics of an ideal perfect liquid) could contribute anything towards an explanation of the atoms of matter and their mutual actions. I had occupied myself much with that idea for about twenty years; but I abandoned it when I became convinced that there was no truth or help towards truth in it.”

Since the above was published, Prof. O. Reynolds, F.R.S., has delivered the Rede lecture at Cambridge, and broached a new theory in it, that ether consists of inconceivably small grains. Matter represents a deficiency of these grains [how were they lost?] causing a strain in the medium and thus accounting for the law of gravitation, etc.

Experts only can determine what degree of probability Prof. Reynolds's theory may have to support it; or how far it interferes with that of vortex-rings. At all events, at a later date (1st May, 1903) Lord Kelvin had occasion to say that he was “horrified to read in the

¹ *Matter, Ether and Motion* (S. P. C. K., 1899).

press that he had spoken of ether-atoms. Ether was absolutely non-atomic ; it was absolutely structureless and homogeneous.”

What physicists may finally determine as to the nature of electrons and ions, must be left to their researches.

These latest deductions of scientists seem to bring us to the Origin of the Universe.

If we may assume the existence of an infinite and eternal ether, perfectly homogeneous but replete with motion, we thus arrive at the primary condition of matter and motion, as being all that pure science can imagine or detect.

If we think that an Omnipotent, Conscious, Intelligent Power is present in the Universe as well as a limitless ether ; then if that Power be supposed to be infinite in space, we might express this as regarding ether as the “vehicle” of that Power. Science suggests, as we have seen, that matter (represented by the seventy or more “elements” known to physicists) was the first result of some special kind of motion set up in ether, which resulted in the production of vortex-rings ; these vortex-rings being atoms of the known elements.

How vortex-rings are set going in ether is unknown. All that Prof. Dolbear says is: “Imagine then, that vortex-rings were in some way formed in the ether, constituted of ether”. They then appear to have all the physical peculiarities claimed for atoms of matter as ordinarily known to physicists.

Atoms once formed in this way, when suitable conditions, as of heat, occur, enter into combination with one another and produce molecules composed of two or more different elements, and in various proportions.

As soon as this is the case the substances exhibit

phenomena quite unknown in the individual atoms themselves. Thus nitrogen and oxygen mixed mechanically constitute the atmosphere; but if one atom of nitrogen and one of hydrogen be chemically combined with three of oxygen, we get the powerfully corroding substance called "nitric acid".

How do these properties arise? I am not aware that any one knows.

We need not proceed further at present, for enough questions begin to crowd upon one, but the fundamental one is: *How do vortex-rings arise in ether?* Did they arise spontaneously? If not, what caused them, and what was the antecedent cause, and so on *ad infinitum*? Dr. Charnock thus writes: "The proof of the beginning of the world is affirmed with good reason". This is abundantly corroborated by modern science. "If it had a beginning, it had also some higher cause than itself; every effect hath a cause." Similarly, "all motion hath a beginning".¹

The question, therefore, is, Was the origin of vortices, as well as of subsequent phenomena attending atoms of elements, which come under the sphere of chemical investigations, from nebula to granite, as well as gravitation, rotation, etc., etc., all purely mechanical under the action of blind forces; or are we justified in recognising a *Conscious*, Omnipotent Power acting as the Originator of special forms of force, or of the first impulse in making vortex-rings, thence atoms, thence all the material substances in the universe with their respective properties?

The answer depends upon two factors—the amount of *probabilities*, and the *receptivity of evidence* in the human mind.

¹ Complete Works, vol. i., pp. 144, 145. He was born in 1628.

The cumulative evidence of the existence of a Deity seems ample to one mind ; whereas he who will not rise beyond sensual perceptions of physical phenomena, of course, closes his mind to all other evidence which is based on a totally different and more abstract line of reasoning.

To the one a large part of "proof" is inductive ; or what is called "Faith". To the other this is purposely excluded as not evidential at all, and the man prefers to be Agnostic in the sense that "he does not know," as the evidence does not appeal to him as sufficient.

Dr. Charnock thus continues : "We must come to something that is first in every kind, and this first must have a cause not of the same kind, but infinite and independent ; otherwise men run into inconceivable labyrinths and contradictions. . . . If the world were uncreated, it were then immutable, but every creature upon the earth is in a continual flux, always changing [this has been corroborated and greatly intensified by evolution]. If things be mutable, they were created ; if created, they were made by some author ; whatsoever hath a beginning must have a maker. If the world hath a beginning, there was then a time when it was not ; it must have some cause to produce it. That which makes is before that which is made, and this is God. No creature can make itself : the world could not make itself. . . . Whatsoever began in time, was not ; and when it was nothing¹ it had nothing and could do nothing ; and therefore could never give to itself nor to any other to be, or be able to do ; for then it gave what it had not, and did what it could not." Dr. Charnock here argues on the old hypothesis of the

¹ For "nothing" may be substituted "ether".

creation of the world out of nothing ; but if we substitute a homogeneous ether, it is difficult to realise how man's mind could be potentially in it, if there be no Creative Mind at all. "If it were," he proceeds, "as some fancy, made by an assembly of atoms, there must be some infinite intelligent Cause that made them, some cause that separated them, some cause that mingled them together for the fitting up so comely a structure as the world. It is the most absurd thing to think they should meet together by hazard, and rank themselves in that order we see without a higher and a wise agent, so that no creature could make the world. For supposing any creature was formed before this visible world, and might have a hand in disposing things, yet he must have a cause of himself, and must act by the virtue and strength of another, and this is God."¹

So now, if atoms are vortex-rings, whence came the initial power to make the rings in ether? Those atom-rings were made in time, and if a nebula consist of millions of glowing hot vortex-rings of hydrogen, whence the "Directivity"² which has produced the planetary order out of them? Dr. Charnock then concludes his argument: "To conclude this; as when a man comes into a palace, built according to the exactest rule of art, and with an unexceptionable conveniency for the in-

¹ *Op. cit.*, vol. i., p. 150.

² I am indebted to Prof. A. H. Church, F.R.S., for this very useful and expressive word. It seems a better one than Jas. Croll's "Determining Power" referred to below and employed in his paper—*What Determines Molecular Motion, the Fundamental Problem of Nature?* Prof. Church writes me, "I coined it many years ago to avoid the use of 'force,' 'energy,' etc., when describing in lectures on organic chemistry the parallelism between the chemist *directing* in his laboratory physico-chemical forces in the making of a true organic compound, and that mysterious "something" which employs the same forces to make the same compound in the plant or animal."

habitants, he would acknowledge both the being and skill of the builder; so whosoever shall observe the disposition of all the parts of the world, their connection, comeliness, the variety of the seasons, the swarms of different creatures, and the mutual offices they render to one another—cannot conclude less that it was contrived by an infinite skill, effected by infinite power, and governed by infinite wisdom.”¹

Since this chapter was written, we have learnt a great deal about Radium and radio-activities, which seem likely to revolutionise previous conceptions of the nature of atoms; but the only question which arises in connection with my present argument is: Are these complicated phenomena more or less likely to favour Rationalism or Dualism?

One cannot say more than, that in proportion as the complexity of an atom and its activities appear to increase, so much the more difficult, if not incomprehensible is it, to believe that its structure and powers should have arisen *suâ sponte*, without some Directive Agency.

¹ *Op. cit.*, vol. i., p. 158.

CHAPTER V

HAECKEL'S MATERIALISTIC THEORY OF THE ORIGIN OF LIVING BEINGS

THE following are a few passages from Haeckel's *Riddle of the Universe* bearing on the origin of life.

“Max Verworn showed as a result of an ingenious series of experimental researches that the ‘theory of a cell-soul’ is completely established by an accurate study of the unicellular protozoa, and that ‘the psychic phenomena of the protistæ’ form the bridge which unites the chemical processes of inorganic nature with the mental life of the highest animals.”¹

“I restrict the idea of spontaneous generation—also called abiogenesis or archigony—to the first development of living protoplasm out of inorganic carbonates and distinguish two phases in this ‘beginning of biogenesis’—(1) *autogony* or the rise of the simplest protoplasmic substances in a formative fluid, and (2) *plasmogony*, the differentiation of individual primitive organisms out of these protoplasmic compounds in the form of *monera*.”²

“Modern physiology teaches us that the first source of organic life on the earth is the formation of protoplasm, and that this synthesis of simple inorganic substances, water, carbonic acid and ammonia, only takes place under the influence of sunlight.”³

¹ *Riddle of the Universe*, pp. 48, 49, 155.

² *Op. cit.*, p. 263.

³ *Op. cit.*, p. 288.

It will be observed here that Haeckel does not say where the sulphur and phosphorus are to come from which protoplasm and its nucleus require.

In referring to the necessity of sunlight, such is only necessary for plants provided with *chlorophyll* which can live on the inorganic world. Colourless animals and plants, like monera and bacteria, do not require it ; for they can only live upon *already prepared organised food*. Where this is to come from for his primitive beings Haeckel neglects to tell us, for no such organisms can live upon mineral food.

According to Haeckel, therefore, protoplasm, the only known substance which can be alive, was originally derived from the inorganic world ; and he does not hesitate to explain from what mineral materials he believes it to have been evolved. We know that it requires carbon, nitrogen, hydrogen, oxygen and sulphur, and we might add phosphorus for the nucleus. Haeckel supplies us with carbonic acid, ammonia and water, but here he forgets the sulphur (though he has previously mentioned it), together with a hypothetical "formative fluid". What this is, of what it is composed and where it occurred, we are not informed.

Haeckel then appears to combine these compounds somehow ; for he calls the primitive inorganic substances "nitrocarbonates".

Surely it would be strange if carbonic acid and ammonia did not form common "smelling salts" rather than protoplasm !

Searching among minerals for one containing the same elements in its composition as protoplasm, we seem to approach it in a comparatively rare one called *mascagnite*, a product of volcanic action, being found at Etna, Vesuvius and the Lipari Islands. It is described

as a "hydrous ammonium sulphate," that is to say, it contains water, ammonium and sulphur in its composition but not carbon. However, there is plenty of carbonic acid produced by volcanic action; so with that we have got all we practically want of the elements of protoplasm. Thus we are better off than Haeckel; but the question is, How are we to get the right proportions of these elements for building up protoplasm?

Mascagnite contains in one molecule $N_2H_{10}O_5S$. But protoplasm requires them to be in much higher proportions. The composition of albumen, which is a near ally of protoplasm, is said to contain $C_{60}H_{100}N_{16}O_{20}$; while the nucleus is reported to have a still more complicated composition.

"The result of an analysis of the plasmodium of a Slime-mould (*Æthelium septicum*) showed 71·6 per cent. water and 28·4 per cent. solid matter. The latter was composed of 30 per cent. of nitrogenous compounds: *e.g.*, plastine, vitelline, myosine, pepsine, lecithine, guanine, sarcine, xanthine *and* ammonia carbonate; 41 per cent. was composed of ternary compounds, including paracholsterine, resin and a yellow pigment, sugar (non-reductive), various fatty acids and neutral fatty substances. The remainder was composed of mineral substances, including calcium combined with various acids, phosphates of potassium and magnesium and chloride of sodium. . . . This illustrates the extraordinary complexity of the protoplast, and the impossibility of obtaining more than an approximation of its chemical composition."¹

Protoplasm, therefore, does not seem to be quite so simple a substance as Haeckel would like us to suppose!

It may be added that "the Slime-fungi occupy quite

¹ *A University Text-book of Botany*, by D. H. Campbell, Ph.D., 1902.

an isolated position in the vegetable kingdom. They are, perhaps, the most nearly related to the group of Rhizopods in the animal kingdom. They live in and on organic remains, especially rotten wood and leaves, etc. They are without chlorophyll, consisting of masses of protoplasm without cell wall (*plasmodia*).”¹

Dr. Vines has lately investigated the physiology of the yeast-plant, *Saccharomyces Cerevisiæ*; and drew attention to the remarkable fact that though this plant consists of but a single minute cell, it is known to produce a variety of enzymes or ferments; *diastase*, that converts starch into sugar; *invertine*, that splits cane-sugar into glucose and fructose; *glucase*, that converts maltose into glucose; *zymase*, that decomposes glucose into alcohol and carbon dioxide; as well as an undefined enzyme, *protease*, which digests proteid matter.

There is *nothing*—any more than with slime-fungi or bacteria—to enable it to live on mineral food alone; nor are any of these enzymes known in the inorganic world.

Lankester (article “Protozoa”) says: “A conceivable state of things is that a vast amount of albuminoids and other such compounds had been brought into existence by those processes which culminated in the development of the first protoplasm; and it seems, therefore, likely enough that the first protoplasm fed upon these antecedent steps in its own evolution just as animals feed on organic compounds at the present day, more especially as the large creeping plasmodia of some Mycetozoa feed on vegetable refuse”.

It will be observed that the question of the origin of life is not solved, but only pushed further back; for

¹ *Systematic Botany* (Warming and Potter), p. 5.

Lankester offers no explanation as to the origin of the albuminoids.

To bring this question up to date "a new suggestion as to the nature and origin of protoplasm has been made by Herrera.¹ By triturating the acetate, carbonate, or chloride of calcium with glacial phosphoric acid, and then treating the resulting substance with salt solutions, the author obtains a mass which behaves under the microscope very much as does protoplasm. It shows amoeboid motion, a vacuolar or granular structure, plasmolyzes in certain cases when treated with plasmolyzing solutions, can be stained with methyl green, has its movements accelerated by sodium chloride, etc."

But, in reality, we are still no nearer to answering the question: How was protoplasm *first* made in Nature? In all attempts at its artificial construction, *Man* replaces *Natural Directivity*, and supplies the materials together, which as far as we know, Nature does not; certainly not in all the compounds mentioned in this extract from the *Gardener's Chronicle*, p. 459 (Dec. 20, 1902).

Haeckel also says that the element carbon is the effective one in making protoplasm according to his "carbon theory"; but nitrogen is really the one which allows of the "facility of decomposition".

It is the presence of this element which accounts for the explosiveness of gunpowder, gun-cotton, etc. It is also nitrogen which facilitates rapid decomposition of organic matters. If white of egg or albumen be treated in the same way as to temperature, etc., with sugar, it is the former (not the latter, which consists of water and carbon only) which decomposes.

Neither Haeckel nor Lankester has brought us one

¹ A. L. Herrera, "Le protoplasma de métaphosphate de chaux," *Mem. Rev. Soc., Sci.*, "Antonio Alzate," Mexico, 17, 201-213, 1902.

whit nearer to the solution of the problem of the first origin of protoplasm.

But besides protoplasm there is the ever-present nucleus to be considered. Even if the primordial protoplasmic being contained no nucleus—as the bacteria are at present supposed by some to be without it¹—how did it arise? Every living being, animal or plant above those most degraded forms of fungi cannot be formed at all without one.

The nucleus is now known to be a highly complicated body, and passes through an elaborate series of evolutions, when undergoing division for the making of new cells. It is never known to arise spontaneously in protoplasm, but always from pre-existing ones. Hence, whenever the first protoplasm was formed, it must either have had a nucleus within it, or very soon acquired one; otherwise Evolution, as we know it, could never have proceeded at all.

It is in the behaviour of the nucleus that we first begin to see marked *directivity* in the evolutions of its structure. The spirem stage or chain with chromosomes divides into a definite number, these arrange themselves in a definite manner, in a certain place. They then undergo certain changes, certain tracks are prepared like single rails on a spindle, each travels along a line of the spindle, half of them going one way, half the other, till the individual parts of the two groups of bodies meet and fuse, forming two fresh “daughter” nuclei one at one end, the other at the other end or “pole”. After these daughter nuclei are formed, the second act of the drama begins, and a cell-plate is laid down between the two, which gradually extends from one side to the other of the original cell.

¹They contain chromosomes, thought to be either the beginning of a nucleus or degradations.

According to observers various little difficulties are surmounted by modifications in the method of laying down the cell-plate ; just as an engineer will overcome some local difficulty by skill and ingenuity.

“Directivity” is thus very apparent at the very beginning of life-work.

Haeckel totally avoids touching upon the structure and behaviour of the nucleus. He boldly assumes that protoplasm arose by *autogony*, *i.e.*, it was “self-begotten”.

Rationalists are fond of arguing that if there be a God, there must be an antecedent Cause of God ; so we might ask them in return, What is the cause of autogony ?

What were the first organisms supposed to be like ? Haeckel boldly tells us they were “monera (for instance *Chromacea* and *Bacteria*) which consist only of primitive protoplasm and arose by spontaneous generation from inorganic nitrocarbons”.

Unfortunately he gives us no proof, though he speaks very categorically here. In the first place, he cannot prove that these creatures are not *degradations* from higher forms rather than primitive types. Knowing, as we do, how degeneration has always accompanied evolution, both in the animal and vegetable world, and considering the millions of years we believe life to have been on this world, it would seem that the probability is in favour of their being degenerations rather than unchanged, original beings. But there is something like proof that such is the case, for Haeckel has overlooked the fact that these creatures cannot live on water, stones and air, but must (as already observed) have organised substances for their nourishment. Thus, some bacteria cause diseases in trees, others, putrefactions, others, again, are pathogenetic in man and animals, etc., but none of them can live and thrive on purely inorganic matter.

Haeckel does not provide his first evolved beings with anything which they can assimilate as food ; an essential characteristic of all living beings.

As far as we know it is only chlorophyll-bearing organisms which can decompose carbon dioxide ; and, although nitrogenous compounds are in some mysterious way made out of ammonia salts by the "nitrifying" species of bacteria, these are not supposed to live *solely* on inorganic matters.

Hence the first beings must have been *green algæ* or something of the sort, judging by our existing knowledge.

The group of plants known as *Schizophyta*, *i.e.*, plants multiplying by "fission" only (or else by spores), are divided into two groups.

Schizophycæ, of the nature of algæ with green chlorophyll, and *Schizomycetes*, colourless fungi. These may be regarded, Strasburger observes, as derivative forms of the former.

The *Bacteria* belong to this latter group.

Prof. Vines says of the *Schizomycetes* : "They multiply by cell-division, the nucleus undergoing 'mitotic' division in connection with this process." That is the complicated process already referred to.

Strasburger says that the nuclei have not been observed in many forms ; but *were* seen in certain species examined by Hegler.

If it should be proved to be actually wanting, such must be due to extreme degradation, and not a characteristic of a primitive type.

The *Schizophycæ*, therefore, might be more probably nearer to the original type.

Much has been written for and against the conception of a "Vital Force" in organisms. Haeckel, of course,

ridicules it ; but whatever *name* be proposed for it, there *is* undoubtedly a "Directivity" in living beings of a kind which is not observable in inorganic matter. It has also been described as "Dominant". Each of these two words expresses observable phenomena.

Thus when a new variety of a plant or animal appears, it is due to alterations in the structure, so that the external visible organs appear different in some degree from the corresponding organs of the parent. The internal anatomy may undergo parallel changes. That is to say, the tissues within are different ; and as these tissues are made up of cells, which again arise by divisions of nuclei, we arrive at the fundamental sources of the changes of form ; and the conclusion is expressed by saying that the protoplasm and nucleus respond to the direct action of the environment, and at once build up cells and tissues so as to make the organs suitable, or in harmony with, the new conditions of life supplied by the environment. Here, then, we have internal "Directivity" constantly displayed.

The word "Dominant" might be used to represent the "over-ruling" power of Life.

And here it may be added that this innate power of adaptation is as perceptible in microscopic fungi, as it is in trees and herbs ; for there is, for example, a parasitic fungus, *Erysiphe graminis*, which attacks species of the genus *Bromus* among grasses. The observer, Mr. E. S. Salmon, F.L.S., remarks that specialisation has involved the evolution of a considerable number of "biologic forms" of the fungus, specially adapted to eight distinct species of *Bromus*, respectively.

Now supposing protoplasm were evolved from minerals, there is much more to be accounted for and explained than mere structure, such as all the enzymes

mentioned ; and in addition this inherent power of adaptability to host plants in such as are parasitic.

Again, although chemical forces are active all over the body, especially observable, perhaps, in the processes of digestion and respiration, yet *life* is always more or less *dominant*, for these chemical processes cannot go on if life be withdrawn. As long as life is present, those bacteria which cause putrefaction are powerless, though they must invade all living beings by tens of thousands.

Again many combinations of elements occur in living bodies, forming substances which are never formed naturally outside an organism. Life, therefore, is a dominant power ordering as it were chemical combinations to be made, which the unassisted inorganic forces cannot accomplish. Materialistic Monists try to make much of the fact that several vegetable products, as indigo, madder, etc., and the waste product *urea* of the animal kingdom, can be made in the laboratory, and they look forward with confidence to the time when chemists will succeed in making albumen and then, at last, protoplasm itself. When this is done, they say, all the phenomena of life will appear ; since (they assert) all vital phenomena are but the results of the molecular composition of substances in the body.

But supposing protoplasm were made artificially, why *must* it be instantly alive ? Protoplasm can be killed readily enough. Dead protoplasm exists as well as living protoplasm.

But there is a still more important fact which Materialistic Monists completely overlook : and that is that the *Chemist* takes the place of the *Directivity* of the living cell, in making vegetable products ; and if the former were to make protoplasm artificially, whose place does

he then take ?—for such would be a very different thing from protoplasm making itself *de novo* by autogony.

Let the chemist do for Nature a good turn in providing all the elements required, each being in as nearly the exact proportion as is known to be in protoplasm, mix them all together, then *leave them to themselves*, and see if they will make protoplasm or even albumen. That would at least be helping autogony if such exist, by providing all the materials for life.

The assumption of Lankester of a *quasi* organic substance on the road to the formation of protoplasm is, of course, a pure assumption to support the theory that living protoplasm arose out of the inorganic world by some natural process.

All I contend for is, that, at present, we are in total darkness ; but people who know nothing of science are only too ready to accept as *truths* whatever an eminent man such as Lankester or Haeckel chooses to say.

Surely it is more philosophical to call oneself an Agnostic where we “do not know,” than to hazard baseless hypotheses to be accepted by people who have no knowledge to enable them to see their baselessness,

CHAPTER VI

LIFE AND ITS PHENOMENA

WE will now suppose the first living organism to have appeared upon this earth *somehow* ; but as to the method of procedure by which it came into existence, it seems wiser to confess our entire ignorance than to frame impossible theories when we have no facts to go upon.

At this point Darwin enters upon the scene, as his theory of the "Origin of Species by Means of Natural Selection" was concerned with the evolution of animals and plants since the commencement of life upon earth.

Comparing Evolution with the previous conception of Creation by Design, he wrote as follows at the close of his work :—

"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 ; and that, whilst this planet has gone cycling on according to the fixed law of gravity ; from so simple a beginning, endless forms, most beautiful and most wonderful, have been and are being evolved."¹

It will be here seen that Darwin believed in a Conscious, Omnipotent Creator, and evidently did not realise when he wrote his books that his own theory in explanation of Evolution would supply a basis for the Atheistic Monism of to-day which ignores the existence

¹ *Origin of Species*, 6th ed., 1878, p. 429.

of a Conscious Creator altogether. His previous mental training saved him at that time from the Agnosticism of modern Rationalists, scientific or otherwise ; though their conclusion, so far as his theory is concerned is a legitimate one, had Darwinism any real foundation in fact.

It need hardly be added that the belief in a Creator was and is held by astronomers, physicists, chemists and others who are not biologists. Inductive evidence of the existence of an Omnipotent Power is not confined to the living world, but is based on the widest series of facts.

When, however, we turn to Darwin's "Life," we read a somewhat different story. He tells us that when standing in a Brazilian forest he wrote in his diary : "It is not possible to give an adequate idea of the higher feelings of wonder, admiration and devotion which fill and elevate the mind".¹

"But now," he continues, "the grandest scenes would not cause any such convictions and feelings to rise in my mind." I will not quote his description of his mental atrophy for art, etc, nor more of his conversion by his own theory of Natural Selection to Agnosticism. It appears to me that this resulted from, as I shall show, the total absence of *Natural Law* in Natural Selection, as an element in the Origin of Species. For—and I wish to emphasise this fact as it is so important to bear it in mind—there is *no relationship* at all between the accidentally arising, favourable variations (out of imaginary indefinite variations among a group of offspring) and the requirements of the beings in adaptation to their new conditions of life.

This is the fatal want in Darwinism ; and at once stamps it with an atheistic character in the eyes of those

¹ *Life*, vol. i., p. 311.

who are predisposed to look upon all processes in Nature as being the result of chemico-physical forces alone.

There are no facts known to occur in Nature in support of Darwinism.

We can see, too, how the error of Darwinism misled Romanes, who in referring to the well-known argument of the watch with which Paley begins his work on *Natural Theology*, says that he "will suppose the discoverer of the watch to proceed to the sea-side and to examine a bay. He would note the corresponding configuration of the cliffs, the river with its suitable bed entering the bay and many other details, etc. . . . Now I think that our imaginary inquirer would be a dull man, if he failed to conclude that the evidence of design furnished by the marine bay was at least as cogent as that which he had previously formed in his study of the watch. . . . The teleologist would feel that he must abandon the supposition of any *special* design in the construction of that particular bay." Then in turning from the phenomena of the inorganic world to those of organisms, Romanes observes: "The mere fact that we meet with more numerous and apparently more complete instances of design in the one province than in the other is, *ex hypothesi*, merely due to our ignorance of natural causation in the more intricate province," by which he means "Natural Selection".¹

Romanes thus tries to bring the inorganic into line with the organic by means of Natural Selection. But in drawing a comparison between a sea-beach and a watch, which is supposed to represent an organism, Romanes strangely failed to see that the two things are not really comparable; for purely physical forces, provided with

¹ *Thoughts on Religion*, pp. 57, 65.

the same kind of materials to work upon, always produce precisely the same general results, and have done so since the foundation of the world. Old sea-beaches very similar to existing ones are in evidence, which were probably laid down millions of years ago; with the impress of rain-drops and ripple-marks of the retreating waves stamped indelibly upon them. Rivers flowed in their beds to the sea then, just as they do now. So, too, chemical combinations and crystallisations went on at all ages, exactly as they do to-day, with as exactly the same results.

But when we turn to living organisms, all is changed. The great groups of animals and plants, it is true, have existed in past ages; but, nevertheless, they have changed in detail again and again, through the epochs of the world's history; and it is only the very latest of the earth's strata which contain organisms identically the same as existing ones.

This profound difference between the results of physical forces acting on inorganic bodies as distinct from the effects of life, has to be accounted for. On merely *à priori* assumptions, one would deem it probable that some different or additional powers must have come into play, where the results are so profoundly different.¹

Romanes thus went beyond Darwin in trying to unite the physical world with the organic, as if both alike depended upon Natural Selection, and as ejecting "Design" from the world altogether.

If Darwin be right that all animals and plants in the past, present and future are evolved from "few" or "one" original being, that being might have been a simple microscopic germ for all we know. Then, when we think

¹ I have here quoted from my little book entitled, *The Argument of Adaptation or Natural Theology Reconsidered* (Williams and Norgate, 1s.).

of this, does it not excite our wonder to an astonishing degree, on witnessing the practical omnipotence of protoplasm and its nucleus, and to imagine how it could have acquired it? Materialistic Monists and Rationalists, like Romanes, try to bring life into the same category as all physical forces ; but, as pointed out, we see a feature altogether unknown in the inorganic world. All physical forces act in precisely the same way now as ever before. It is just because they do so that we can interpret the past physical phenomena of the world by means of the present.

It is not so with living beings. Evolution shows us that so far as organisms go, though the same type is produced by heredity, generation after generation, as long as the conditions of life are constant ; yet change is really the order of the day sooner or later.

Moreover, contrary to the behaviour of physical forces which tend to dissipation, the commonest result being heat, animals and plants have gone on getting more and more complicated as the world grew older. The law of adaptation has ever added new features as required, though usually coupled with degeneracy whenever any special structure is no longer useful. Thus have been left the numerous rudimentary organs in animals and plants still present, or, as in many cases, they have gone altogether.

In whatever way we compare living beings with non-living we see striking contrasts both in structures and energies concerned with them, which have to be accounted for, if it be thought that all the phenomena of life can be relegated to purely physical procedures.

All the way from primitive protoplasmic beings to man there is that *Directivity* which refuses to be excluded. It thrusts itself upon our notice, as I have said,

even in the process of cell-division by the nucleus, in the formation of suitable tissues and organic substances, and also in the construction of entire organs, producing results which Paley and the teleological school of old thought must have been designed.

Whether created all at once by a *fiat*, as Milton but too graphically describes it, or evolved by adaptation, the *result* is precisely the same, forcing on every one who is not blinded by the preconception of Atheism, a Dominant or Directive Agent in every particle of living matter.

It is sometimes desirable to supply concrete illustrations, as many readers may not be scientific ; and so may not see the significance of the above remarks. Let us take, for example, an illustration of use and disuse and their effects. The familiar increase of the size of the muscles of the arm by exercise is a case in point. How is it done? The living protoplasm responds to the call upon the activities of the muscle to meet them. It sets to work and builds up fresh cells and muscular fibres, and so strengthens the arm. The bones, if required to do so, will as readily respond to efforts and increase in size. Thus, in consequence of the great weight thrown upon them they are enormous in the elephant as compared with those of a horse or gazelle. The formation of the foot corresponds with the habits of the animal and nature of the ground it frequents. Thus, the so-called "cloven hoof," really consists of two effective toes which are spread out in animals living on soft soil, while their tongue is correlated with the foot in adaptation to the requirement of grasping long grass, as may readily be observed in grazing oxen. On the other hand, the horse has lost four toes from each foot and now stands upon the middle toe only of the original five.

This is better adapted for a harder soil, while the incisors can nibble short grass, as on downs ; and it does not require the use of the tongue for "licking" up the grass.

Huxley said somewhere that even if such Lamarckism were true, it could only apply to half the living world ; but he was not then aware that "use and disuse" are equally applicable to the vegetable kingdom.

Thus, if weights be attached to young parts of plants, as growing shoots or leaf-stalks, just insufficient to break them, they soon acquire a much greater strength than they would have done, had they been not so weighted. Thus, *e.g.*, the little stem of a seedling sunflower, which would have broken under a weight of 160 grms., bore a weight of 250 grms., after having been subjected to a strain of a weight of 150 grms. for two days. The weight was subsequently increased to 400 grms. without injury. Leaf-stalks of the Christmas rose, which broke with a weight of 400 grms., were able to resist one of 35 kils., after having been subjected to a strain for five days.¹

Wood is formed more or less in most stems growing in the air, to resist the strain of gravity. But in aquatic plants, since the water supports the submerged parts as well as air within them, the stem ceases to form wood by "disuse," since it is no longer called upon to support itself.

The bodies of animals and plants are thus living automata. Their protoplasm spontaneously responds in hundreds of ways to whatever stimulus comes from without, and the response evinces itself, as if by an immaterial Directivity which meets the irritations, environ-

¹ I am here quoting from my book, *The Origin of Plant Structures*, p. 204, where further illustrations will be found.

mental forces, or whatever we call them, in the most admirable manner. Then if the stimulus be kept up by the organism and its offspring continually living under the same conditions of life, the changed organs become fixed and hereditary, as is abundantly seen under cultivation and domesticity.

Man has often found that he cannot do better than imitate natural phenomena; whenever he wants some special contrivance as in engineering structures. If I remember rightly, the iron "cells" on the top of the Menai bridge were suggested by the structure of a barnacle. Fox's iron-fluted stays of the umbrella are precisely like hundreds of leaf-stalks; in which the edges are raised forming lateral flanges, thereby resisting the downward tendency to snap through the weight of the blade. Girders are found in some climbing stems as the "monkey's ladder," buttresses are added to trunks of trees, etc.

The structures of flowers possess adaptations to insects, which furnished Darwin and others with admirable illustrations of what one would have formerly said were undoubtedly designed.

The Argument of Design was considered by Huxley to have received its death-blow by Darwinism; and so undoubtedly it would have been slain, had Darwinism been true; but, as I have elsewhere shown,¹ it does not exist at all. Nevertheless *Design* must give way to *Adaptation*.

For if we accept Darwin's own alternative, namely, of *Definite Variations* arising in response to the *Direct Action* of the environment, we discover that if the

¹ See address on *Present Day Rationalism, with an Examination of Darwinism*, in "Christian Apologetics" (J. Murray), and in the *Appendix*, below, p. 145.

Argument of Design be not restored, that of *Adaptation* under *Directivity* takes its place ; and Paley's argument, readapted to Evolution, becomes as sound as before ; and, indeed, far strengthened as being strictly in accordance with facts. What then is the source of this *Directivity* which runs through the whole of the organic world ?

Rationalists demand evidence of God, such as a chemist might give for a new product, or "experimental verification" ; but it is absurd to ask for it. They forget that scientific truths are, as often as not, entirely based on inductive evidence ; and such too is the only "proof" of the existence of God from Nature.

Scientists, as Tyndall, H. Spencer, Huxley, etc., all recognised a "Power" behind Nature ; and the real question is—Is that Power *conscious* or not ?

If man were not conscious himself, of course he could not conceive of any other being as possessed with consciousness. Moreover, it is impossible to think of minerals being conscious, or of consciousness residing in physical forces, as gravitation, or even in the vegetable kingdom.

In our present state of knowledge, as we only know of Life proceeding from Life, so too we can only conceive of consciousness proceeding from some Conscious Being who could impart it.

The answer to the above question, therefore, is that as far as our existing knowledge will take us, the *probabilities* of there being a "Conscious Power" whom we call "God" are a hundred-fold greater than that everything is due, as Haeckel says, to some "blind, unconscious forces".

We can only build on our own experience by a process of analogy. We know that order can only come out of

disorder in our temporal affairs by man's mind and directivity.

Now, we have every reason to believe physical astronomers who tell us that our own universe was originally a fiery vapour, or cosmic nebula. It has somehow become arranged into a beautiful order of sun, planets and satellites ; and, as far as the earth is concerned, with many series of living beings terminated by Man.

Once given protoplasm we find all plants, animals and man can have been evolved out of it.

If man wields limited powers as inventor and constructor to meet wants and requirements, that is, adaptations to the needs of his environment ; he sees very similar processes going on all around him in the past and present. He, therefore, is justified in logically concluding that there must be some conscious Directivity akin to his own behind the infinite adaptations to needs in all organic beings.

One notices that man himself never gets perfection all at once. In music he began with, we will say, a tom-tom, but he has now got to an orchestra. In drawing, prehistoric man began by scratching the figure of a mammoth on a flat bone. He now fills galleries with beautiful compositions ; and so is it with the appliances of forces, electricity, etc.

Just so is it with Nature. We notice that the *adult* stages of her earliest efforts in the various groups of animals represented the *embryonic* conditions of later ones of the same kinds.

A progress from simple to compound has always taken place, just as man progressed himself in his knowledge of the sciences and in the progress of the arts.

He at once recognises a Mind akin to his own in such parallels in the working out the structure of pro-

gressive, organic beings, just as he did in working out the problems of art.

In this way—and illustrations may be multiplied indefinitely—does man gradually accumulate probabilities arising from the number of evidences between the workings of his own mind and what he sees in Nature, that the power behind Nature is gradually forced upon him, as a Being who is conscious as himself, and that it is *God* who must be the source of the Directivity so apparent in all beings that are alive.

On the other hand, the stronger this impression grows upon him, the more incompatible does it become to identify this Power with “blind forces” acting by fixed laws unchangeable in their effects; as is apparent in the workings of all purely physical forces in the inorganic world.

CHAPTER VII

LIFE AND ITS PHENOMENA (*Continued*)

LIVING beings were formerly supposed to possess a "Vital Principle or Force,"¹ as of a special kind "conceived to exist apart from any material organisation as a kind of entity. A difference between a living and a dead animal was thought to be simply one of the presence or absence of that entity called life."²

Prof. Dolbear quotes the opinions of fifteen modern scientific authors, who all agree in regarding the phenomena of life as comparable or identical with the physico-chemical processes well known in the mineral kingdom. For example:—

Haeckel says: "We can demonstrate . . . the physical and chemical properties of the albuminous bodies to be the real cause of organic or vital phenomena".

But since no albuminous bodies are ever formed without a precedent life, how is it possible to *demonstrate* as a cause that which depends upon the other?

Höfdding says: "The aim of modern physiology is to conceive all organic processes as physical or chemical".

¹ A good account of Barthez' theory of the "Vital Principle" will be found in E. T. Withington's *Medical History from the Earliest Times*, sec. "Vitalism," p. 338. "He repeatedly protests that he does not mean to explain anything by his 'vital principle,' which is simply a short way of expressing his belief that life is not the result of either bodily or mental action." This will equally apply to "Directivity" in plants and animals.

² Dolbear, *op. cit.*, p. 277.

It is difficult to conceive how alteration in *structure-building* under new conditions of life can be accounted for without *Directivity*.

B. Sanderson says: "In physiology the word Life is understood to mean the chemical and physical activities of the parts of which the organism consists".

Lankester says: "Zoology, the science which seeks to arrange and discuss the phenomena of animal life and form [?] as the outcome of the operation of the laws of physics and chemistry".

Lastly, Huxley says: "It must not be supposed that the differences between living and not-living matter are such as to justify the assumption that the forces at work in the one are different from those to be met with in the other".

All the fifteen authorities would reduce "vital phenomena" to "chemical and physical forces".

No one to-day can possibly deny the fact that an organism cannot be kept alive, whatever that word means, without food; and that by means of chemico-physical processes going on within the body it breathes and digests that food, which is converted into other substances which build up the structures of the body till it be adult and then repairs the daily waste as well as supplies the whole organism with energy till it dies.

But there is one thing omitted, and that is *Directivity*, which is obvious in every organism and every part of it. To take an illustration, Prof. Lankester inserts the word "form". He will admit that the form of a hawk is very different from that of a cat? What causes the difference? If a young kitten and a young hawk be fed on precisely the same food until they are adults, it is obvious that the same food has built up two totally different "forms".

As the molecules of the food passed through several

physico-chemical processes till it became flesh, bone, skin, hair or feathers, etc., what kinds of physical or chemical forces were they which brought about two so different results as the "form" of a cat and that of a hawk, one having hair and the other feathers, not to add that these animals develop different habits and different methods of propagation?

From having been molecules of food such become molecules in the blood, ready to be *located* in their proper places in the animals' bodies. They then require some *directing* to put them there; so that every part, bone, claw, feather, teeth or beak, etc., receives just what it wants and no others; as on repairing a house, stones, bricks, wood, slates, etc., are placed by the builder wherever a house may require any restorations. What purely chemical or purely physical force (such as occurs in the inorganic world) is capable of carrying out this *selective* process and whence arises the very obvious *Directivity*?

Now all this is greatly extended by Evolution. It is not enough to explain how the same form is reproduced by heredity as kittens or young hawks, but variation occurs when the environment is changed. Adaptive variations appear through the responsiveness of protoplasm to the direct action of the new conditions of life. Here again Directivity asserts itself. The direct action is upon the *surface* of the organism externally or internally as food; but the response is *deep-seated in the nuclei of the merismatic cells*, which divide and build up tissues in adjustment to new requirements. It is the nuclei which are the ultimate originators of cells; but, having made them, the cells during growth assume the necessary forms to meet the new requirements.

Thus, as stated, if strains be put upon stem, petioles, etc., beyond what are normally sustained by a plant,

more wood-fibres and other mechanical tissues are developed to meet the strain ; just as bones and muscles are formed wherever they may be required in animals. A large series of experiments with plants has lately been made by M. Ph. Eberhardt,¹ to show the adaptations in the minute microscopical characters of the tissues of plants subjected to drought and moisture. In every case the artificially induced results were precisely the same as observable in plants growing in arid and desert regions on the one hand and in marshes and in water on the other. In all cases the changes are just those most suitable to the conditions under which the plants grow.

Can, therefore, alterations of *structure* in response to external forces and in adaptation to them be accounted for solely by means of the physico-chemical processes involved in their manufacture? There is no such Directivity ever observable, I repeat, in the mineral kingdom. The nearest approach to it is seen in the angular symmetry of crystals ; but this is constant.

Why are the molecules of living bodies being constantly arranged differently? No two peas in a pod are precisely alike, showing a variability which becomes very pronounced under cultivation.

On the other hand molecules of all inorganic substances assume constant forms when crystallised. A crystal of salt made artificially is exactly like their "casts" found in the Triassic strata. Every substance that can be crystallised can be referred to its "system," whether it be quartz from the silurian rocks or of any later strata.

Evolution, on the other hand, shows constant change in living organisms. Whence is this difference?

¹ *Ann. des Sci. Nat.*, xviii., p. 61, 1903.

No one would deny that the execution of the work or organism-building is *carried out* by means of chemico-physical forces ; but there is abundant evidence of a *Directivity* which is wanting in inorganic structures. And the questions are, What is it ? Whence is it ? It is perceptible, I repeat, even in cell-building. Though the process of karyokinesis may go on regularly and mostly in the same way, yet it has been shown that the nucleus sometimes has to overcome difficulties. It is not mathematically and accurately placed in the middle of the cell. It is often at one side ; so that to make a cell-plate across the cell, as it divides into two daughter-nuclei, they can travel across laying down the cell-plate between them, till they get to the other side. Or, as an alternative, the "equator" of the spindle or barrel may become so inordinately extended as actually to stretch from one side of the cell to the other. Here, then, is *Directivity* displayed in the very fundamental stage of tissue-making, not to add the behaviour of the curved V like chromosomes, which arrange themselves in an orderly way, and travel up the lines, as if they thoroughly understood what is expected of them to accomplish. Can all this complicated process be brought under chemico-physical forces of the inorganic world ?

One is inclined to wonder what these fifteen writers would have to say about *Directivity*. May not the suspicion be correct that their overlooking this special peculiarity of living beings arises from Darwinism lying behind their views ? Is it not this which thus causes them to approximate Haeckel's and Büchner's ideas, even if they do not go so far as to acknowledge themselves Atheists ?

I will now return to Prof. Dolbear. He says in speaking of protoplasm : " It is entirely structureless,

homogeneous, and as undifferentiated as to parts, as is a solution of starch or the albumen of an egg".¹

"The protoplasm organises itself into cells and tissues in the same sense as atoms organise themselves into molecules and molecules into crystals of various sorts having different properties that depend upon the kind of atoms, their number and arrangement in the molecule."²

In an appendix he somewhat corrects this utterly false statement, which, by the bye, agrees with Haeckel's, who also ignores the phenomena of karyokinesis in the nucleus, for on p. 369 Prof. Dolbear informs us: "Histologists find that protoplasm consists of a kind of network of less fluid material, the interstices being filled with more fluid material . . . hence if there be so-called 'structureless' protoplasm, it is only apparently so, because the meshes are too fine to be seen."

But this is nothing *new*, and it is a pity the author had not made himself better acquainted with physiology before he wrote the chapter on "Physical Life". He appears not to be aware of the phenomenon of "cell-rotation" and other well-known peculiarities of protoplasm.

When he uses the word "organised" for inorganic molecules, he is totally misusing the term. It is *only* in living beings that "organisation" takes place. It implies a locating of molecules as a definite means for an "end".

In crystals, there is only an increase in size by superficial accretions, with no "end" at all in view, and, of course, no internal organisation.

Like Haeckel and others, Prof. Dolbear alludes to the fact that chemists have succeeded in making many

¹ *Op. cit.*, p. 280.

² *Op. cit.*, p. 281.

substances in the laboratory, "which were not long ago believed to be formed only by living things ; and there is but little reason to doubt that, when [?] they shall be able to form the substance protoplasm, it will possess all the properties it is now known to have, including what is called its life ; and one ought not to be surprised at its announcement any day."¹

In another appendix he describes Prof. Quincke and Bülschle's experiments with emulsions of soap, oils, H_2CO_2 etc., which show "amoeboid" motions and "streaming" movements something like protoplasmic ; but no intelligent reader will be deceived by them as being identical. For there is no nitrogen present, the most important element, with carbon, of the constituents of protoplasm.

He finally closes his book with the sapient remark : "It is evident that in a chemically homogeneous mass there can be no occasion for changes of any kind within it ; and chemistry alone cannot give us any substance which can give characteristic vital actions".

One feels inclined, therefore, to ask what is the use of his giving an illustration of the plume-like figures formed by frost on a window pane?—under which he writes : "The similarity it presents to vegetable forms is very striking. . . . Such fantastic imitations of inorganic things forcibly suggest vitality. They are too common to be considered coincidences."

I reply there is *no* resemblance beyond a slight imitation. It is a "chemically homogeneous" structure consisting throughout of H_2O and therefore "cannot give characteristic vital actions". We might compare it with an ostrich feather, the inflorescence of the reed or a fern.

¹ *Op. cit.*, p. 283.

It is as much like one as the other. To which of the two organic kingdoms would Prof. Dolbear compare it?

All modern biologists attack the question as to *how* the processes of growth, etc., go on in the body. That they grow by means of chemical processes is obvious; that the purely chemical process of oxidation of carbon underlies respiration is perfectly clear. That electrical phenomena are seen in the actions of muscles is well-known; that the phenomena of heat are patent to every one in his own body, etc. No one now will dispute all this. But it is all beside the question, What is Life? There *is* a something which sharply separates a mouse from a lump of granite, or an organic molecule from a crystal.

Why does biology form a study by itself independently of physical geology?

The term "Vital Force" may be objectional or not; but some name is wanted to account for the *Directivity* observable in every organ of every living being.

Prof. Dolbear quotes several definitions of life; but they only state what is obviously *seen*. Thus Bichot says, "Life is the sum of the functions by which death is resisted". But the "functions" can only be carried on as long as life is present, and "organs" wherewith they can be done. What makes the organs?

Dreges calls life "the special activity of organised beings": but it is only organised beings which are alive and exhibit activities.

H. Spencer's is "the continuous adjustment of internal relations to external relations". That is true, and the practical basis of Evolution; but it is no definition of Life; only a description of what takes place as long as a being *is* alive.

All definitions, however, show that *Life is recognisable*

by its effects and that those effects never occur away from any being which is alive.

It is easy to show that Prof. Dolbear is wrong when he says : " All physiological phenomena whatever can be accounted for without going beyond the bounds of physical and chemical science ".¹ For Directivity, which always co-ordinates means with ends, cannot be a purely chemical or physical force ; though those " ends " be brought about by chemical and physical agencies.

It is just those " ends," which Darwin called " purposes," though he would insist upon the word being metaphorically accepted, that sharply separate the organic from the inorganic world.

The late James Croll published an article entitled—*What Determines Molecular Motion?—the Fundamental Problem of Nature.*

I would add, What is the final cause or source of Directivity in the organic world?

¹ *Op. cit.*, p. 279.

CHAPTER VIII

“DIRECTIVITY” A WITNESS OF MIND, IN EVIDENCE THROUGHOUT THE LIVING WORLD

AS I regard Directivity as one of the most important of the numerous lines of argument in proof of a conscious Power behind Nature, I propose devoting a chapter to it, in order to enable the reader to thoroughly grasp its significance.

Of course, we learn nothing as to the nature of that Power. All we can attempt to prove is its existence, by the accumulation of probabilities; which then amount to a moral conviction, which, however, is equivalent to a demonstration.

I would first emphasise the fact that “Life” *per se* must be distinguished from purely physical forces. Whether it will ever be proved to fall into line with the correlation of physical forces, it is impossible to say; but its phenomena at present lead one to suspect such will *not* be the case.

I will herein quote what the learned authors of the *Unseen Universe* have to say upon the subject.

Starting with “the principle that life proceeds from life, or to speak more accurately, that a conditioned living thing proceeds only from a conditioned living thing . . . if we assume the truth of this principle, it appears to lead us directly to infer that life is not merely a species of energy, or a phenomenon of matter. . . . Life, how-

ever, can be produced from life only, and this law would seem to give an indication that the solution of the mystery is not to be found by considering life as merely a species of energy. It is some time since we gave up the idea that life could generate energy; it now seems that we must give up the idea that energy can generate life.”¹

Now in order to show how the various functions of the body are procurable out of food which is “matter stored with energy,” Prof. Dolbear asks, “How is this transformation of energy in the body effected?” “Roughly,” he says, “there are five different kinds of motion to trace the antecedents of, in the body of any of the higher animals.” (1) mechanical; (2) muscular; (3) temperature; (4) transpiration [osmosis?]; (5) nervous.

As an example of (1) we will say a man walks, *i.e.*, his bones move by mechanical force. For this muscular action (2) is brought into play. To do this nerve force (5) is required. But what sets the nerves working? The Professor does not answer that question. There are two causes: either the *automatic* action of the brain, when a man runs away from an angry bull; the other is *volitional* when, after careful deliberation, he *chooses* to take one road rather than another. He is *conscious* of the power to choose.

Prof. Dolbear refers to the senses as recipient of waves, etherial for sight, aerial for hearing, but until these waves reach the brain along the nerves there is neither “light” nor “sound”.

He says all organic phenomena are reducible to physical processes. What physical process is able to convert “waves” into “sensations,” or into “consciousness” of those sensations?

¹ *The Unseen Universe*, p. 228.

He says of nerves: “The activity of protoplasm in the various cells transforms the various food stuffs into the proper substances needed.

“The energy is already present; it is only differently distributed by protoplasm; and nervous action determines what changes, if any, shall go on at a given place.”¹

He here recognises a sort of “Directivity” and places it in the nerves, while protoplasm is charged with the power of making assimilable molecules.

This may be true as far as the results come about. But how can the same kind of protoplasm—for no two sorts are known²—make a great variety of different substances, and what sets the nerves into action?

There is “something” behind all these curious processes which is not touched! Nothing could better display the powerlessness of the attempt to reduce all vital phenomena to physics and chemistry than Prof. Dolbear’s description of the germination of a grain of corn and the evolution of a chick from the egg. The grain and the egg, he says, differ from the plantlet and the chick in that the former may remain even years without germinating, and “when growth has once really begun it must keep on growing or die, arrest is impossible,³ which seems to show that life is a process rather than a condition, and the grain of corn is simply a combination of materials where, under suitable conditions, life may begin”.⁴

The last three words beg the question. If life be only a physical force it *cannot* begin. It could only appear

¹ *Op. cit.*, p. 290.

² Haeckel invents terms such as “neuroplasm” for nerves.

³ Arrest in plant-growth often occurs when the temperature in spring falls between 40° and 32° F.

⁴ *Op. cit.*, p. 292.

by its effects as transposed physical force. However, no biologist will admit this supposition at all. Moreover, there is nothing resembling germination in the inorganic world. Whence arises the profound difference between them?

Speaking of the reserve-food materials in the endosperm he says: "There are not only molecular groups of many sorts, but they are segregated into families, so that bodies of one constitution are all in one locality, and bodies of other constitutions in other separate localities, but definitely arranged so as to be available when the life process begins".¹

There could hardly be a better illustration or better description of *Directivity* than this passage; while the reader will also perceive that Prof. Dolbear shows the "ends" secured by "means," all for the definite purpose of nourishing the embryo when it begins to sprout. It is not only the making of the starch, the oil, the nitrogenous aleurone grains, etc., which require chemical processes for their manufacture, but the presence of ferments or enzymes to render them assimilable, also chemical products, but necessary as solvents before the embryo can utilise the reserve food at all.

The mere physical and chemical processes will not *per se* account for all this *Directivity* and *Object*. He then asks: "What is the distinction between what is called living and dead matter? One is able to transform energy for its maintenance and the other seems to be wholly inert; yet, if analysed, both may be reduced to precisely the same amount of elements".² All this we knew before! Let us see if Huxley can enlighten us: "It must not be supposed that the differences between living and

¹ *Op. cit.*, p. 292.

² *Op. cit.*, p. 294.

not-living matter are such as to justify the assumption that the forces at work in the one are different from those to be met with in the other”.¹ Is that true? An obvious difference is that the forces in dead protoplasm are excited by microbes which cause putrefaction. They play no similar part in a living organism, though other kinds of microbes can act pathologically. Again, the forces of protoplasm bring about the formation of starch, sugar, oil and hundreds of other substances in living vegetable cells. The forces of dead protoplasm do no such work, but destruction only. They may be, broadly speaking, “chemical” or “physical” in both, but the above statement of Huxley’s requires demonstration *in details*. Living protoplasm transforms energy from food and utilises it in various ways. Whatever forces may be at work in dead protoplasm nothing of the kind is possible.

Prof. Dolbear commits himself still further by comparing an electrical machine with a living being. He observes that all the parts are made separately and then put together, yet no electricity appears; but “if the proper kind of energy is spent upon it, it at once becomes electrified, and electrical energy may now be got from it in indefinite quantity, dependent wholly upon the proper turning of the crank. . . . One might speak of the whole machine as an organism, its wood and glass and brass as its molecular composition, its function depending upon each of these being in its appropriate place, and nothing more. It can only exercise that function when energy of the proper sort is turned into it.”²

Precisely so, but what Prof. Dolbear does *not* see, is

¹ *Op. cit.*, p. 359.

² *Op. cit.*, p. 295.

that *man* has assumed, as Prof. Church points out, the position of the *Directivity* in the living organism ; or as we say, *Life*. If protoplasm once artificially made could spring into life, and the electrical machine set up electricity of itself, as soon as made, some analogy might be drawn, but no more electricity can come out of it than its equivalent to the muscular force derived from the man's arm that turns the crank.

We come back to the unanswerable original question—What determines molecular motion which brings about purposeful results in living organisms ; so that plants and animals can not only reproduce themselves, but evolve differently formed beings in adaptation to their environments ?

There *must* be a something in the background which causes it ; as there cannot be an “effect,” *viz.*, variation, without a “cause” ; which, as far as we can see, resides in protoplasm and its nucleus and *nowhere else*.

The above conclusions of physiologists seem to have been arrived at from the belief in Darwinism. This was said by Huxley to have given the death-blow to the Argument of Design.

Now, if all adaptations seen in living beings arose by means of Natural Selection, then it is easy to see that Directivity has no place in the construction of animals and plants ; consequently all the processes of growth and development must be referable to physics and chemistry.

Since, however, Natural Selection has no place in the *Origin* of Species, but only in their *Distribution* in time and space ; while all adaptations issue from the responsive power of protoplasm to the definite action of the environment, Directivity is reinstated as before ; *Design* giving place to *Adaptation*.

I have alluded to an important paper by the late Mr. James Croll in the *Philosophical Magazine* for July, 1872; and as this is not readily accessible to every one, I propose making extracts from it; as they convey precisely what I could have wished said on the present occasion. The title of the paper I have already given, but will here repeat—*What Determines Molecular Motion?—the Fundamental Problem of Nature* (1872).

“Physical inquiry in every direction is converging towards Molecular Physics, is resolving itself into questions regarding the dynamical action of the ultimate particles of matter.

“To determine (1) the constitution of the ultimate atoms and molecules of matter, what they really are, and (2) the laws of their motions, are two great problems of Molecular Physics.

“With regard to all physical change or motion . . . there are at the very outset two fundamental questions: (1) what produces the change—causes motion? (2) what determines or directs it?

“All agree that what produces change or causes motion is Force.

“What determines or directs the motion, is not so easily answered.

“In the production of all physical phenomena we have two distinct elements, *viz.*, force, and the way or manner in which force acts; in other words—Force and the Laws of Force; or as Mr. Lewes expresses them—‘the paths along which they travel to their particular results’. What determines the paths along which force acts? It is not what gives *existence* to the motion, but what *determines its direction*, is the great question.”

Mr. Croll thus arrives at the first most important distinction:—

(1) “*The Production of Motion and the Determination of Motion are absolutely and essentially different.*”

Applying this to living beings Mr. Croll rightly observes: “In the production of organic forms from the simplest up to the most special and complex in the vegetable and animal kingdom two things require to be accounted for, *viz.*: (1) the *motion* of the matter of which they are composed, and (2) its *disposition* or *arrangement* with reference to time and space. . . . Not only must something produce the motion, but something must determine it also. . . . To assign a sufficient cause for the one does not in the least degree satisfy the mind as to the presence of the other. To account for the motion of a ball does not account for why it moves, say, east rather than west or in any other possible direction.

“The grand and fundamental question then is, What is it that determines or directs the action of the forces concerned in the production of molecular change? . . . We must not only know the paths taken by the particles, but must be able also to explain *why* the paths are taken. . . . What causes the molecules and particles of living nature to arrange themselves into organic forms? Is it a Force?”

These questions bring Mr. Croll to his second conclusion:—

(2) *The action of a Force cannot be Determined by a Force nor can Motion be Determined by Motion*:—

“That the action of a force cannot be determined by the action of a force is demonstrable thus. If the action of a force is determined by an act, then this determining act must itself have been determined by a preceding act, and this preceding act by another, and so on in like manner to infinity.

“Hence in any exhibition of force in action we have to account (1) for its *production*, (2) for its *determination*. . . . It must be evident that whatever this cause may have been, it was not an *exertion of force*. . . . By no possible means can we conceive [original ?] determination to be the result of an act, or exertion of force.”

He proves this by supposing a number of bodies A, B, C, etc., each acting in turn upon the other ; A being the final recipient of the force. The direction of movement of A in time and space is determined by that of B, and so on backwards, till we come to the primary director, so to say, or the original *directivity*, as something quite different from the actual *force* which sets the series in movement with definite directions in time and space.

“Motion cannot possibly take place without its being in some particular direction. But this does not prove that the two things are the same. It only proves that they are inseparably connected.

“The mystery is not what are the forces which move the particles but what is it that guides and directs the action of the forces, so that they move each particle in the particular manner and direction required. . . . A molecule may move without moving in the *proper* direction. . . . What is it that determines that the forces shall act in the proper way? Out of the infinite number of different paths, what is it that directs the force to select the right path? It follows that there is something else to be known than mere force before we can penetrate the mystery of Nature.

“The simple truth is, in attempting to account for the *determination* of motion by referring it to a *force*, we are attempting an absolute impossibility. The *production* of motion and the *determination* of motion are two things

absolutely different in their essential nature. Force produces motion; but it is as impossible that force can determine motion as that two can be equal to three, or that a thing can be and not be at the same time. The necessity is as absolute in the one case as in the other."

In order to show that *shape* or *form* of any thing in Nature could not be the sole product of a force, Mr. Croll takes a crystal for illustration. He observes: "All that force does is simply to move or draw the molecules and hold them together in the crystalline state. The crystalline *form* is therefore not due to the force, but to that something, be it what it may, which is the cause why the molecules have a [certain] shape, and why their attraction is confined to the definite points on the surfaces of the molecules.

"What, then, is the cause of determination? This is the all-important question, whether as regards life-theories, theism or evolution."

Mr. Croll is now led to his third proposition as follows:—

(3) "*All the Energies and Forces of Nature are probably the same, and differ only in regard to their modes of operation.*

"This proposition follows as a consequence from the principle of the Conservation of Energy.

"The only difference between chemical, electric, magnetic and heat energy is merely in the mode of operation. The difference lies, therefore, not in the force or energy itself, but in its determination, that is, not in the mere *exertion* of force, but in the *way* or *manner* in which force is exerted."

Mr. Croll then proceeds to consider the bearing which these propositions have on theories regarding the so-called "Vital Force" and the Mystery of Life.

“The various theories may be divided into two classes—the advocates of the one class maintaining that all the phenomena of life, all the changes which take place in organic nature, are the result of purely chemical and physical agencies; while the other party maintain that there must be something more than the ordinary chemical and physical forces at work.”

From what I have said above it will be gathered that Materialistic Monists, like Haeckel and many physiologists of different countries, appear to repudiate everything except chemical and physical forces; taking no account of this *Determination* which Mr. Croll insists upon, or what I have called *Directivity* in the building up the structures of animals and plants.

That life in any organisation is maintained by the assimilation of food is obvious. Hence we might say that “vital force” is chemical force transformed. The same remark holds true of the mechanical and other physical energies of the body. The energy by which the arm is raised or by which the heart beats is derived from the food. Animal heat is derived from chemical combination, and so on.

“So far as all this is concerned the advocates of the physical theory of life are evidently correct. But are they warranted in affirming, as they do, that *all* the energies of plants and animals are either chemical or physical? . . . Are the known forms of energy manifested in the inorganic world sufficient to account for the phenomena of life and organic nature?”

“Chemistry and physics are insufficient because *they do not account for the Objective Idea in Nature.*

“Whatever may be one’s opinions regarding the doctrine of Final Causes and the evidence of Design in Nature, all must admit the existence of the *Objective Idea in*

Nature." We see everywhere not only exquisite order and arrangement in the structure of plants and animals, but a unity of plan pervading the whole. We see, in endless complexity, beauty and simplicity, the most perfect adaptation of means to ends. The advocates of the physical theory are at least bound to show how it is probable that this exquisite arrangement and unity of plan could have been produced by means of chemical and physical agencies.

Mr. Croll here instances the formation of a leaf of a tree, but as Prof. Dolbear referred to the reserve-food material in the grain of corn, I will take that as an illustration of Determination and Directivity.

The *object* of the grain is, of course, reproduction. Having this, so to say, in view, Nature secures the impregnation of the female germ-cell by the male sperm-cell contained in a separate organ, the pollen grain.

There are two fertilising bodies in this latter, so that when the origin of the new plant or embryo is thus secured, the other "fertiliser" pays attention to another body in the same chamber or embryo sac. This latter having been, so to say, impregnated, undertakes to make the reserve-food material for the embryo. Both proceed to grow and develop independently of each other; so that when the grain is ripe the embryo lies freely at one end of the grain with the "endosperm," as it is now called, at the back of it.

The endosperm consists of a great number of chambers called cells in which the food is stored up; but how came it there? The main ingredient consists of starch grains. This was *made* in the leaves, but being solid was changed into soluble sugar, conveyed away by proper tubes, etc., to the growing grain, where the sugar is re-formed into starch in view of the resting period the grain goes through before it germinates in the following year. Besides starch

(which contains no nitrogen) other granules are made containing nitrogen and certain minerals which will be required in due course. In some grains and seeds oil is present instead of starch.

When the time comes for the seed to germinate, the embryo can make no use of these permanent forms of food until they have been changed into liquid states capable of being assimilated. This is done by means of ferments or enzymes, which convert the starch into sugar, the "gluten" into "peptones," etc. The embryo now absorbs them, and the starch ultimately goes to build up the cell-walls and the nitrogenous gluten to increase the quantity of living protoplasm.

The above is but a sketch: a number of other facts might be mentioned, every one implying directivity or determination of the paths along which molecules have to travel to carry out the above and many more peculiarities of a grain of corn, all conspiring to secure the most perfect adaptation of means to ends.

Generalising these observations over the structure of many kinds of plants or animals, Mr. Croll says: "In Nature we have a group of molecular movements corresponding to the objective idea of each particular object that is being formed. In objects of the same species the groups of molecular movements have a specific resemblance to one another, while in the formation of all objects of the same genus there is a genuine resemblance between the groups of molecular movements. In the formation of objects of the same family we have a still higher unity, comprehending a still greater number of groups of molecular movements. We go on in like manner till we reach a unity which comprehends under it all the groups of molecular movements occurring in the vegetable or in the animal kingdom. The unity which pervades the

endless diversity of molecular movements must be as perfect as the unity which we find to pervade the endless diversity of organic forms. In fact, the two are inseparable, because the unity which exists amongst organic forms is the *effect* of the unity which exists among molecular movements. It is because these molecular movements are determined according to a unity of plan that their effects (*viz.*, organic objects) have a unity of form. It is the particular determinations of the movements of the molecules that give the particular form to a tree."

I will hereafter show¹ that "Darwinism," or "The Origin of Species by means of Natural Selection," does not exist in Nature, and that it represents no Natural Law by which the accidental, favourable variations could be in correlation with the requirements of the being, so as to be in harmony with new surroundings.

Mr. Croll drew the same conclusion in 1872, for he thus wrote: "Natural Selection never can explain the objective idea in Nature unless we suppose the selection to be made according to a design or plan. Mr. Darwin's theory can never, from its very nature, explain the mystery of the organic world. There must be a *determining* cause in the background of all natural selection working out the objective idea."

That is to say, Mr. Croll demands some *Natural Law* governing the process by which new species arise: and that we now know is expressed by saying *the living protoplasm responds to the direct action of the new conditions of life*; and molecular motion takes place in accordance with *Directivity* towards adjustment.

"But there is not merely a unity of *plan* to be accounted

¹ See Appendix, p. 145.

for, but also a unity of *purpose*. Things in Nature are not only related to one another in form, but they stand related as means to ends. And this relationship is as all-pervading as that of form. There is not an object in Nature that does not stand in the relationship of a *means* to something as an *end*. And there exists a unity in the ends as well as in the forms. All molecular motions must consequently have this double relationship of plan and purpose. How, then, is all this order and unity both of plan and purpose in molecular motions to be accounted for?”

Mr. Croll concludes his paper with the following heading—“*Molecular Motion in Relation to Unity of Plan*”.

“The form assumed is due, not to the motion of the molecules, but to the determination of that motion—to the way in which the motions are guided and adjusted in relation to one another. It is not the energy which conveys the bricks that account for the form of the house, but that which guides and directs the energy. So far as the form of the house is concerned, it is a matter of indifference whether the bricks are conveyed on the backs of labourers or transported by a steam crane. In like manner, in accounting for organic forms, we must exhibit not the mere energy which moves the molecules, but that which directs and guides the energy.”

Of the fifteen authors quoted by Prof. Dolbear, Lankester is the only one who includes “form” as the “outcome of the operation of the laws of physics and chemistry”; all the others omit this fundamental word, upon which Evolution depends.

The question to be considered is, Can this marvellous adjustment of molecular motions be explained by anything which is found within the domains of chemistry and

physics? The advocates of the physical theory must afford us some explanation of the cause of the determination of molecular motion derived from physics and chemistry, if their theory in reality rests upon a true foundation.

“The chief argument in favour of this theory seems to be that *all* the energies in Nature to which the term ‘vital’ can be applied evidently have a chemical or physical origin. For example, the vital energies of our bodies are derived from the food we eat, the water we drink and the air we breathe; they, therefore existed first under the form of chemical affinities. The same is the case in regard to plants; all the energies in operation in the plant are in like manner derived from the nutriment received through its leaves and rootlets. But the energy is no longer chemical or physical after it has changed its mode of operation. If energies are to bear names according to their mode of operation (which is the practice in science), then energies differing from those of chemistry and physics must have a name by which they are to be distinguished. Why then, not call them ‘vital energies’?”

“The terms light, heat, electricity, magnetism, etc., are different names which we apply to different modes of molecular motion; and it is true that at present little is known regarding the nature of their modes of motion; but notwithstanding this we have reason to conclude that, although we knew all that absolutely can be known regarding them, yet *it would not afford us any explanation of the cause* of the determination of molecular motion in organic nature.

“If one plant or animal differs from another, or the parent from the child, it is because in the building-up process the determinations of molecular motion were different in the two cases; and the true and fundamental

ground of the difference must be sought for in the *cause* of the determination of molecular motion.

“Here in this region the doctrine of Natural Selection and the struggle for existence can afford no more light on the matter than the fortuitous concourse of atoms and the atomical philosophy of the ancients.”

Mr. Croll’s imagery of a house recalls that of Darwin’s to which I shall refer, where I endeavour to show that if naturally made fragments of rocks—supposed to represent casual, favourable variations in organisms—were taken with the purpose of building a “noble and commodious edifice,” such was impossible ; for no such house has ever been built nor could be, with undressed stone.

Mr. Croll introduces another point. Supposing the fragments were suitable, how are they to move from the base of the cliff and find their proper places in the edifice without a “director” who fits them in just where they are to go? If the analogy between Darwin’s noble and commodious house and an organism be carried out, then the bricks must be made for walls of the house, just as molecules of cellulose must be made for cell-walls of plants or of bone and enamel for teeth of animals.

Secondly, being made, the former have to be located on the periphery of the protoplasm, and those required for the teeth to be placed in those organs and nowhere else.

There is first the preparation of the right chemical molecules out of food to be gone through, and, secondly, Directivity or Determination to locate them in the being.

A writer of an article on “The Atomic Theory of Lucretius” observes : “It is a principle of mechanics that a force acting at right angles to the direction in which a body is moving does no work, although it may continually and continuously alter the direction in which the

body moves. No power, no energy is required to deflect a bullet from its path, provided the deflecting force acts always at right angles to that path”.¹

The author then applies this to man’s free will : “ The will would add nothing sensible to nor take anything sensible from the energy of the universe”.

Similarly Directivity may be present everywhere in the organic world, but neither exert nor neutralise any force.

¹*North British Review*, March, 1868.

CHAPTER IX

THE PRINCIPLE OF LEAST ACTION IN THE EVOLUTION OF ORGANIC STRUCTURES

IN drawing attention to Directivity, so conspicuous throughout the whole of the organic world, there is a feature very observable in the structure of organs of all kinds, which adds an additional value to the importance of Directivity as one of the many coincident lines of indubitable evidence which leads to the conclusion that the Power behind Nature is not only conscious but Omnipotent. It is, that in making organs for which physical force has been employed, the responsive power of protoplasm is seen in its forming the organ not only to be admirably constructed for fulfilling its purpose but in *proportion* to the need required.

It has not infrequently been found necessary in engineering and other constructions to endeavour to discover methods of securing the greatest possible strength with the least amount of substance and more especially the least waste of force. This is called the "Principle of Least Action".

One of the most interesting discoveries in animal mechanics is that the muscles and bones are invariably constructed and placed on this principle, and often secure ends far more effectively and perfectly than man has succeeded in doing in architectural and engineering works.

Rev. S. Haughton, D.C.L., F.R.S., a divine, mathematician and medical man, investigated this subject, and he found "that in every arrangement of bones, muscles, joints and parts of animals the motion must be such as it would be on the hypothesis that the muscle were a living intelligent thing, trying to save itself trouble. We can calculate with a certainty as perfect as we can calculate the path of a planet the positions of bones and sockets as we find them in Nature".¹

The law is familiar to every one on a little reflection. Thus no one, not even a dog, would go round two sides of a triangular field to get to another corner. Though Euclid took the trouble to prove that any two sides of a triangle are together longer than the third yet it is *practically* axiomatic. With all people there exists the universal habit of abbreviating words. We say, for example, "won't" and "can't" for "will not" and "cannot," and many other instances will occur to the reader.

The bee supplies a good instance in making its honeycomb. The cells are constructed on strictly mathematical principles. It has been ascertained by mathematical calculations that no other form of cells in combination could give the maximum capacity with the minimum of material; yet the bee is quite unconscious of the fact. All that it does is to build cells on opposite sides of a sheet of wax, only taking care that each cell stands over the space between three cells on the other side. The cells being then erected on both sides result in the usual hexagonal form.

Similarly with regard to muscles, Dr. Haughton observes, "Nature aims at producing a given quantity of

¹ *The Principle of Least Action in Nature*, illustrated by Animal Mechanics; being three lectures delivered at the Royal Institution of Great Britain, 1871.

work with the least quantity of material, and their forms are precisely those which the principle of least action takes in muscular mechanics”.

The first thing to do in investigating this subject was to obtain the “coefficient” of muscular force, which represents the number of lbs. weight necessary to break the muscle across, as if it were a rope. Dr. Haughton, by an elaborate series of experiments, found that “94·7 lbs. per square inch is the weight that the arms of a young man accustomed to athletic exercises are capable of lifting. 110·4 is the corresponding coefficient for the muscles of the legs of a similar class, and 107 for the muscles covering the abdomen.”

In concluding his first of three lectures Dr. Haughton observes: “I have shown you that a planet moves in its orbit as a lazy intelligent creature would, who was anxious to perform an allotted task with the least trouble to itself; that the bee constructs its wonderful cell so as to produce a given amount of storage for its honey with the least possible amount of trouble to itself. Similarly, I will show you how the tendons of the legs and arms of animals are constructed with a wonderful economy of the same kind as that with which the bee constructs its cell. . . . Is it by the intelligence of the planet that it moves in its orbit? Who has weighed out and regulated the weight of the tendons of our arms and hands? By what force or by what intelligence do the limbs of animals describe their proper paths? Who places the socket of each joint in the exact position (which can be calculated with unerring certainty by mathematics) which enables the muscle to perform its allotted task with the least amount of trouble to itself?”

The answer which the Doctrine of Evolution by self-adaptation gives is, that protoplasm at once responds to

exercise. The effort made by the creature is at once answered by that response, and whatever be the object the creature wants, protoplasm automatically, instantly sets to work to construct the muscle necessary and sufficiently strong and applicable for the purpose. The response is always approximately proportionate to the effort, so that no *great* excess of structure is made and the principle of least action is acted upon.

But *Directivity* is here most plainly discernible in the results ; which Paley selected as proving, from his point of view, that they were "designed". We shift the point of sight and say they were evolved.

In his second lecture Dr. Haughton selected the muscles and tendons of the feet of monkeys of the old and new worlds, calling attention to a difference between them correlated with their habits. Two tendons pass into the palm and then branch into five for the digits. In both classes the two main tendons are joined at the base of the thumb (or No. 1 digit) and in both a tendon crosses the palm from No. 1 into No. 5 ; the difference lies in the fact that in the old world monkeys the tendon, No. 2, coheres with the tendon in the thumb ; whereas it is free from it in the foot of the new world monkeys.

"In the South American monkeys, best known by those beautiful little capuchins, the natural action is to place the first and fifth together or the first, second, third and fourth. The monkey of Africa prefers to grasp with the first, second and fifth toes."

Dr. Haughton then proceeds to classify muscles as : "(1) prismatic, in which the muscular fibres run parallel from bone to bone ; (2) penniform, where the fibres radiate at equal angles from a common tendinous line and are inserted, of course, at each extremity into the bone ; (3) triangular, where the muscular fibres proceed

from a fixed line and converge to a very short one, practically a point; (4) quadrilateral is the same as the triangular, but in which the short line is longer, so that the whole makes a four-sided figure; (5) sphincter and ellipsoidal, which surround a circular or elliptical space".

The quadrilateral muscle is peculiar in that if the bones be not in the same plane the fibres instead of being parallel now take up the position forming a "skew surface" precisely on the same principle as of a skew bridge. Dr. Haughton observes: "I have succeeded in discovering that the particular skew surface, of which muscles are capable of assuming the shape, is the beautiful surface known to geometers by the name of the hyperboloid of one sheet.

"This is not a mere fiction of geometers. The adductor magnus muscle in the leg of man, and the great pectoral muscle in the wing of every bird, are living examples of the reality of this curious fact, that Nature constructs not merely plane muscular structures but that she is capable of constructing muscular surfaces belonging to the most beautiful and elegant forms that have been studied and invented by abstract geometers.

"The prismatic muscle and the penniform muscle possess the remarkable property, which can be demonstrated mathematically, that in their contraction no loss whatever takes place . . . whereas in the triangular, quadrilateral and skew muscles we can demonstrate that in the use of every such muscle there is a necessary loss of force; but these are only used under great necessity.

"The most wonderful triangular muscle in the world is the biceps femoris or the flexor of the thigh of a tiger. In the leg of a man it is like a rope of parallel fibres, but a tiger's habit is to leap from the jungle at its prey. The weight of muscle to give the tiger the spring is

enormous, and if it took the form of a rope would greatly impede it.

“The most remarkable example of the penniform muscle in Nature is the muscle which lifts the wing of the bird. The bird’s wing is depressed by great and powerful muscles but it is lifted by a small compact muscle. . . . The nature of a bird’s flight is this: The depressor muscles of the wing must be made enormously great, to strike the air with the utmost force; the muscles which lift the wing must be made as light and small as possible. Therefore we find that Nature always employs the penniform muscle to lift a bird’s wing. Thus no force is lost and the bird is enabled to repeat the downward stroke much faster than if the prismatic form of muscle had been retained.”

Dr. Houghton concludes his lectures by describing an “ellipsoid muscle that surrounds a cavity”—a muscular bag. “In attempting the solution of the problem of an ellipsoid muscle, I found myself brought into contact with a problem in architecture which has baffled architects for many years. I mean the problem of the equilibrium of an elliptical dome. Every portion of a curved ellipsoidal muscle forms a portion of a small flat dome; and to determine the equilibrium of tensions and strains among the muscular fibres of such an animal structure, is the same thing as solving the problem in architecture of what are the strains in various directions in an elliptical dome. The difficulty of constructing equilibrated domes may be illustrated by the fact that, with the exception of the Pantheon in Paris, there is not a truly equilibrated dome in existence. The dome of St. Paul’s is braced up with double chains of iron, and other chains of timber and lead put on to cover the defects in the original structure of the dome. No case exists, I

believe, of a self-supporting perfectly equilibrated spherical dome but that of the Pantheon at Paris.¹ A perfect ellipsoidal muscle is found in placental animals for expulsion of the young in which there is a perfect adaptation of force to resistance."

Dr. Haughton's three lectures on "Least Action" would have furnished Paley with admirable materials; but the question is: How can chemico-physical forces alone be made responsible for the Principle of Least Action?

It is paralleled in the vegetable kingdom. Every tree puts on wood sufficient to support its own weight. Lianes or woody climbers of tropical countries make "cables" and "girders" to resist such strains as they are subjected to; while experiments of weighting stems, leaf-stalks, etc., show that such strains as are produced, instantly call out the responsive powers of the plants to meet them. If a bough be bent and tied back in that position, it will be found after a few years to be permanently fixed, the strain having been met and completely overcome.

From a simple experiment of tying a weight on to a leaf-stalk to the formation of the skew, or ellipsoidal muscle, the structures produced under strains, etc., are all traceable to the responsive power of protoplasm together with its nucleus.

But there is *Directivity* throughout, as seen by the *Objective Results*, in the development of the tissues of the skew or muscle, out of molecules of matter derived from food.

¹This was written in 1871. I am under the impression that the large dome of the church at Musta in Malta, entirely built of stone, is self-supporting.

CHAPTER X

THE ABANDONED ARGUMENT OF DESIGN

WITH regard to this subject, the doctrine of Evolution has quite altered our perspective. Nevertheless, Paley's well-known argument of the watch only requires readjustment to be as sound as ever.

Huxley said that the argument had received its death-blow, on the appearance of Darwin's *Origin of Species by Means of Natural Selection*. Possibly such might have been the case, if Natural Selection had anything to do with the Origin of Species.

A remarkable anticipation of Darwinism even in the use of the word "indefinite" occurs in Paley's *Natural Theology* (chap. v.).

"The division of organised substances into animals and vegetables, and the distribution and subdistribution of each into genera and species, which distribution is not an arbitrary act of the mind, but founded in the order which prevails in external nature, appear to me to contradict the supposition of the present world being *the remains of an indefinite variety of existence* [here Darwin would say 'the survival of the fittest from "indefinite varieties,"']; of a variety which rejects all plan. The hypothesis teaches that *every possible variety of being* hath, at one time or another, found its way into existence (by what cause or in what manner is not said), and that those which were *badly formed* [Darwin's 'injurious variations']

perished, but how or why those which survived [Darwin's 'survival of the fittest'] should be cast, as we see that plants and animals are cast, into regular classes, the hypothesis does not explain, or rather the hypothesis is inconsistent with this phenomenon." ¹

In another passage (chap. xvi.) he brings forward a well-known objection to Darwinism. In speaking of the elephant's trunk, he says: "The short unbending neck of the elephant is compensated by the length and flexibility of his proboscis. . . . If it be suggested that this proboscis may have been produced in a long course of generations, by the constant endeavour of the elephant to thrust out its nose (which is the general hypothesis by which it has lately been attempted to account for the forms of animated nature) I would ask, *How was the animal to subsist in the meantime* during the process until this prolongation of its nose were completed? What was to become of the individual whilst the species was perfecting?"

This is a reasonable and, indeed, often suggested question for Darwinism; as there is *no* relationship between the accidental, favourable variation, which may appear in one year, without any guarantee of its being improved upon, even if it reappear in the next or any future year; but with "definite" variations, the case is different, the continued change in one direction, not of one, but of all the individuals, year after year or generation after generation, is secured, provided the same inciting conditions of life be constant.

Besides the presence of the "Object," as Croll says, or Purpose in organic structures, there is their arrangement and order to enable them to execute their functions *together* for the well-being of the organism. Paley sup-

¹ The italics in this passage are mine.

poses some opponent—it might be a Monist of to-day—to argue that “there existed in things a principle of order, which had disposed the parts of the watch into their present form and situation ;” but as Paley observes, it is inconceivable for a man at least to conceive of a principle of order “distinct from the intelligence of the watch-maker”. Darwinism, however, does not even admit such an hypothesis of a “principle of order”. The mechanism of an animal, far more profoundly complex than a watch, is supposed to have been evolved by “chance improvements” occurring over immensely long periods ; but the more the *minutiæ* of living beings are studied, the more inconceivable is it that such a process could be effective. As an example, I will here quote Paley’s observations on the structure of the eye and leave it to the reader’s judgment to decide which is the more probable hypothesis, that *all* the adjustments have been developed together, in response to the external stimulus, that being, in the case of the eye, simply, light, to which the protoplasm responds, and builds up the necessary tissues under that mysterious Directivity already spoken of—or, as according to Darwin, each of the details appeared as a chance favourable variety, to wait for improvement till another chance favourable variety should appear, and so on and so on till that most elaborate structure in its entirety might be perfected.

Paley thus begins chapter vi. on “The Argument Cumulative” : “Were there no example in the world, of contrivance, except that of the eye, it would be alone sufficient to support the conclusion which we draw from it, as to the necessity of an intelligent Creator. It could never be got rid of, because it could not be accounted for by any other supposition, which did not contradict all the principles we possess of knowledge ; the principles ac-

ording to which things do, as often as they can be brought to the test of experience, turn out to be true or false. Its coats and humours, constructed, as the lenses of a telescope are constructed, for the refraction of rays of light to a point, which forms the proper action of the organ; the provision in its muscular tendons for turning its pupil to the object, similar to that which is given to the telescope by screws, and upon which power of direction in the eye the exercise of its office as an optical instrument depends; the farther provision for its defence, for its constant lubricity and moisture, which we see in its socket and its lids, in its gland for the secretion of the matter of tears, its outlet or communication with the nose for carrying off the liquid after the eye is washed with it; these provisions compose altogether an apparatus, a system of parts, a preparation of means, so manifest in their design, so exquisite in their contrivance, so successful in their use, as, in my opinion, to bear down all doubt that can be raised upon the subject."

Had Paley lived now he could have added a great deal more. He would probably have compared the eye with a photographic camera, for it is a dark chamber with the lens in front and a sensitive plate at the back: upon which the external image is focussed as a minute picture in a similarly *inverted* position. From this plate (the retina) the optic nerve carries the vibrations to the brain, where the picture is reversed, and the sense of vision beholds, not the *tiny image* at the back of the eye, but its source outside, as a house, in its proper dimensions.

Can all this and much more be acquired by chance variations, the few which are favourable occurring from time to time? Indeed, there is no guarantee that they will occur at all in the succeeding generations; when

perhaps, according to Darwin, injurious ones might come in, and the being perish; so that the beginning of improvements would be lost for ever.

Paley sums up the "cumulative argument" thus: "The proof is not a conclusion which lies at the end of a chain of reasoning, of which chain each instance of contrivance is only a link, and of which, if one link fail, the whole fails; but it is an argument separately supplied by every separate example. An error in stating an example affects only that example. The argument is cumulative in the fullest sense of that term. The eye proves it without the ear; the ear without the eye. The proof in each example is complete; for when the design of the part, and the conduciveness of its structure to that design is shown, the mind may set itself at rest; no future consideration can detract anything from the force of the example."

This passage is, of course, equally applicable to the evolutionary origin of the eye and ear by protoplasmic adaptations instead of being designed.

Darwin—in spite of the logical conclusion to which Natural Selection might have brought him, as it did Haeckel and Büchner—could not refrain from exclaiming, in comparing Evolution with Creation by *fiat*: "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; and that . . . from so simple a beginning, endless forms most beautiful and most wonderful have been and are being evolved."¹

Through all the illustrations which Paley gives, there is in the background that Directivity or Determination towards an object, which we have seen to be so obvious

¹ *Origin of Species*, 6th ed., 1878, p. 429.

in the muscles as described by Dr. Haughton, and emphasised by Mr. James Croll.

Natural Selection in sweeping away Design was supposed to have swept away Determination with it ; so that all animals and plants, including, of course, all their internal anatomical structures, were supposed to have arisen by the chance appearance of favourable variations, accumulated through generations.

As, however, Natural Selection, so far as it was supposed to be concerned with the *Origin* of Species, has not a shadow of a foundation in Nature, the Law of Direct Adaptation to the conditions of life is substituted ; and all these wonderful structures which Paley thought to have been designed, are now regarded as having arisen by Evolution instead ; but there is everywhere present the evidence of Determination or Directivity as patent as ever.

The human eye was undoubtedly evolved from a pigment spot on the skin of some far distant creature at the beginning of the series which led up to that of the mammalia, which was sensitive to light ; such perhaps as is found at the ends of the rays of a starfish ; so that while there is hardly anything in these to be called structure, in the human eye we attain to all the elements of a self-acting photographic camera !

Paley observes that if a man discovered the use of a watch picked up on a heath, not knowing what it was, it would raise his admiration still more if he found that the watch could reproduce itself by young ones, as a living organism does.

We may add here, that if he found that, by placing young watches in various localities some would eventually become "time-pieces," "eight-day clocks," "alarums," "chronometers," etc., his admiration of the power of the original watchmaker would be still more enhanced.

Now this is precisely what Evolution represents.

There may yet be added another feature. If a watch gets out of order it has to be taken to a watchmaker to be repaired ; but organisms have self-reparative powers, so that a wound will heal up without external assistance.

However clever a human watchmaker may be, Nature is incomparably the better of the two ; even though not a single structure in the world may be regarded as ideally perfect.

Darwin gives us his ideas of how he conceived a human eye was evolved from a pigment spot by means of Natural Selection, first observing : " I have felt the difficulty too keenly to be surprised at others hesitating to extend the principle of Natural Selection to so startling a length " .

" If we must compare the eye to an optical instrument, we ought in imagination to take a thick layer of *transparent tissue* [itself as well as the following having arisen through Natural Selection] with *spaces* filled with *fluid*, and with a *nerve sensitive to light*, beneath, and then suppose *every part of this layer to be continually changing slowly into density*, so as to separate into *layers of different densities and thicknesses*, placed at *different distances* from each other, and with *surfaces of each layer changing in form*. [We may ask where are all these things to be got, and why do they arise in Nature?] Further we must suppose that *there is a power*, represented by Natural Selection or the survival of the fittest, always *intently watching each slight alteration in the transparent layers* ; and *carefully preserving each which, under varied circumstances* in any way or in any degree, *tends to produce a distincter image*. We must suppose *each new state* of the instrument *to be multiplied by the million* [this is impossible unless this sequence has occurred in a multitude of individuals instead of *one* only] ; each to be preserved

until a better one is produced, and then the old ones to be all destroyed. In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely [why so, if they only appear in a few favoured offspring?], and Natural Selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might thus be formed as superior to one of glass as the works of the Creator are to those of man?"¹

It did not seem to occur to Darwin, that if the eye is a work of the Creator, as the reader infers such to be Darwin's belief from the last sentence, why should He proceed in this roundabout process of making innumerable variations in which some twenty suppositions are included, and so necessitating a "power" to pick out the best ones. Why cannot the Creator make only the best quality at once? Why not let *all* the individuals enjoy the best variations, instead of a few only, without ruthlessly destroying millions of living beings unblest with favourable variations?²

¹ *Origin of Species*, p. 146. I have indicated by italics *seventeen* suppositions. The above paragraph is reproduced from my address in *Christian Apologetics* (J. Murray).

² When I first read the *Origin of Species*, etc., in 1860, I had misgivings long before I came to this passage; but this hypothetical argument was sufficient to clinch the matter in my mind. I have never accepted Darwinism at all. I was fortunate in gaining one of the two "Actonian Prizes," for an essay on the subject—"The Theory of Evolution of Living Things," offered by the Royal Institution in 1872. I chose Palæontology as the subject for illustrating Evolution; but never referred to Natural Selection at all as an instrument in the process.

The other successful essayist was Mr. B. T. Lowne (as there were *two* prizes of a hundred guineas each given in that year). The authorities showed their impartiality, for his essay was based entirely on Darwinism.

In describing anatomical structures illustrating Directivity (I will not now say Design) Paley notices cases where mechanical principles are brought into play ; thus there is a pulley in the muscles of the eye, levers in the feet and arms, etc.

We have seen how a skew bridge is imitated in a bird's wing and a man's leg, and the thigh bone has, internally, the structure of an arch.

In the vegetable kingdom we find the principle of springs to be frequent in flowers and mechanical traps in insectivorous plants, as the Venus' fly-trap, which resembles a rat-trap ; while a lever is seen in the stamens of *Salvias*.

Where engineers and architects construct machines or erect buildings, arches, bridges, etc., they do so on precisely similar principles. They do but imitate, consciously or unconsciously, what Nature has done before them.

Man, therefore, is much more a *revealer* than an original *inventor* ; for his inventions are all based on principles discovered to exist in Nature's works. Indeed, the primary meaning of "Invention" is "Discovery,"¹ and is a better description of man's work than the ordinary meaning.

If a man "invents" the telescope, it is because he has "discovered" the action of lenses in combination. Similarly he may invent mathematical formulæ, using letters of alphabets, but they only represent illustrations of the natural laws of Numbers, of Geometry, etc. They were all there from the beginning, but no creature before man arrived could reveal them.

When we turn to Astronomy we find the forms and motions of the heavenly bodies to be strictly bound by

¹ For example, "The Invention of the Cross" signified its discovery.

mathematical laws capable of being expressed in technical terms. The question then arises : What was the primary origin of "Natural" Mathematics and Geometry ; of the natural laws of Physics and Chemistry ? Are they all self-existent and self-caused ?

What is the difference between the amount of probabilities of the pre-existence of an Intelligent Power, and those of blind forces producing those laws of combinations of numbers in mathematics ; or of vibrations of Sound-producing Air and of Light-producing Ether or of Light itself in producing colours only appreciable by an eye ?

In chapter viii. Paley describes the mechanical action of the human bones and alludes to that of the elbow. He says : " In the fore-arm, for the perfect use of the limb, two motions are wanted ; a motion at the elbow backward and forward which is called a reciprocal motion, and a rotatory motion, by which the palm of the hand, as occasion requires, may be turned upward. How is this managed ? The fore-arm consists of two bones, lying alongside each other, but touching only towards the ends. One, and only one, of these bones is joined to the cubit, or upper part of the arm, at the elbow ; the other alone to the hand at the wrist. The first, by means at the elbow of a hinge-joint (which allows only of motion in the same plane) swings backward and forward, carrying along with it the other bone, and the whole fore-arm. In the meantime, as often as there is occasion to turn the palm upward, that other bone to which the hand is attached rolls upon the first, by the help of a groove or hollow near each end of one bone, to which is fitted a corresponding prominence in the other. If both bones had been joined to the cubit or upper arm at the elbow, or both to the hand at the wrist, the thing could not have been done.

The first was at liberty at one end, and the second at the other; by which means the two actions may be performed together. The great bone which carries the fore-arm may be swinging upon its hinge at the elbow, at the very time that the lesser bone, which carries the hand, may be turning round it in the grooves."

According to Paley all this would be supposed to have been designed by the Creator *antecedently* to the creation of man and in *anticipation* of his future requirements. Evolution *reverses* this conception, in that no structure, however much it may be exquisitely adapted to its use, is ever *originally* begun in *anticipation* of its use. The effort to effect some purpose calls out the responsive power of protoplasm and the organ is then and there originated. Then, by the effort being constantly renewed, the organ is developed upon the "principle of least action"; that is to say, it somewhat exceeds rather than just exactly meets the requirement; since the use of any organic structure is never absolutely the same on two occasions, or the number of pounds weight represented is not mathematically always the same to an ounce; so Nature takes care to supply rather more than is usually required.

A remarkable instance of a relatively quick response to use occurred to a patient at St. Bartholomew's Hospital, London, a few years ago. A railway guard had his elbow crushed. The bones at the joint were excised and he subsequently returned to resume his former occupation. This often necessitated his reaching his compartment after the train had started. To do this he had to walk along the footboard and swing himself, so to say, by means of the rail on the carriage. This required a constantly repeated bending at the elbow. Nature at once responded to the action, and supplied him with a per-

fectly efficient and flexible elbow, though probably not at all like the bony structure that had been excised.

This case reminds one of the fact, a very common feature in Nature, that the same *result* can be produced by very different *means*. Thus flight is secured in very different parts of the fore-limb in the extinct Pterodactyle, the existing bat and the bird.

Similarly, in plants the tendril of a pea closely resembles that of the vine; but while the former is a metamorphosed *leaf* the latter is homologous with a *flowering branch*. In saying that Evolution never *anticipates* the *use* of a structure, I repeat, this only applies to its *origin*. Once formed, heredity tends to preserve it, and continual use to improve it; we thus obtain organs in every animal and plant *now*, which are built up during the development in anticipation of their use later on—as the eye in the fœtus in total darkness—because the Evolution of any individual being re-capitulates the development of the race.

Hence Paley's fourteenth chapter on "Prospective Contrivances," in which he alludes to the eye, must be read in the light of Evolution to understand the real significance of prospective structures.

Paley has an interesting chapter (xv.) on "Relations". By these he means what are now called "Correlations". Thus he says: "The aptness of the jaws and teeth to prepare the food for the stomach is, at least, as manifest as that of the cider-mill to crush the apples for the press. The concoction of the food in the stomach is as necessary for its future use, as the fermentation of the stum in the vat is to the perfection of the liquor, etc."

"Spallanzani has remarked a circumstantial resemblance between the stomachs of gallinaceous fowls and the structure of *corn-mills*. Whilst the two sides of the

gizzard perform the office of the mill-stones, the craw or crop supplies the place of the *hopper*.

“Nor does the gizzard belong to birds as such. A gizzard is not found in birds of prey. *Their* food requires not to be ground down in a mill. The comparatory contrivance goes no farther than the necessity.”

In other words, it is an illustration of the Principle of Least Action.

Degeneration, so commonly occurring in organs of animals and plants, was a great stumbling block as long as every kind of structure was supposed to be created as it now is and “very good”.

Of course the interpretation by degeneracy under Evolution is perfectly sufficient. It is *one* of the several lines of evidence which together prove inductively that man is descended from the animal world.

CHAPTER XI

PSEUDO-PHILOSOPHIC VIEWS OF EVOLUTION

HAVING surveyed the animal and vegetable kingdoms, as coming into existence as soon as protoplasm with the nucleus appeared upon this earth, by Evolution; it is necessary to pay some attention to what certain Rationalists and others have to say upon the subject.

Being profoundly impressed by the *continuity* which pervades Nature, many eminent scientists, as Huxley, Tyndall, Herbert Spencer as well as Haeckel and Büchner, would see no "break" at the origin of life in organisms; which, to satisfy the law of continuity, *must*, according to their views, have proceeded from the inorganic world.

When, however, we read what those philosophers have to say on the subject, we find nothing beyond suggestions, or what they imagine, on *à priori* grounds, as to what was the case. Not one can be accepted as a scientific truth based on inductive evidence.

Dr. Tyndall, for example, wrote¹ as follows: he saw in matter, "the promise and potency of all terrestrial life"; "Life under all its forms has arisen by an unbroken evolution, and through the instrumentality of what are called natural causes". First there is "a nebular haze," then this becomes a "molten mass," wherein are all forms of life, man included, "potentially"

¹ The following references are to his *Fragments of Science*.

existent—"the human mind itself—emotion, intellect, will and all their phenomena . . . all our philosophy, all our poetry, all our science, and all our art are potential in the fires of the sun." ¹

"Having determined the elements of their curve [in allusion to the discoverable path of a comet] in a world of observation and experiment, they [*i.e.*, those who hold the doctrine of evolution] prolong that curve into an antecedent world, and accept as probable the unbroken sequence of development from the nebula to the present time." ²

The question arises, whether this *is* a legitimate "scientific use of the imagination," or is it not rather an *a priori* deduction without any efficient data whereon to rest the theory? Let us see, then, what Tyndall could bring forward in the way of concrete phenomena. He proceeds to say: "The matter of the animal body is that of inorganic nature. There is no substance in the animal tissues that is not primarily derived from the rocks, the water and the air. Are the forces of organic matter, then, different in kind from those of inorganic matter? The philosophy of the present day negatives the question. It is the compounding, in the organic world of forces belonging equally to the inorganic, that constitutes the mystery and the miracle of vitality. Every portion of every animal body may be reduced to purely inorganic matter. A perfect reversal of this process of reduction would carry us from the inorganic to the organic; and such a reversal is at least conceivable" [?]. ³

In the present state of our knowledge I, for one, flatly deny that a living organism can be conceived as arising out of its inorganic constituents, without the aid of Life;

¹ *Scientific use of the Imagination*, p. 453.

² *Ibid.*, p. 456.

³ *Vitality*, p. 463.

or even of a dead body coming back to life again of any of Nature's millions of plants and animals.

Finally, he says: "Not with the vagueness belonging to the emotions but with the definiteness belonging to the understanding, the scientific man has to put to himself these questions regarding the introduction of life upon the earth. . . . As far as the eye of science has hitherto ranged through Nature, no intrusion of purely creative power into any series of phenomena has been observed."¹ What did Tyndall understand by a "purely creative power"? Presumably, the "God of Design"; but if the making of one species out of another may be called "creative," we find that protoplasm with its nucleus is perfectly well able to do it.

If Tyndall meant some direct interference of an external, conscious Creator, working *upon* matter and force from without physical nature; then we have no direct evidence of any such interference throughout the whole period of the world's history; since Evolution first began to work out the life histories of plants and animals, including man, *from the first appearance of protoplasm* on this earth.

But when we turn from useless speculations of the imagination, however scientific they may be thought to be, to positive facts capable of investigation, we at once come upon a phenomenon which is *not* discoverable in the inorganic world, namely, that *Directivity* within *protoplasm*, to which I have abundantly alluded.

This Directivity is only associated with Life;² and these two things have been in close operation through all organisation. Both, like physical forces, are only

¹ *Apology for the Belfast Address*, p. 547.

² I do not here include the arrangements of molecules to form crystals in the mineral kingdom under the term; though Croll would do so.

recognisable by their effects ; and as Croll said are just as worthy of the term "Vital Force" or "Vital Energy" or any other like expression, as are Gravitation, Electricity and Magnetism are of their special names.

Now let us see if Huxley can help us. He says: "A sufficient intelligence could, from a knowledge of the properties of the molecules of that [cosmic] vapour, have predicted, say the fauna of Britain in 1869, with as much certainty as one can say what will happen to the vapour of the breath in a cold winter's day."¹

"Were it given to me to look beyond the abyss of geologically recorded time to the still more remote period when the earth was passing through physical and chemical conditions, which it can no more see again than a man can recall his infancy, I should expect to be a witness of the Evolution of living protoplasm from non-living matter."²

The reader will here note that he derives nothing of any scientific value from this utterance any more than from Tyndall's. The "man in the street" asks for *facts*, and they both supply him with *imagination*s.

It naturally occurs to one, Why is it necessary to go back to so early a period for life? We still have both degrees of heat and cold beyond which no living being can exist ; we know the external conditions of air, light, moisture and food which are necessary for plant and animal life ; *why* then cannot a living being arise now, or at any time along the evolutionary history of the world?

A very obvious answer appears to be that *once was enough*. Given the tiniest speck of living protoplasm with its nucleus, and all the living world can have come out of it.

¹*Genealogy of Animals.*

²*Critiques and Addresses*, p. 239.

It is of no use saying with Tyndall "on tracing the line of life backwards, we see it approaching more and more to what we call the purely physical condition".¹ It really does nothing of the sort. An amœba, a monera or a bacterium is as much *alive* as a man. The protoplasm of which it is made (as Huxley observes) is the same. It shows no approximation whatever to the inorganic world. Because it is *small* such is no proof that it approaches the composition of any mineral. This, surely, is a most unscientific use of the imagination!

Lastly Mr. Herbert Spencer observes: "That the forces exhibited in vital actions, vegetable and animal, are similarly derived, is so obvious a deduction from the facts of organic chemistry, that it will meet with ready acceptance from readers acquainted with the facts."² As an illustration, we may take his description of the assimilation of carbon dioxide by plants. "To overcome the powerful affinities which hold their elements together, it requires the expenditure of force, and this force is supplied by the sun". He does not seem to consider *how it is done* by means of living, green-coloured protoplasm only. Sunlight supplies the energy, but protoplasm is the manufacturer.

The preceding authors do not emphasise sufficiently the significance of Natural Laws. Dr. Whewell in his "Bridgewater Treatise" on "Astronomy and General Physics" calls attention to the metaphorical use of the term "law" in Nature. Contrasting it with Moral Law he says: "The language of moral law is 'Man *shall* not kill: the language of a Law of Nature is, a stone *will* fall to the earth'." In other words, a moral law states what a man always *ought* to be, a natural law, what always *is*.

¹ *Belfast Address*, p. 524.

² *First Principles*, p. 271.

If men were perfect, then, their actions due to their moral character would become a natural law.

Now, the Laws of Nature have always struck theological thinkers as being, *per se*, a witness to Mind. Thus, if it be true that the universe originated out of a homogeneous cosmic vapour, it is inconceivable (judging by our own minds, and we know of no others for comparison) how the laws, as of gravity, heat, light, electricity and of evolution itself, could have *originated*, except from an Omnipotent Mind or Will.

The whole universe is subject to laws ; as Dr. Whewell observes : “ The whole course of the visible universe is but the collective result of such laws ; its movements are only the aggregate of *their* working. . . . The number and variety of the laws which we find established in the universe is so great, that it would be idle to endeavour to enumerate them. In their operation they are combined and intermixed in incalculable and endless complexity, influencing and modifying each other’s effects in every direction. . . . Yet, in so far as we consider the bearing of one part upon another, we receive an impression of adaptation, of mutual fitness, of conspiring means, of preparation and completion, of purpose and provision. This impression is suggested by the contemplation of every part of Nature.”¹

All this will be equally true whether Evolution of Animals and Plants or the instantaneous creation by a *Fiat* were the method. The innumerable adaptations and correlations are precisely the same. And it is the wonderfully complete adjustments between the organic and inorganic kingdoms, wrought out as we now know, in large measure by the self-adapting powers of proto-

¹ Pp. 7, 12.

plasm, that impress the mind with the necessity of an over-ruling "Adapter".

Let us follow out briefly the interdependence of the three kingdoms. A man must live. He must breathe, he must eat and drink. To do the first the air must be so constituted as to supply him with the necessary oxygen. Water is a necessity of life; and if he eat animal food, the sheep or ox had to live upon the vegetable kingdom; but grass or wheat, if man eat bread, requires various mineral salts; nitrates, phosphates, etc., and potash, iron, etc., or it cannot grow. All green plants require carbon dioxide from the air, or they could not build up their tissues. To do this they require heat and light from the sun, the energy of which is stored up in plants; these have been converted into coal. Man extracts it, lights a fire and roasts his meat, thereby liberating sun-light and sun-heat; or he may utilise the stored up solar energy in driving his motor car or any kind of engine.

The question is, Which is more probable: that the innumerable adaptations between the three kingdoms was *foreseen* by a Master Mind *before* protoplasm appeared on this earth, or whether the exquisite adjustments between Matter, Force and Life came about by chance; *i.e.*, without any natural laws in mutual correlation, just as natural selection is supposed to have brought about Evolution, without any connection between the appearance of favourable variations and the environment.

I prefer to regard this interaction as one of the many coincidences which supply inductive evidence in support of the proof of a Creator, both seen in the Origin of Life, and the Origin of Species.

CHAPTER XII

FINAL CAUSES¹

THE argument from design, which proved so fascinating a subject to writers on teleology of the old School, has been thought to have received its death-blow by Darwinism.² This doctrine, as propounded by Mr. Darwin, is now forty years of age. In the year 1878 appeared probably the most elaborate work on *Final Causes* which has ever issued from the Press. It contains two books. The first treats of the Law of Finality, the second of the First Cause of Finality. This term is defined as follows: "It signifies the end (*finis*) for which one acts, or towards which one tends, and which may consequently be considered as a cause of action or of motion". Hence it would seem that a sharp distinction should be drawn between *Finality* and *Causality*; that while every phenomenon demands a *cause* of some sort, it is only a certain number which have an *end*, this notion being "produced

¹ *Final Causes*. By Paul Janet, Member of the Institute, Professor at the Faculté des Lettres of Paris. Translated from the French by William Affleck, B.D., with preface by Robert Flint, D.D., LL.D., Professor of Divinity, University of Edinburgh. T. & T. Clark, Edinburgh, 1878.

This chapter recapitulates to a certain extent several observations made throughout this book. I do not think this is any objection to its insertion. It was written more than twenty years ago, but the arguments are, I believe, as sound to-day as they were when it was written.

² *Lay Sermons*. By T. H. Huxley, p. 330.

with an imperious and irresistible force". Thus, for example, that a pebble should be round and smooth is a result of friction; but we see no "end" in its roundness or smoothness. The eye-ball is also round and smooth, and we rightly or wrongly *do* infer an end in its spherical form; for we recognise its use for rotation. This "imperiousness," however, is not argument, and the question may be asked, How is any supposed end to be distinguished from a mere result?

The reply is, that in every case where an end is recognised there is a multiplicity of coincidences which have by their mutual interaction brought about that end; while the probability of their occurring at haphazard, or as uncorrelated coincidences, and yet collectively producing such a structure as the eye, is one to infinity that such should be the case. It is on these grounds that the order of the planetary system, as well as the organs of animals and plants, imply ends; but we cannot recognise any end in the way a stream of lava pours down one side of a volcano rather than the other.

We may, however, here ask what degree of complexity is requisite to constitute or illustrate an end? If there is an indubitable end in the human eye, is there not a like end in the pigment cell attached to a nerve? or, if there is an end in the limbs of a vertebrate, is there no end in the shapeless pseudopodia of an *amæba*?

Now, the formation of pseudopodia may be claimed by the Rationalists as illustrating the inherent properties of protoplasm, and as such they are simply *results* and not *ends*.

Even sex, so obviously an end, as Janet thinks, if traced to elementary forms, is foreshadowed in the accidental fusion of two vegetative zoospores. Hence although ends may seem very apparent in highly organ-

ised beings, the organs exhibiting these ends may be traced back to states where those "ends," by a gradual process of minimisation, seem to pass into accidental "results," and so one cannot at last draw any sharp line between them.

Mr. Herbert Spencer, in tracing conduct from such random motions as are executed by pseudopodia, to the actions of higher animals, which seem to show definite ends, points out how the gradations are complete—say, from the swimming of an infusorium to the habits of a cephalopod, or from those of an ascidian to an elephant. It is just this which renders the attempts to limit finality with any degree of precision so difficult a task.

This difficulty, if I mistake not, is scarcely brought out with sufficient precision by M. Janet. It may, therefore, indicate a line of objection to finality, as it undoubtedly would be to the old views of teleology.

In his sixth chapter of the first book on "Objections and Difficulties," M. Janet refers to M. Littré's view that "the property of matter of accommodating itself to ends—of *adjusting itself*, as he says—is one of the properties of organised matter. It is of the essence of this matter to adapt itself to ends as it is of its essence to contract or expand, to move or to feel."¹ Our author takes M. Littré to task for this expression. It is not *Matter*, but *Directivity*, which guides matter to "ends". Otherwise the very existence of the animal and vegetable kingdoms as they now are, cannot be accounted for. If Littré meant that the protoplasm, say, of some reptile, through some inherent power of adaptation, developed wings instead of forelegs, and so produced a bird, such a description may sound absurd. But every evidence yet

¹ P. 221.

discovered goes to prove it to be true, though the process may have been a gradual one, and only perfected through very many generations.

In fact, Evolution is based on the principle that protoplasm *has* within it an infinite potentiality of adaptation; and when our author objects to M. Littré's expression about organised matter having the power of adapting or adjusting itself, he does not refute it by saying, "Let men but think of it, and they will own that there does not exist a sort of entity called organised matter, endowed, one knows not why or how, with the property of attaining ends; what really exists is a totality of solids, liquids, tissues, canals, hard parts and soft parts—in a word, an incalculable totality of second causes and blind agents, that all unite in a common action, which is life".¹ Now, this, in a sense, is true; but it is not one whit the less true that it is, so to say, a plastic whole; for, although when a creature is once born into the world, and has grown to maturity, it can rarely change its form much after that, any more than "the leopard its spots";² yet, by the power of inherent adaptability, its offspring can during growth acquire a form and structure different in some degree from the parent's; and so after several generations can produce a new species, abounding in so-called "ends" which were not to be found in the original ancestral form.

It is, in fact, just this plasticity of organised matter (for want of a better expression), to which is due the marvellous results which, *per se*, have all the appearance

¹ P. 221.

² This expression, as symbolical of fixity, is singularly inappropriate, for the colour of the skin of even one and the same animal is extremely variable, according to circumstances, as is the case with trout, frogs, and, above all, the chameleon,

of ends. M. Janet finally asks: "Wherein is it more absurd to admit in matter the property of healing itself than the property of adjusting itself to ends?" Neither one nor the other is absurd for both are equally true. To the famous argument of the watch it might be added that, if a watch could heal up an injury to its wheels, it would imply a vastly increased skill in its artificer. But this is just what the highest kinds of organised matter *can* do, and *are* doing every day!

Hence, if on the one hand, a large class of phenomena do not instantly convey to our mind the idea of end, whereas another large class imperatively force it upon us; we must bear in mind that the doctrine of Evolution, without destroying that force as far as it acts *per se*, has proved that, in all instances, we can actually or presumedly pass from the highly complex organ, or organism, so to say, *crammed with ends*, to seemingly a mere lump of jelly, with, apparently, none at all; and that by development, whether studied historically in palæontology or in embryology, we pass by many gradations from what we call *a priori*, "results," to what we *a priori*, call "ends". It is this discovery coupled with, or rather based upon Darwinism, which has (it is supposed) given the death-blow to teleology. For tracking them up from below, who can say where "ends" begin? And we may therefore, and finally, ask—Is it not somewhat arbitrary to assert such or such a structure to be an end and not a result?

Before attempting to reply to this, let us return to our author. He gives, as another basis of finality, *the correlation of the end with the future*, which implies the existence of the future phenomenon as the efficient cause; and he adopts the old illustration of the eye being fully developed in the womb, though the use of it is solely for the future.

It seems to me that a line of argument may be

followed which will eliminate this dilemma. It is based on the fact that *function precedes structure*, by which I mean that functions *now* performed by well-differentiated and specific organs, *were* undertaken by more generalised structures before these organs existed; just as, for example, the membrane of a sea-anemone performs functions of both digestion and respiration.

Again, when a new function is required by even a highly organised being, that function is, so to say, undertaken for a time by some existing organ (of totally different function), until such modifications have occurred in successive generations, as will ultimately enable the organ (thus metamorphosed into a new form) to execute its new functions exclusively. For example, the tendrils of *Naravelia* are foreshadowed in the sensitive climbing petioles of *Clematis*, and the seed-carrying expanded leaf of *Cycas* is preliminary to the ordinary closed seed-vessel, such as the pod of a pea.

Now, these principles of differentiation and metamorphosis which run through the organised world, imply a universal *potentiality* of acquiring new functions, which, at the same time, proceeds to modify structure, and so gives rise to new organs.

May we not, then, legitimately pass from a consideration of finality in the actual organ to a finality in this very power and potency inherent in organised matter? Whence it comes is unsearchable and past finding out. All we can say is, that inorganic matter shows no sign of it whatever, whereas organised matter, or its ultimate elements, protoplasm with its nucleus, would appear to have it to an infinite degree.

Grant finality in this marvellous power, and the whole question would seem to at once meet with its ultimate solution.

Further illustrations will not be unadvisable.

If one contemplates the eye as it is, without regard to its evolutionary history, the idea of finality, if not design, is very "imperious"; but by tracing that history from a mere pigment cell in contact with a nerve, and then by imagining almost microscopic improvements, so to say, to have taken place, the idea of finality seems frittered away, while the notion of design vanishes altogether. Such we have seen is the Darwinian view.

But it seems to return again under the aspect now considered; for granting the pigment cell and a nerve, beyond which analysis is unable to proceed, and mere sensation as a result, "we maintain that, what occurs first as an *effect* takes thereupon the character of an *end*, by reason of the number and the complexity of the combinations which have rendered it possible;"¹ and we may ask, Why should the more complex eye issue at all out of the simpler condition? Finality, as expressed by the inherent potentiality of protoplasm, seems to be the sole answer.

Again, our author lays stress upon the sexes, as illustrating the most remarkable fact of co-ordination; for it is not merely a case of adaptation of one organ to its function, but of one organ to another. Neither is one the effect of the other. "Those two organs are two distinct and independent effects, and yet they can only be explained the one by the other, which is precisely the relation of finality."²

"It cannot be said," M. Janet observes, "that this adaptation has been made in course of time; for as the species could not subsist without it, it would have perished before it had been formed."³

¹ P. 39.

² P. 52.

³ P. 53.

No doubt existing species could not exist without their full amount of correlative structures ; but it is just because the sexes have been, as it is believed, differentiated in course of time, that the supposed finality becomes, like that of the eye, attenuated by being prolonged backwards into history ; for by travelling historically backwards we can theoretically, if not always practically, see species getting simpler and simpler, and more and more generalised, till in every organism the sexual process would be represented by a mere accidental fusion of two identically similar protoplasmic masses ; while one stage further brings us to an entire independence of such conjugations, and the being propagates by fission of its vegetative system only.

Instead, however, of thus eliminating by degrees every trace of finality in sexuality till we merge into merely mechanical results ; is it not just as logical to say that the sexuality of mammalia and flowering plants was potentially visible in the conjugation of monera and plasmodia ? and that the "sexual idea" has reigned throughout, function ever dominating structure till the latter had conformed to the more complete function by becoming specialised more and more ; or, in the words of M. Janet, "The agreement of several phenomena, bound together with a future determinate phenomenon, supposes a cause in which that future phenomenon is ideally represented, and the probability of this presumption increases with the complexity of the concordant phenomena, and the number of the relations which unite them to the final phenomenon."¹

M. Janet devotes the second chapter to an elaborate investigation of the structure of the eye, ear, tooth, etc.,

¹ P. 55.

and sees finality in all, just as the older teleologists saw design, in "that when a complex combination of heterogeneous phenomena is found to agree with the possibility of a future act, which was not contained beforehand in any of these phenomena in particular, this agreement can only be comprehended by the human mind by a kind of pre-existence in an ideal form of the future act itself, which transforms it from a result into an end—that is to say, into a final cause."¹

If this be a correct account of finality, then the intercrossing of flowers would be a most pertinent illustration of it. For the conclusion Darwin arrived at was that plants, to be perpetuated, *must* be crossed at least occasionally, that Nature "abhors perpetual self-fertilisation," that "self-fertilisation is injurious," etc., such being expressions to be found in Darwin's writings.² We have a "complex combination of phenomena" in the structure of the flower of an *orchis*. This structure is correlated to an insect which *must* convey the pollen-mass from one flower to another, or the seed will not be set. Here, then, is exactly what M. Janet defines as finality; for the structure is found to agree with the possibility—nay, necessity—of a future act, that performed by the insect, which was certainly not contained beforehand in the structure itself. Such, then, is clearly finality in the structure of many flowers as they now exist. *How* their peculiar structures were obtained is another question, which I will not discuss at present.

One of the most patent facts in Darwin's expositions

¹ P. 85.

² As, for example, repeatedly in his work "Cross and Self-Fertilisation of Plants". I have given reasons for dissenting strongly from these expressions, in my book *The Origin of Floral Structures* and in "Self-Fertilisation," *Trans. Lin. Soc., 2nd Ser. Bot., vol. i., p. 317, 1877.*

is that almost every detail of structure is presumed to have a use, excepting, of course "rudimentary organs," whose use is now gone, as it is superseded by that of other organs, notably so in the structure of flowers; and he sets himself the task of discovering such use. This is an *a priori* conclusion which he then proceeds to test by trying to discover the use.¹ His language could be very appropriately adopted by a teleologist; but we know he does not believe in direct design. All the minute details of structure which seem so "imperiously" to force finality, if not design, upon the mind, have been acquired, according to Darwin, by the unintentional acts of natural selection. All the characters by which a specific form is known, he compares, as will be seen,² to chance fragments of stone, broken from a mountain rock, but of which natural selection has picked out and preserved those most suited to render the creature the fittest to survive; just as a man may select stones of different shapes wherewith to build his house, without having previously shaped them himself.

The exquisite detail of structure of a flower of the field, like to which Solomon in all his glory was not arrayed, is much more comparable to a highly finished and beautifully designed architectural pile, than to such a rough building as that to which Darwin would have us liken it. If it be necessary to prepare *intentionally* each stone for its future position in the structure, so by analogy it might be reasoned that Nature had intentionally caused each detail to develop with the ultimate end of forming a "complex heterogeneous whole". No doubt Darwin's simile is correctly apposite to *his* theory of

¹ See, for example, his remarks on "Momordes Ignea" in *Fertilisation of Orchids*, p. 249, first edition.

² See Appendix, p. 145.

indefinite variations, out of which natural selection takes the best ; but, as already stated, naturalists are by no means at one in adopting this view. The one I am advocating in this book is Darwin's alternative to natural selection, *viz.*, that variations do not occur until external conditions have incited them to appear ; and that when they do, it is in response to, and they are then consequently correlated with, the environment ; in other words, the organism becomes more and more adapted to the environment, so that natural selection has nothing to do.

Darwin would seem to lay much more stress upon the inherent, spontaneous powers of variation than upon the environment as an inciting cause ; for he expresses himself as inclined "to lay less weight on the direct action of the surrounding conditions than on a tendency to vary, due to causes of which we are ignorant."¹ We shall see that he came to modify this view in 1876 in favour of direct adaptation.

I have always adhered to the opposite view, and regarded the environment as by far the most important "cause" of variation, in that it influences the organism, which, by its inherent but latent power to vary, responds to the external stimulus, and then varies accordingly.

This view was very strongly insisted upon by Dr. Aug. Weismann, who thus speaks : "A species is only caused to change through the influence of changing external conditions of life, this change being in a fixed direction, which entirely depends on the physical nature of the varying organism, and is different in different species, or even in the two sexes of the same species. According to my view, transmutation by purely internal

¹ *Origin of Species*, p. 107. Sixth edition, 1878.

causes is not to be entertained. If we could absolutely suspend the changes of the external conditions of life, existing species would remain stationary. The action of external inciting causes in the widest sense of the word is alone able to produce modifications." Dr. Alfred R. Wallace, who quoted the preceding in his review of Dr. Weismann's work, *Studies in the Theory of Descent*, said that he had "arrived at almost exactly similar conclusions to these".¹

Whichever theory be adopted, the outcome is, of course, the same—*viz.*, structures which *per se* imperiously suggest finality or design. But since the special creation hypothesis is out of court, and Evolution only accepted, design may be excluded, and the question stands, Does finality remain? If M. Janet's definition be accepted, then as "ends" abound everywhere in organisms, finality is also *passim*. We are not concerned, be it remembered, at present with the investigation as to *how* the complex correlated structures *do* arise in response to either an external or internal stimulus.

Now, assuming finality to be recognised in Nature, it must be either intentional or not. In the first book M. Janet does not concern himself with intentionality. He does not therein raise the question as to how the first cause acts, but whether the second causes, as they are given to us in experience, act for ends or not. Within these limits, then, is the analogy between the industry of man and that of Nature legitimate?

Taking as a starting point the consciousness of personal finality in ourselves, we infer by analogy a similar finality in other men; "from finality in the industrious actions of other men, we pass to finality in the

¹ *Nature*, vol. xxii., p. 141. Cf. p. 161.

industrious actions of animals, whether these actions present the appearance of some foresight and reflection, or appear to us absolutely automatic. We have now to pass from the external actions of the animal, which are called its *instincts*, to its internal operations, which are called its *functions*. This is the kernel of our whole deduction.”¹

In tracking finality thus downwards, the reader will at once perceive that the author considers finality as equally characteristic of the *voluntary* and the *automatic* acts of man, as well as the acts of all other animals whether external and instinctive, or internal and functional.

He notices a “profound difference between functional industry and human—namely, that artificial industry constructs the machines it has need of to perform its operations, while the animal functions are only the operations of machines already constructed. The man makes pumps, but the animal has received from Nature a natural pump, the heart. . . . Whatever be the cause that has constructed it . . . is of little consequence; in any case, this cause in constructing this machine has performed a series of operations entirely resembling those of a workman constructing analogous machines.”²

The author then pertinently asks, “How could the same machine be considered here as a collection of means and ends, there as a simple coincidence of causes and effects?” Why is a spider’s web a mere effect, but a fishing net an end? “Can we thus assign two absolutely identical causes to two absolutely identical actions?” And M. Janet redefines finality under this comparison, observing that “in both cases there is a twofold common char-

¹ P. 97.

² P. 99.

acter: (1) the relation of the parts to the whole; (2) the relation of the whole to the external medium. . . . There is no part which has not its reason in the whole. . . . Now, is not that the essential and distinctive character of finality? It is not, then, the more or less of internal activity or of spontaneity that is here in question; it is that *pre-established harmony* of the part and the whole, which, common at once to the works of art and to the works of Nature, confers upon them, on the one as on the other, an incontestable character of finality.”¹

The two words I have italicised in this quotation may possibly give rise to a misconception; for whatever “pre-established harmony” may be seemingly present in the correlation of organic structures, Evolution will not permit of any correlated structures having been made primarily in *anticipation* of fulfilling a want. They may be made so now in the development of existing species—say the eye in a foetus—but when originally differentiated, it was in accordance with *immediate* wants, or in response to external stimuli—*e.g.*, light in this case.² But once formed, it becomes hereditary, and *then* ever afterwards will be formed in apparent anticipation.

Finality is certainly not destroyed, whether we believe organs to have been developed by Evolution, or to have been created in some analogous manner to the fabrication of a steam-engine by man. For my own part, I still hold to the theory that *uses* cause *adaptations*, on the principle that *function precedes structure*. Thus as a graminivorous animal has its food already (so to say) cut

¹ P. 101.

² If total darkness causes eyes to atrophy, as in fishes, etc., in caves, light is evidently essential to keep the structure of the eye in its normal state. Hence it is legitimately to be inferred that light has “caused” them. The eye of a blind man atrophies.

up into slices in grass-blades, it does not require scissors to reduce it to small pieces in order to make a convenient mouthful. But a carnivorous animal has a large lump of flesh in the shape of a carcass. It requires to cut it up. The action of biting in order to do this, previous to its consumption, has converted its teeth into scissors-like carnassials, and as it can no longer masticate it bolts the pieces whole.

So, too, man would never have thought of making scissors unless he had had something that he wanted to cut up. The object induced the manufacture, "Necessity being the mother of invention". The parallel is complete; only, in the one case it is spontaneously effected by the plasticity and adaptability of living matter; in the other it is artificially produced by the consciousness and skill of man.

Not only, then, do we recognise finality in the functions of the completed organs, but in the very formations of the organs themselves.

But now, asks M. Janet, "Is this analogy between human industry and the industry of Nature, though justified by theory, also justified by science?" According to the older methods of interpretation, the form of the organs was supposed to imply their function. But at the present day we have reason to believe the reverse, or, as I have expressed it, that *function precedes structure*. In generalised animals different functions are often executed by one and the same organ; and it is not till later—*i.e.*, higher in the scale of life—that differentiation of a common structure into special organs occurs, each organ now taking on its special function, according to the principle of the division of labour.

The present method of investigation does not limit itself to organs, but presses on to the ultimate analysis,

till it reaches the fundamental and physical basis of life, or the protoplasmic cell ; and science declares that this analysis leaves no room for ends, but can find nothing but causes and effects. Hence once more do we ultimately arrive at the *potentiality of protoplasm*, and all I claim is, that, given certain, nay, almost any, combinations of conditions of the environment, protoplasm will respond and do such or such a work, the outcome of which is an organ adapted to its environment, and finally an organism which then "imperiously" asserts to us its finality.

We thus arrive at the last question, Whence comes this potentiality of protoplasm? or, How is it that orderly differentiation comes out, and not perpetually changing states of chaos? As a fact, the more differentiation has set in, the more wonderful are the structures produced ; so that, casting the eye back through the vista of past ages, from the most primitive creature to man, we see as a rule nothing but ascending series in every direction.

Science knows nothing of "must". All that we can say is, that such or such organs do grow in an embryo, and that collectively they do make an organism, but they may at any time make a monster instead.

Thus normally the tissue of a leaf-bud is formed in a certain way ; but a *cynips* punctures it and deposits an egg within. The tissues *now* grow abnormally and produce a gall. The inner layers of this contain nutritive food suitable for the grub, and upon which it lives. If the nourishment were not specially provided by the tree, the grub could not live. This is a case which shows how the gall is apparently nothing but an effect or result of a mechanical injury caused by the puncture. But looking at the gall *per se*, we find it furnishes board and residence for the *cynips*. Here

there are at least two "ends" in the structure; and why may we, then, not regard it as one of those "imperious" cases of finality? Yet the whole structure was simply an outgrowth in "response" to, or a "result" of, a minute injury.

This case would seem to furnish a good illustrative example of many others, of which the only interpretation would seem to be that protoplasm is endowed with the property of producing tissues in response to stimuli, and that when the organ composed of those tissues is completed, it has all the appearance of having had an end in view during its entire structure. And what is true of single organs is true for their totality or a living being.

I have dwelt upon this potentiality of protoplasm, because, contrary to M. Janet's opinion, it seems to me that it affords the only true resting-ground upon which to base the doctrine of Finality. It is an objective fact which is indisputable. Recognise it as such, and then all forms of finality will flow from it.

Having pretty well exhausted the subject of finality as apparent in organs, M. Janet observes that as animals and plants cannot live without a suitable environment to furnish them with adequate food, "we are thus brought to the notion of *external* or *relative* finality". "It is strange," he adds, in speaking of external finality, "that it did not strike Kant from this point of view, that internal finality is in reality inseparable from external, and cannot be understood without it. The organised being, in fact, is not self-sufficient, and it only exists by means of the medium in which it lives. Nature, then, would have done an absurd thing if, in preparing an organism, it had not, at the same time, prepared besides the means necessary for that organism to subsist."¹

¹ P. 157.

But is he not here inverting the process? Nature did not prepare grass *for* herbivorous cattle, nor did she develop herbivorous cattle *for* the carnivora. Every organism was, of course, independent of all others that came into existence after it, as they entered the world in an ever-ascending scale; though each one is *now* dependent upon some other or others if regarded in the reverse order. Thus the lamb was not made for the wolf, but the wolf's teeth have been secured to it as the best adapted for tearing flesh of some kind. Teeth are an internal finality, but the lamb cannot be regarded as external finality for the teeth.

The oak-gall produced specially by and for the cynips would seem to be a much better case of external finality; or again, the honey of flowers for insects. Organic internal finality is the result of adaptation to the environment, but the environment cannot adapt itself to the organism.

The eleventh chapter is devoted to the consideration of various forms of objections which the author describes with his usual acumen. He shows, for example, that when Descartes objects because, as he says, we cannot find out God's ends, he confounds *absolute* with *relative* ends. The former, he observes, may well be beyond our reach, but the latter are matters for investigation, and come within the region of experience.

The objection of Maupertuis, quoted as follows by M. Janet, is based upon *the conditions of existence*, and, is singularly like Darwinism: "Might it not be said," he writes, "that in the fortuitous combination of the productions of Nature, as it was only those in which certain relations of convenience were found that could exist, it is not wonderful that this convenience is found in all the species that actually exist? Chance, it might be said,

had produced an innumerable multitude of individuals ; a small number were found constructed so that the parts of the animal could satisfy their wants ; in an infinitely greater number there was neither convenience nor order ; all these last have perished.

“This hypothesis of a groping of Nature, and of a period of disordered parturition, said to have preceded rational productions such as we see them now, is contrary to all that we know of the processes of Nature. No trace subsists of this period of chaos, and everything leads to the belief that, if Nature had begun by chaos, it would never have come out of it.”¹

His idea appears to have been general in ancient cosmogonies, that as long as a chaotic state of things existed, nothing but monstrous beings could be or were produced. Hence, the strange beings described by Berossos : “There was a time in which all was darkness and water, and in these were generated monstrous creatures having mixed forms. Men were born with two and some with four wings, bulls were produced having human heads, and dogs with four bodies having fishes’ tails . . . and horses with dogs’ heads, and other creatures having the shape of all sorts of beasts,” etc.²

But this is only a concrete ideal representation of a fundamental conception, that *order* is incompatible with chaos or chance, *i.e.*, the undesigned and undirected clashing of Nature’s forces. And although expressed in so quaint a form, it undeniably involves a great truth, which was early grasped by the mind of man.

¹ Pp. 205, 206.

² Quoted from Max Müller’s *Lectures on the Science of Religion*, p. 50. See also Sayce’s *The Religions of Ancient Egypt and Babylonia*, p. 377.

Darwinism is essentially a similar theory, though in a very different dress. The reader will detect a similar ring in the following tones: "Of tens and hundreds of thousands of intermediate forms we know nothing by direct observation. They have perished as better fitted forms ousted them in the never-ending conflict."¹

The *idea* underlying these words is closely akin to that of Berossos—*viz.*, "intermediate forms unfitted to survive".

The Planetary system furnishes another illustration, and seems ever to have been taken as indicating order. The following is from the fifth tablet of the Cosmogony discovered by Mr. G. Smith. In the sixth and seventh lines we read—

He marked the positions of the wandering stars to shine in their courses,
That they may not do injury and may not trouble any one.

Just as chaos and disorder, or their spiritual representative, the great dragon of the sea, are considered as the source of evil, so where *order* reigns no harm follows. Psalm cxxi. 6, 7, has a somewhat similar idea—"The sun shall not smite thee by day, nor the moon by night. The Lord shall preserve thee from evil; He shall preserve thy soul".

It seems to me that the same problem is offered both by chaos and by Darwinism—namely, How can order and admirable adjustment issue out of either chaos on the one hand, or out of innumerable chance variations on the other? If, however, we recognise in protoplasm (as we must) a power of development in conformity or in adaptation to a changeable environment, *the change in the right direction being set up by the environment*, then the difficulty of the "tens or hundreds of thousands of

¹ *Degeneration*, by E. Ray Lankester, p. 17.

intermediate forms" vanishes; for they were but the creation of the brain—not of Nature.

And we may carry the problem further back, and observe with M. Janet that, "It still remains to explain how a conflict of forces can, at a given moment, have brought about a result so complicated, and requiring so appropriate a mechanism as life".¹ "Everything leads to the belief that if Nature had begun by chaos, it would never have come out of it."²

M. Janet does not seem to be a palæontologist, or probably he would not have misunderstood the expression that "fossils are embryos of actual species," or have said of Aristotle's remark—"the animal is an unfinished man"—"as a metaphorical and hyperbolic expression, this is an admirable thought; as an exact theory, it is very disputable."³ Every naturalist will recognise the author's difficulty, which leads him into false inferences; for he says: "No doubt the inferior species have imperfect forms in relation to the superior. It is better to have the wings of the bird than the flaps of reptiles; the brain of man than that of the oyster." Such is, however, *not better if taken alone*. With the conditions of life required by the oyster or the reptile, brains and wings respectively would be utterly useless and superfluous. He is more accurate when he says: "Every being that lives, being even thereby organised to live, be that life humble or powerful, contains relations of finality and design [?]; between this being, however humble, and a purely fortuitous product, a freak of Nature, there is already an abyss, and the latter can never have served as a transition to the former. In the polyp I see finality as well as in the vertebrates, and the tentacles by which it seizes its

¹ P. 207.

² P. 206.

³ P. 209.

prey are as appropriate to their use as the claws of the tiger or the hand of man.”¹

M. Janet next considers Spinoza's objections. The latter “explains the belief in final causes as he explains the belief in liberty—*i.e.*, by ignorance of causes. When we act without knowing what determines us to act, we think ourselves the masters of our actions, and we say that we act freely. So when we do not know how Nature acts, we suppose that it acts voluntarily, and in order to be useful to us.”²

No doubt an enormous percentage of our acts are automatic, as I shall show in the second part of this work, even though we should know—*if we thought about them*—the cause, in many instances; yet we do these acts spontaneously. But—and this appears to me to lie at the root of so-called free will—we *can make any motive an object of thought*; and so far as we do so, we are *not* ignorant of the cause, as in all cases of deliberate choice. A selection between two acts may be purely automatic, and we may call it unconscious natural selection, and we act purely and simply in obedience to the strongest motive and we are then automata. But we *can* bring motives to bear upon the question by a determined reflection, and not merely through automatic memory. We then make the selection *an object of deliberate thought*. This is volition, or free will.

Conscious of this, we can, by analogy, infer it in finality.

Spinoza's objection, moreover, would prove too much, for, as M. Janet observes, “There are thousands of phenomena whose causes are unknown, and which are by no means, therefore, given as examples of finality, such as showers of meteors, volcanoes, etc.”.

¹P. 209.

²P. 211.

The author next notices M. Littré's objection to finality. "The property of accommodating itself to ends,"¹ to which I have already alluded. . . . "In another writing M. Littré had opposed with eloquent vivacity the *vis medicatrix* of the school of Hippocrates. Wherein is it more absurd to admit in matter the property of healing itself than the property of adjusting itself to ends?"²

As long as we merely investigate the structure of organised matter—say, protoplasm, which certainly "does exist,"—and record our observations upon *what it can do*, apart from all considerations of finality, it is impossible to escape from either the *vis medicatrix*, or some equivalent expression or from M. Littré's "property of adjusting;" for we find a seemingly homogeneous mass of jelly capable of secreting the most beautifully symmetrical shells conceivable, as in the case of the *Radiolaria*, *Diatomaceæ*, and others; and when we contemplate a complicated organism, such as one of the vertebrates, it is simply a highly differentiated mass of protoplasm; every atom of which has furnished its individual quota towards the complex structure of the whole. As the whole is an organism adjusted to its environment in all its organs, so are its organs, and so on till we have dissected out its ultimate elements of cells and fibres, and come at last to the physical basis of life itself. Nothing is more remarkable in the analogy between Nature's organism and man's works, than that whereas the latter cannot spontaneously repair an injury, the former can; hence the final question of M. Janet seems singularly inappropriate; for it is just the property of healing itself residing in a living organism—at least in the animal kingdom—that stands out as

¹ P. 221.² P. 222.

so complete a contrast to the powerlessness of human works of art to repair an injury.

Rudimentary organs, so abundant in Nature including man himself, difficult as they are to reconcile with any argument of direct design, are discussed by M. Janet with ability, and are considered by him as affording no objection to finality—rather the reverse; for they were of use formerly, but have become rudimentary through disuse, other uses having superseded them. “Nothing conforms more to the theory of finality than the gradual disappearance of useless complications.”

Lastly, the production of monsters calls for some attention as bearing upon finality.

The existence of monsters raises no great problem when we consider the *relatively perfect state* in which every organism finds its existence to be; or what I have called “Inideality” (see Part II, Chap. X).

Were every environment absolutely and perfectly adapted to a being's welfare, and were every condition for the development of a perfect being secured to the parents, then monsters would be impossible. Since, however, under existing circumstances, such a Utopian idea cannot be realised, monsters and abnormal growths of all kinds, as well as diseases, are simply the outcome of the clash of accidentally conflicting forces. They are “errors of Nature,” caused, as M. Janet observes, “by the predominance of the laws of Nature in general over the interests of living Nature”. This was Plato's view, and Aristotle explained evil in the same way. And if men would but clearly distinguish between moral evil (*i.e.*, *conscious* abuse of Nature's laws) and physical evil (*i.e.*, the production of effects which man—chiefly—dislikes), there would not have been so many attempts to prove a separate author of “evil” from that of “good” in the world.

In the second book the author addresses himself to solve the question whether there is a First Cause of finality. Finality being a law of Nature, what is the first cause of that law? The reply has ever been, Intelligence. Is this conclusion legitimate?

The old teleological argument has ever been met by the Epicurean view of chances. Atoms have an eternal motion; their fortuitous concourses must have already exhausted infinite combinations, so that the one which now exists is simply one of them. But this theory requires *infinite time* for its accomplishment, and the most modern views of the period spent in elaborating the universe from nebulous matter still make it finite. But, further, we are told that the existence of such combinations of atoms fortuitously, as exist, is possible, *because it is*. This is obviously to beg the whole question, for the theory assumes that the universe is possible without an intelligent cause. M. Janet justly remarks, "This picture is possible, because it is; it has, therefore, had no painter," is just as logical. Logical possibility and real possibility are confounded.

The whole argument is, however, antiquated, and so may be dismissed. The modern form of the objection is that raised by Kant and other metaphysicians, who point out that the argument of analogy cannot do more than suggest an *Architect*, but not a *Creator*. It cannot rise beyond suggesting a relatively wise, skilful, or powerful cause, but not an absolute one. This, however, implies, observes M. Janet, that only the form of things is contingent, and that *matter* is not so. "If matter is not contingent, that means that it is necessary,—it exists of itself, it has in itself the reason of its existence; . . . for the same reason we must suppose the cause that gives the form to be necessary on the same ground as

the matter itself, and that it is self-existent. How, in short, can it be admitted that a non-necessary cause would have the power to act on a necessary matter and to give it orders? . . . The *processus in infinitum* would here avail nothing, for by hypothesis the matter supposed necessary is also a last term; therefore, on the other hand, the cause must likewise be a last term.”¹

This argument strikes one as irrefragable, and the conclusion is obvious, that the organising cause of the world is a cause of itself or an Absolute Cause.

Kant's second objection falls with the first, namely, that “from a contingent world we cannot rise to an absolute cause”. “But the first objection,” says our author, “by the hypothesis of a pre-existent—that is, necessary—matter, furnishes the material of the absolute idea of which I have need. If the first cause is absolute, it will be so in all its attributes: being by hypothesis intelligent, it will be omniscient; being powerful, it will be omnipotent; being good, it will be perfectly good, and so on.”²

These two objections of Kant, however, do not touch the very essence of the argument, that Law and Order imply Intelligence.

Three solutions have been offered to account for the existence of finality: the hypothesis of *subjective* finality, that of *immanent*, and that of *unconscious* finality.

The first is the doctrine of Kant, and M. Janet fully admits “that there is something subjective in this doctrine, namely, the part that is insusceptible of demonstration and verification, and also the unknown part that goes on always increasing in proportion as we approach the very source of the creative activity. But then, again, the

¹ P. 335.

² P. 336.

same doctrine is objective where it represents facts ; it is real on the same ground as all induction that rises from what is seen to what is not seen".¹

That finality is *internal* or *immanent* is perfectly admissible, " but this *relative immanence* of natural finality does not imply an *absolute immanence*, and, on the contrary, can only be comprehended by its relation to a transcendent terminus. These two difficulties overcome, we are now face to face with the true problem : Is the supreme cause of finality an intelligent cause—a *Mind*? This will be the object of our last inquiries."²

Hegel says that finality is not merely immanent, it is *unconscious*. A striking illustration of unconscious finality is seen in the instincts of animals ; which will be sufficiently discussed hereafter.

An unconscious finality, says Frauenstadt, is no contradiction of terms, just as " the Aristotelian opposition between the efficient and final cause is in no way identical with the opposition between the unconscious and the intelligent cause. For the final cause itself may be unconscious."³

" To attribute to Nature an *instinctive* activity is to say that Nature acts like bees and the ant in place of acting like man ; it is *zoomorphism* substituted for *anthropomorphism*. We see no advantage in it.

" In fact, the true difficulty, the profound difficulty, in this question is that we can only explain the creative activity of Nature by comparing it to something that is in Nature itself—that is to say, which is precisely one of the effects of that activity. . . . The true difficulty evidently applies to the hypothesis of a primitive instinct quite as well as to that of a primitive intelligence."⁴

¹ Pp. 352, 353.

² P. 375.

³ P. 377.

⁴ P. 379.

Still we have not reached the primary activity yet ; the source, perhaps common, both of instinct in animals and intelligence in man. M. Janet says that what is called Inspiration perhaps comes nearest to our conception of a creative intelligence, or the inventing at once both the means and the end, by a single thought, in which foresight may be regarded as identical with immediate conception ; as, for example, the entire air dominates the very first notes of a musical composition. M. Janet considers the products of a genius as vastly superior to the unconscious products of instinct. He says, " The soul inspired by sentiment is not a blind activity. It is conscious of itself ; it has a vivid and profound intuition of its end ; it is quite full of it ; and it is precisely this vivid sentiment of the end that evokes in it its own realisation. Instinct, on the other hand, not only is ignorant of the means, but of the end." ¹

Is not our author here adducing what is *accidental* to man as grounds for regarding genius as essentially and *per se* intelligent? I cannot help thinking that M. Janet does not attribute enough to the wonderful powers of the automatic properties of the brain. " Calculating boys " can give no *rationale* of the marvellous feats performed by their own brains. A half-idiotic person may be an extraordinary musical performer, like the negro, " Blind Tom," who used to play in public some fifty years ago. Remarkable powers of improvisation are perfectly spontaneous and automatic, often enkindled by artificial means, which specially excite the automatic action of the brain. It would seem very difficult to separate flights of genius from automatism, when we put aside the *consciousness* of man and his powers, and

¹ P. 394.

the *knowledge* that he can cultivate and improve those powers. It was pure automatism that led Mozart, when four years old, to compose a piece of music far too difficult to be played, but perfectly correct in harmony.¹

While, therefore, I should lay less stress on man's genius than M. Janet does as implying great intelligence, I would see in it the highest concrete manifestation of the infinite genius of the Immanent Worker of Nature, so that whereas different forms and varieties of genius are exhibited in different men, I would regard them collectively as the common characteristics of the *Power* which underlies Nature itself, and which thus shines through those favoured human beings whom we call geniuses.

"Then, what of Intelligence? This is not identical with genius. Perhaps one definition of intelligence is the power to distinguish *means* from *ends*, and thus to prepare the means with the view of accomplishing the ends. Thus, intelligence is distinct from *tendencies*. Hunger, for instance, is a tendency. It is not the same thing as the industry that finds food."² But both are really equally automatic, and I do not see that our author clears up the difficulty when he asks finally: "Is there not something that represents what we should call foresight, if the divine act were translated into human language? This is the question."³ After discussing the nature of human foresight trammelled by accident, M. Janet compares it with God's "foresight," which means complete vision of present and future at once, as "the act that perceives the end, and the act that distinguishes the means".

"Thus, the doctrine of the *Noûs*, or of intentional finality, has for us no other meaning than this—that intelli-

¹ I quote the story from memory, not remembering where I read it.

² P. 408.

³ P. 410.

gence is the highest and most approximate cause we can conceive of a world of order.”¹

“The doctrine of final causes, however, cannot escape, as it would seem, a final problem. If each of the things of the universe, taken separately, has been produced for another, for what, and to what end, have they, taken together, been made?”² To be brief, the sole explanation is in the doctrine of Divine Love. “It is by goodness that Plato, as well as Christianity, explains the production of things.”³ Knowledge is not the absolute end of the universe; but, as Kant says, the end is found in morality or a Moral Being—*i.e.*, Man. “The end of Nature is, therefore, to realise in itself the absolute as far as possible, or, if you will, it is to render possible the realisation of the absolute in the world. This is brought about by morality. . . . Morality is, therefore, at once the accomplishment and the ultimate proof of the law of finality.”⁴ Man is the *only moral being* upon earth. All others are *non-moral*.

¹ P. 415.

² P. 443.

³ P. 447.

⁴ P. 455.

APPENDIX TO PART I

DARWINISM

I

DARWINISM BASED ON ERRONEOUS ASSUMPTIONS

THE first thing to do, now, appears to be to show that this assumed basis of modern Rationalism, Materialism or Materialistic Monism is a fictitious one.

“Darwinism” is the name given to Darwin’s *theory*, expressed or defined by the title of his book, *The Origin of Species by means of Natural Selection*. It must be carefully distinguished from “Evolution,” which is often spoken of as “Darwin’s Theory”.

Evolution is a thoroughly established *fact*, based on the strongest inductive evidence, as well as proved by an abundance of experimental verification.

Darwinism is a *theory* or hypothesis to account for it. It is an *imaginary process* to account for Evolution.

When Darwin propounded his theory, he gave us an alternative; but having his mind so concentrated upon “Natural Selection,” he did not then see that the evidence for his second one was at all sufficient.

It is this alternative which I propose to call the “True

Darwinism,"¹ and is rapidly gaining ground among observers, especially, perhaps, in France and the United States.

Let us consider what really takes place in Nature.

As long as animals and plants live for generations under the same conditions of life their forms are constant, allowing for trivial individual differences, which supply no basis for classification. But when they migrate and their offspring grow up under a new set of conditions, markedly different from those formerly surrounding the species, Darwin supposed that the new conditions stimulated the latent variability (or innate capacity for varying) and that as they grew up to the adult stage, they varied "indefinitely," some variations being indifferent, others useless or even injurious; while a few only, *perchance*, varied in such a way as to be slightly beneficial. These alone, he said, would survive, and all the others die before reaching maturity. That imaginary process he called "Natural Selection," with the "Survival of the Fittest". Then by the accumulation of favourable slight variations a new "species" would be established after many generations; but it must be carefully observed that there is *no Natural Law* connecting such chance favourable variations with the requirements of the organism under the new conditions of life.

No evidence has ever been forthcoming from Nature in support of this theory of "the Origin of Species by means of Natural Selection".

The difficulty of accidental variations being sufficient has been observed by many. Weismann asks how we can account for "the occurrence of the right variations at the right place?" How is it that "the useful variations were always present, or that they always existed in a sufficiently large number of indi-

¹ It has already acquired a name in botany, *viz.*, "Ecology" (or Oecology, as some prefer it), *i.e.*, "the study of the homes" of plants, including their adaptive structures to their environments, respectively. The latest work is Dr. Schimper's *Plant Geography on a Physiological Basis*.

viduals for the selective process?" . . . "Something is still wanting to the selection of Darwin and Wallace."¹

Prof. Cope said—"The survival of the fittest does not explain the origin of species until we explain 'the origin of the fittest?'" Asa Gray assumed that the variations must be "led along certain beneficial lines".²

Dr. G. Fk. Wright observes: "The difficult question for those who deny any purposive element at the bottom of organic evolution is how to secure the complicated co-ordination of results involved in the development of any decidedly advantageous anatomical variations".³

Now the following is Darwin's alternative process: "By the term 'Definite Action' I mean that when many individuals of the same variety are exposed to any change in their physical conditions of life, all or nearly all the individuals are modified in the same manner. A new sub-variety would thus be produced without the aid of Natural Selection."⁴

Many observers soon discovered that the evidence of "definite action" was abundant. It was ultimately seen that such represented a *Natural Law*, viz., that *the organism responded directly to the environment*, and so grew up in harmony with it, *all* the offspring of any species thus *varying alike* in adaptation. None died through want of it.

It may be added that it is perfectly true that "the struggle for life," "natural selection" and the "survival of the fittest" occur *everywhere* in Nature. These things, however, are concerned with the *Distribution* of organisms. They account for the presence or absence of species in any given area; but *they have nothing to do with their origins, as these are based on structure alone.*

It is a common mistake to suppose that Natural Selection is still required even if it be admitted that plants and animals can grow in response to the environment; so that *all* the

¹ *Monist*, 1896, pp. 261, 263, 264.

² *Darwiniana*.

³ *Scientific Aspects of Christian Evidences*, p. 94.

⁴ *Animals and Plants under Domestication*, ii., p. 271.

individual offspring are in adaptation to the new conditions of life, "without the aid of Natural Selection," as Darwin says.

Thus Büchner writes: "There seems to be no fundamental opposition between Darwinism and Neo-Lamarckism, and one may rather be considered as the complement of the other".¹

Dr. Vernon, who accepts hereditary variations which have arisen from direct action on the *soma*—*i.e.*, the vegetative system in plants and the bodies of animals, asks: "Are we to agree with Henslow that the close adaptation of plants to their environment is due entirely to the responsive power of protoplasm to the external environmental forces, and that it is absolutely unnecessary to call in the aid of Natural Selection? By no means. Adaptive variation may be responsible for a good deal of the adaptation observed in plants, and for a very small part of that observed in animals, but probably [why?] in each case by far the larger portion must be ascribed to the ever-present and ever-acting agency of Natural Selection."²

This author does not perceive that when *all* the offspring vary alike under the *definite* action of the environment there are *no* variations for Natural Selection to select from. Hence Darwin says, "a new sub-variety will be formed *without* the aid of Natural Selection". That is, so far as a new variety is concerned. Still, out of, say, 100 seedlings, though they all vary alike, 95 may perish from various causes, but they have nothing to do with the production of the variation. The mistake is due to the fact that he does not distinguish between Natural Selection as supposed to weed out all the imaginary individuals less fitted in *structure* (*i.e.*, *Darwinism*), and Natural Selection as being concerned with those individuals which are unable to withstand the struggle from various reasons, but *altogether irrespective of structure*.

Natural Selection is always present, wherever some die and

¹ *Last Words on Materialism*, p. 194.

² *Variation in Animals and Plants* (Int. Sci. Ser.), p 391.

others live, but has nothing to do with *structure* when it is concerned with *the origination of new varietal characters*. This was evidently perfectly clear to Darwin himself, for he more than once insists upon the fact that "Definite Variations" have nothing to do with Natural Selection or *vice versa*.

Having stated the case thus briefly with regard to the present position of Darwinism, it will be as well to discuss the question more fully in order to show how the materialistic reasoning of Haeckel found a basis in Darwin's theory of Natural Selection.

M. Leon A. Dumont published an interesting *résumé* of Haeckel's *Natural History of Creation* in 1873, entitled *Haeckel et la Théorie de l'Évolution en Allemagne*, in which he observes that of all countries Darwinism was best received in Germany; for it appealed more than any other to the pantheistic aspirations of that country. Not only did it apply to natural science, but one tried to extend it to most diverse facts—languages, formation of intellectual faculties, politics, morals, history and the theory of progress. Indeed, Darwinism and its applications gave birth to an entire literature. Thus, Schleicher, a distinguished professor of languages in the University of Jena, who had already, before Darwin, taught the theory of Evolution, explained by Natural Selection, as soon as it was known to him, the development of languages.

A little reflection, however, will show that the "struggle for existence" with "Natural Selection" has nothing to do with the changes in words. Philologists invented the word "Brachylogy" (Short-speech) to express the *cause* of changes. For whatever happens to be the easier to pronounce takes the place of what is less easy. It is for this reason that the initial aspirate *h* has vanished from most words in French which commence with it. In England, however, though it is often dropped in some places, as London, it is not yet recognised as correct not to pronounce it. Spelling is much slower in following suit. Ruthven is pronounced "Rivven," Cholmondeley, "Chumley," etc., but there is nothing of the nature of a struggle for exist-

ence about it. Similarly hour (aspirated) is easier to say than *Hora*, and 'our becomes easier still. So *Dies Dominica* has been welded into Dimanche. Why some nations find it easier to say *b* for *p*, *d* for *t*, and *g* for *ch* (hard) *q* or *k*, it is difficult to say; but such is the case. Thus what a Frenchman calls *boutique*, a German pronounces *apotheke*, and a Spaniard *bodega*. Each has found what is easiest for himself to pronounce; but there was no struggle for existence between these three words in as many countries, not to add the English *apothecary*.

Letters get transposed if it be found easier to pronounce the word with the vowels in a different order. Thus Curaçao and Cacao have become Curaçoa and Cocoa; having changed both in spelling and pronunciation.

Nor has Natural Selection got anything to do with the origin of new words, idioms, etc. They arise automatically or are invented as the want is felt. Once in a way an alternative is proposed, and while one stays the other disappears. Thus the words "telegram" and "telegrapheme" were both suggested when the telegraph was first employed. The latter may be more correct etymologically, but the shorter word was quickly adopted. "Wireless telegram" of five syllables is being subjected to the same process to-day, and will probably yield to "Marconigram" of four.

A new meaning is often added to an old word. Thus several Greek words acquired new meanings under Christianity. Ἀγάπη is the word in the LXX, in the Song of Solomon, as the love of lovers for each other. In the Christian dispensation, it became Brotherly Love and human reverence for God.

Evolution, *per se*, undoubtedly may be applicable to the origin of languages; but Darwinism is not. New words, changes of old ones, different pronunciations, etc., all arise as "definite variations" *in adaptation to new circumstances* when old ones become obsolete and disappear; so that whole languages, like whole families of animals and plants, become extinct in the course of ages. Natural Selection may be called the descriptive phrase of *that* process; but it has nothing to do

with the *origin of the changes*, which give rise to new languages, animals and plants, and does not act as "means" in the process.

The conception of Evolution was impressed upon Darwin's mind by his numerous observations made during his voyage round the world; but his theory of Natural Selection as affording *the means*, for the Origin of Species was suggested by Malthus' *Essay upon the Principle of Population* (1798). "It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms."¹ Darwin, however, introduced an element which Malthus had nothing to do with, namely, *variations in the structure of organisms*.

According to Malthus, population tends to increase by geometrical progression, while the quantity of the means of subsistence is more or less in accordance with an arithmetical one. It is not clear on what grounds this is based. Man being an organism like other animals, he and they as well as plants must follow the same laws; and taking wheat as an important food, it certainly increases by very high geometrical ratios: they may be thirty- sixty- or a hundred-fold. His theory might be true in a limited area, and when no foreign supply of food is accessible.

Moreover, as populations increase, more of Nature's waste lands can be brought under cultivation, as we are now doing in Egypt, and doubtless shall do in South Africa by irrigation.

But the question of the Evolution of Species is not solely concerned with the fact that more animals and plants are born annually than the world can provide for, so that many *must* die or the world would be overstocked. This would be the sole matter for consideration, if offspring were always like their parents; but Malthus did not consider, and Darwin had no grounds for inserting in his theory, anything to do with *new points of structure* in the offspring of organisms. It is upon *these alone* that *varieties* and *species* are based.

Hence, Darwin's theory of "the Origin of Species by

¹ *Origin of Species*, 6th ed., p. 50.

means of [indefinite variations of *structure* and] Natural Selection," is *not* "the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms. As many more individuals of each species are born than can possibly survive . . . it follows that any being, *if it vary however slightly in any manner profitable to itself*, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance any selected variety will tend to propagate its new and modified form."¹

I have italicised the unwarranted intercalation into Malthus' theory.

The mistake Darwin here makes is to suppose that life and death depend upon slight changes of *Structure*; whereas they are far more concerned with *constitution*, which has nothing to do with the origination of changes of *Form*.

In the case of plants growing thickly together, the strongest plants survive by crowding out the weaker.

Darwin very often alludes incidentally to "constitution," as a factor in the struggle for life; but it has nothing to do with the origin of new "variations of structure," upon which *alone* new varieties are formed. I must repeat this, to make it emphatic.

Of course, if it could be proved that new variations of structure and form are in any way or always in correlation with an enhanced vigorous constitution, there might be a shadow of support to his theory; but there is nothing to say for such correlation as necessarily occurring. Hence, Darwin's application of Malthus' theory to *variations* is an illegitimate one; for it will in no way account for them: nor when they arise does it explain why they should survive. The transferring the struggle for life from the *constitution* to *variation* is an illegitimate procedure.

Now let us see what Darwin has to say about Natural Selection. I have mentioned that as long as animals and

¹ *Origin of Species*, p. 3.

plants live under precisely the same conditions of life, respectively, they show no signs of changing. They only exhibit trivial individual, mostly inconstant differences, of which no systematist takes any notice. Though it was upon these that Darwin laid stress.

He thus wrote: "No one supposes that all the individuals of the same species are cast in the same actual mould. These individual differences are of the highest importance for us, for they are often inherited . . . and they afford materials for Natural Selection to act on and accumulate."¹

"Let it be borne in mind how infinitely complex and close-fitting are the mutual relations of all organic beings to each other and to their physical conditions of life; and consequently what infinitely varied diversities of structure *might* be of use to each being under changing conditions of life. *Can it*, then, *be thought improbable*, seeing that variations useful to man have undoubtedly occurred, that other variations useful in some way to each being in the great and complex battle of life, *should* occur in the course of many successive generations? *If* such do occur *can we doubt* (remembering that many more individuals are born than can possibly survive) that individuals having any advantage, however slight, over others, *would have* the best chance of surviving and of procreating their kind? On the other hand, we may feel sure that any variation *in the least degree injurious would be* rigidly destroyed.

"This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest."²

Besides differing from Darwin as to cultivation and domestication affording any basis for comparison with wild plants and animals, Dr. Wallace does not accept these "individual differences" as means for originating species. He thus writes: "In securing the development of new forms in adaptation to

¹ *Origin of Species*, p. 34. I would refer the reader to my paper on "Individual Variations," in *Natural Science*, vol. vi., p. 385.

² *Origin of Species*, p. 623. The italics are mine.

the new environment, Natural Selection is supreme. Hence arises the real distinction, though we may not always be able to distinguish them, between specific and non-specific or developmental characters. The former are those definite though slight modifications through which each new species actually becomes adapted to its changed environment. They are, therefore, in their very nature, useful. The latter [*i.e.*, individual differences] are due to the laws which determine the growth and development of the organism, and, therefore, rarely coincide exactly with the limits of a species.”¹

Now, the first thing which strikes the reader is the extremely hypothetical style of the whole of this passage on Natural Selection, as shown by the words I have italicised. After having collected thousands of facts, published in the two large volumes, *Animals and Plants Under Domestication* (upon which the *Origin of Species* was based) it seems somewhat curious that Darwin could not write more confidently than he has here done.

Moreover, there is another fallacy lurking behind unseen. At what period of life does the struggle for existence mostly take place? It is *during the growth to maturity*. If the offspring do grow to maturity, so as to be able to propagate, they are *ipso facto* naturally selected. If they do not, but perish prematurely, death takes place *before* any important variation has arisen; as, for example, in the flowers and fruits of plants; since specific characters are not looked for, nor based by systematic botanists and zoologists on *immature features*, which may change or be lost before the fixed adult stage is reached.

It is worth while considering this important point somewhat fully.

Specific and still more generic characters, I repeat, are, as a rule, taken from the *flowers* and *fruits*, much more than from the vegetative organs.

The struggle for existence takes place mainly amongst seedlings; for if an annual can succeed in flowering, or a

¹ *Fortnightly Review*, March, 1895, p. 444.

biennial and still more a perennial, which may not blossom for several years, as trees, then such will obviously have survived in the struggle for existence.

Darwinism asserts that specific characters (taken from the flowers and fruit, for example) are secured by Natural Selection weeding out less favourable varieties and intermediate forms. The problem then is this :—

How is it that characters which as yet do not exist [*i.e.*, in seedlings before they blossom] can be an important, if not the main, agent in selecting the species?

The struggle is amongst the young seedlings of the same species competing with one another whenever a large number are scattered within a limited area ; or they are struggling with the seedlings or adults of other species or genera. In any case the particular morphological characters on which the species is founded, *are not formed* till long after the struggle has practically ceased to exist. For if a plant is able to produce its flowers and seeds, as stated, it has proved itself fit to survive.

Hence, this survival has obviously nothing to do with the morphological peculiarities of its flowers or fruit, upon which its varietal, specific or generic characters depend.

It must be distinctly remembered that if a plant succeed in producing its flowers and fruit, its “end” in life has thereby been secured. If it die before it produces flowers and fruits, then, it cannot be said that its death was due to any less adapted or less complex character of its flowers or fruit, by which its specific characters were known ; for they were not in existence.

The conclusion from this logical analysis seems inevitable that the Origin of Species cannot be aided by, much less due to, Natural Selection.

However different their flowers and fruits may be, various seedlings are often well-nigh indistinguishable in form. Even as adults it is often impossible to tell one species or even genus from another, as among grasses, without the flowers or fruit. Hence it may be recognised as a truth, that when the struggle

obtains, it is mainly during the early period of life and long *before* the principal specific or generic characters are formed at all.

We come then to the question, Why do some seedlings survive and others do not when they struggle together? It appears simply to be due to a more vigorous constitution. Assuming an entire absence of all mechanical injuries or of parasites, etc., and that a batch of seeds are all equally healthy, there are seemingly but two causes for a relatively less vigorous constitution. One, when the embryo has been accidentally less provided with reserve food materials in the seed. The second is, where there happens to be less external available nourishment or something prejudicial in its environment superadded.

Here, then, we may recognise a true basis for Natural Selection; and so limit it to its legitimate sphere of action.

But it has nothing to do with the origin of *morphological structures*, upon which specific characters are based.

It has been said: "If we ask for the actual observations of the process of Natural Selection on which the Darwinian theory is based, we find what appear to be very slender foundations of fact for a very large superstructure. There are the experiences of the breeder, and very little more. The real *data* which support the weight of the theory consist in the nature of the actual products which the process is assumed to explain—the actual constitution of animal and vegetable species in their higher and lower forms."¹

In other words, *assume* Darwinism to be true, then, everything follows; just as all *a priori* assumptions satisfy the thinkers, that they have the exact clue, cause and interpretation of any problems in question.

I had not intended writing anything more on Darwin's

¹ Stout's *Manual of Psychology*, p. 17. I would here refer the reader to my reply to Dr. Wallace's criticisms, entitled, "The Origin of Species without the Aid of Natural Selection," *Natural Science*, vol. v., p. 257, 1891; and also to "Does Natural Selection play any part in the Origin of Species of Plants?" *Natural Science*, vol. xi., p. 166.

mistake in basing his theory upon "Individual Differences"; but Dr. Vernon's new book having just appeared, it becomes necessary to show how he confirms, though it be quite unintentionally, the statement that individual differences do *not*, as a rule, help one to discover the origin of variations.

He commences his first chapter as follows: "If a number of individuals of any species be compared, it will be found that they all show differences from each other either in size, shape, colour, etc., . . . in fact, no two of them are exactly alike. . . . These differences constitute what is known as *Variation*, and it is into the facts of this variation, and its importance as the corner-stone of the whole fabric of Evolution, that we shall briefly inquire in the following pages."

Dr. Vernon proceeds to give us illustrations of the many results of observers who represent individual differences by mathematical curves.

Similar curves can be made from shots at a target; since no organ of a plant or animal ever grows absolutely like another, no two leaves are alike, because there is always an inequality in the forces of growth, the amount of food supply, etc., etc.

Hence Wallace is right in saying that "they rarely come within the limits of a species".

These observers of numerical statistics seem to have in some cases overlooked *two* fundamental conditions for *variations* in a true, classificatory sense of the word; *viz.*, *changed conditions of life* or the nature of the environment, and *hereditary constancy*.

There is no use in collecting hundreds or thousands of animals, such as crabs, shrimps, etc., or heads of daisies, marigolds, etc., all coming, respectively from *the same locality*.

No systematist takes any notice of individual differences; because they are *too slight* and *too inconstant*.

Variations which systematists can only recognise *must* have more pronounced differences, and there *must* be hereditary constancy.

Dr. Vernon quotes several instances of the mathematical statistics of the parts of flowers giving maxima and minima. But they are just what a botanist would anticipate. In fact, I did so before studying the tables, because, knowing the origin of the normal number of parts in floral whorls, the maxima only mark off phyllotactical "cycles". Dr. Vernon makes no mention of phyllotaxis; I can only conclude, therefore, that he is not aware of the peculiarities of leaf-arrangements.

Thus, we are informed that Ludwig counted the number of pedicels or "rays" of the umbel of *Torilis Anthriscus* and de Vries the ray florets of *Chrysanthemum segetum*. In the former the maxima were 5, 8, 10 (= 2 × 5). In the latter, 13, 21, 26 (= 2 × 13), 34. In the case of the stigmatic rays of poppies, 13 is the maximum.

Now, these numbers do nothing more than indicate the prevailing phyllotactical cycles corresponding to the "angular divergencies" of the series:—

$$\frac{1}{2}, \frac{1}{3}, \frac{2}{5}, \frac{3}{8}, \frac{5}{13}, \frac{8}{21}, \text{etc.}$$

If the object of these investigations be a search for the Origin of Varieties, they will not afford much help, and generally none at all.¹

Since the above paragraph was written, a friend in Australia has communicated to me an interesting fact, which bears out the origin of variations by adaptation. He found the phyllotactical cycles of the Mediterranean species of marigold (*Calendula*) to be localised according to the nature of the environment. He has observed that the large orange *Calendula* has normally twenty-one ray florets; but near the sea it is preparing to develop a thirty-four-rayed form, many individuals having reached twenty-six (*i.e.*, 2 × 13). He adds that the point he wishes to bring out is that the number of ray-florets in different composites varies with their habitats. "Thus, the ox-eye daisy has generally twenty-one ray-florets at the level of Lake

¹ The reader is referred to *Biometrika* for other examples.

Como ; but at a height of 400-500 feet up the mountain side above Cernobbio a form is developed *during the height of the flowering season* with thirty-four rays, *reverting at the end of it* to the twenty-one-rayed type. On the Mount Resegone above Lecco, there is a still larger species, presumably with thirty-four or more rays, which being *called* a species, is, I suppose, more or less fixed, but I have not found it. At Taormina, where the extensive observations on *Calendula* were made, I think, at the end of them, if a batch of flowers gathered *in one spot* had been given me, I could have inferred the habitat, at all events approximately, by counting the rays."

This writer does not allude to the biometrical observations going on in Europe, but has studied them, independently, from the adaptive point of view ; *i.e.*, upon which I have urged the importance above.

The following, however, gives an illustration of an attempt to combine *locality* with *numerations*.

In a paper on the *Variation and Correlation in Lesser Celandine, from Divers Localities*,¹ the study of the table gave the following conclusions :—

" 1. Local races in plants cannot be defined or distinguished by the existence of differences many times the value of their probable errors between the means, variations or correlations.

" 2. The influences of environment and season are for plants of supreme importance and very widely or indeed entirely screen any differences due to local race."

As an example : While three sepals with eight petals were common in Dorsetshire ; five sepals with ten petals prevailed at Gais (Switzerland).

Again, selecting poppies from five different localities ; their different standards of deviation became apparent from 1'455 to 1'898 upon which Prof. Karl Pearson observes :—

" We have here illustration of how race, environment, selection, correspond to numerical differences in type and variability."

He also suggests that one should "count in some hundreds

¹ *Biometrika* ii., p. 144.

of individual cases the petals or florets of some simple wild flower, and observe the differences which occur when the group is taken from a field with one soil, aspect or altitude, and then from a second wherein all these things are changed.”¹

He here introduces the precise cause of variation which Darwin insists upon, or “changed conditions of life” with their “definite action”.

However, many of the “calculators” do not seem to have considered differences of locality at all or changes in the environment as important or necessary.

When such *are* observed, then Natural Selection, of course, is altogether a superfluity.

I will conclude this section with a summary of the false data upon which Darwinism is based.

1. The *intercalation* of *Structure* or *Form* into Malthus’ Theory of Natural Selection in humanity.

2. *Individual Differences* are not a source of variations, as a rule, the necessary “changed conditions of life” and “hereditary constancy” being mostly neglected by present mathematical observers.

3. The non-existence of *Indefinite* variations in Nature.

4. The assumption that death follows unfavourable variations in *form*.

5. The analogy between man’s extermination of forms he does not require, with a destruction in Nature through the struggle for existence. For man takes care that a selected being should have *no struggle at all*.

6. Any correlation between the *subsequent* appearances of varietal characters (say of flowers and fruits) months or years after the period when the struggle has taken place, *i.e.*, during infancy.

7. That “Natural Selection” can be regarded as an *agent* or as possessing any *power* to effect anything: since it might be called Nature’s registrar of births, deaths and survivals; but is unconcerned with the *cause* of any one of them.

¹ *The Grammar of Science*, p. 388.

II

THE TRUE DARWINISM OR THE NATURAL LAW OF ADAPTATION

BEFORE entering on this important matter I must beg the reader to dissociate my name altogether from what I here call the "True Darwinism". I have been so often credited with the theory of "Evolution by means of direct adaptation to the environment," that I wish here to insist upon the fact that it is *not I* but Darwin who is the original author of it.

In studying his books many years ago it seemed to me that it was more probably the true interpretation of Evolution than by means of Natural Selection. I therefore looked out for, and collected, all the evidence I could find among published writings, as well as made my own observations and experiments. It soon became apparent that proofs of "direct action," as Darwin calls it, were not only "plentiful," as he had discovered by 1876, but *universal*.

It was not, however, till long afterwards that were published my two volumes in the *International Scientific Series*, as well as several papers in the *Journal of the Linnean Society* and in *Natural Science*, etc.

No serious attempt has ever been made to refute this view, excepting one by Dr. Wallace in *Natural Science*, but more than one who did me the honour to read my "Reply" remarked that it was "crushing".¹

In 1876 Darwin came to regard his neglect of this alternative as his "greatest mistake". Those significant words satisfy

¹ *e.g.*, Dr. St. G. Mivart,
(161)

me that had he lived till to-day he would have seen that it is universally true, and his habitual candour would have led him to substitute Self-adaptation for Natural Selection.

It will be desirable now to enter more fully into this aspect of the question, for it has been abundantly shown by observers, especially in France and America, by following up the results of the direct action of the environment, that Lamarck's theory was fundamentally correct if a few aberrations be eliminated.

"The effects" [that is, of the conditions of life], writes Darwin, "are either 'definite' or 'indefinite'. They may be considered as definite when all or nearly all the offspring are modified in the same manner. Indefinite variability is a much more common result of changed conditions than definite variability".¹ In speaking elsewhere of Definite variation he said: "I will give in detail all the facts which I have been able to collect rendering it probable that climate, food, etc., have acted so definitely and powerfully on the organisation of our domesticated productions that they have sufficed to form new sub-varieties or races without the aid of selection by man or of Natural Selection".² Darwin then gives about thirty instances only, but many other cases occur incidentally in his books. In 1876 he had become convinced that "definite variation" was far commoner than he had supposed, for he thus wrote to Prof. Moritz Wagner, of Munich, in that year: "The greatest mistake I made was, I now think, that I did not attach sufficient weight to the direct influence of food, climate, etc., quite independently of Natural Selection. When I wrote my book [*The Origin of Species*, in 1859], and for some years later, I could not find a good proof of the direct action of the environment on the species. Such proofs are now plentiful."³

¹*Origin of Species*, p. 34. This last statement is quite contrary to what takes place in Nature.

²*Animals and Plants under Domestication*, vol. ii., p. 272, 1868; *cf. Origin of Species*, p. 107.

³Quoted by Büchner in *Last Words on Materialism*, p. 194. It is also in his *Life*, vol. iii., p. 159.

Of course they have always been plentiful, but his attention was not drawn to them ; yet, strange to say, it was due to the "direct action of the environment" that all our domesticated animals and cultivated varieties have arisen. As his mind ran on "Selection" he overlooked "Adaptation".

In discussing any question as to the origin of species the first question to ask is, What is a Species? Darwin himself did not define it, but rather left his readers to infer or draw their own conclusions as to what he meant by the term. The following, however, will answer the question as systematists regard it. A species is known by *a collection of relatively constant, morphological characters*. In the case of plants these may be taken from the forms of any or all of their organs, *i.e.*, roots, stems, leaves, flowers, fruits and seeds.

Whenever a plant is found to depart somewhat but constantly from the typical description of the species, in any one or more of its characters, such is called a "variety," and varieties, according to Darwin, are "incipient¹ species".

The second question to ask is, What causes organisms to vary? Most biologists appear to be agreed that the cause is, primarily at least, due to the environment taken in its widest sense. Thus, Dr. Weismann says: "We are driven to the conclusion that the ultimate origin of hereditary individual differences lies in the direct action of external influences upon the organism".² If the surroundings remain permanently the same then there is little or no inducement for the organism to change. Thus it has been noticed that the flowers found in wreaths in the Egyptian tombs are exactly like those of to-day,

¹ I doubt the correctness of this word. The difference between a "variety" and an allied "species" is one of degree, it is true, but the origin of both is due to the relative amount of the "direct action" of the environment together with the response to it. If this be comparatively slight a variety results ; but as long as it remains, generation after generation, under the same conditions it will not advance to acquire a *specific* form, but remains permanently a *variety*. Many such are recorded in Floras.

² *Essays on Heredity*, etc., Eng. trans., p. 279.

because the climate of Egypt has never altered. If seeds, however, be transferred to some quite new and different climatic conditions they are often found to vary very much as they grow to maturity. In agreement with this it has often been observed that most varieties are found on the confines of the geographical areas of any particular plants.

Hence is the discovery that organisms are mostly very plastic and possess "variability," *i.e.*, a capacity for varying which is incited into action by the direct influence of the environment.

Coupled with the power to vary from the characters of the parents, offspring always have a tendency to reproduce the parental form, so that they grow up under the two antagonistic influences, *viz.*, *atavism* or heredity, and *variability*.

In studying the variations of animals and plants under domestication, Darwin noticed that offspring *seemed* to vary "indefinitely," as he called it; that is to say, when a large number, say, of seedlings, are raised in a border, though the majority resemble the parent, several may differ more or less obviously from the parental type. If the raiser see one which he thinks will be of advantage to him, he will "select" this individual, either by removing all others from its neighbourhood and letting it grow by itself; or he removes the plant to a locality far away from the rest, so that no insects may cross it with pollen from others of the same species, but unlike the particular individual. This is called "artificial selection".

Now, it is the peculiarity of the artificially prepared soil of a garden with its variety of ingredients, to so stimulate the seed of a wild plant sown in it (which may never vary at all in Nature, as the cabbage), that its seedlings may grow up into several and differently constructed plants. Thus, to give two examples: M. Carrière¹ cultivated the wild radish, *Raphanus Raphanistrum*. In a few years he obtained the garden or "ameliorated" forms of root, and he found that by sowing

¹ *Origine des Plantes Domestiques démontrée par la Culture du Radis Sauvage.*

the seed in a light soil the long form prevailed, while in a stiff soil the turnip-rooted was predominant. Moreover, in five years he obtained a great variety: in the light soil only white and rose-coloured roots appeared; but elsewhere, besides violet and very dark or almost black, there were others, as he says, "de toutes les couleurs et de toutes les formes possibles".

The late Mr. Jas. Buckman,¹ Professor of Natural History at the Royal College of Agriculture, Cirencester, carried out similar experiments with cabbages, carrots and parsnips, commencing in the year 1847. In 1850 he had succeeded in raising three distinct types of parsnip from the seed of wild plants. He describes them as follows: (1) The round-topped, long-rooted form, resembling the Guernsey parsnip (*Panaïs long* of the French). (2) The hollow-crowned long-root; "Hollow-headed" of gardeners (*Panaïs Lisbonais* type). (3) The short, thick, turnip-shaped root, or "turnip-rooted" of gardeners (*Panaïs rond* form). He finally continued his experiments with the second only, which he called, "The Student". Messrs. Sutton & Sons on receiving seed from Prof. Buckman still further "improved" it, and it is now considered, after fifty years of cultivation, the best in the trade.

The differences presented by garden races are not strictly "varietal" as a rule, *i.e.*, in the sense which a systematic botanist would apply the term; but "individual differences," only *slightly exaggerated*, as compared with the fluctuating individual differences of wild plants.

Sir J. D. Hooker, for instance, in alluding to cabbages under *Brassica oleracea* in his *Student's Flora* calls them "Forms".

Mr. W. B. Scott, in a paper on "Variations and Mutations,"² observes: "Bateson's entire argument is founded upon the assumption that individual variations form the material out of which species are constructed, an assumption which has almost passed into an axiom".

¹ *Journ. Roy. Agric. Soc. of England*, vol. xv., pt. 1, p. 125, 1854.

² *Amer. Journ. Sci.*, 3rd ser., xlvi., 1894, p. 355.

Mr. Bateson's words are: "It is upon the fact of the existence of this phenomenon of variation that all inductive theories of Evolution have been based".¹

I have already quoted Wallace's opinion as opposed to this view of Bateson and Darwin. True varietal and specific differences are due to *more pronounced variations* in Nature than "individual differences" give rise to; and are induced to appear by changed conditions of life.

The exaggerated individual differences of cultivation do not occur in the wild state. The wild species of cabbage, parsnip, carrot, radish have no varieties; and if a systematic botanist found them wild, they would be still regarded as one species, respectively.

Beyond exaggerating the differences in such plants under cultivation, or evolving more pronounced differences in pigeons, Nature is not pursuing a new course totally different from her methods in the wild state. If instead of man interfering and selecting any he wants, suppose he left them to grow as they pleased, none of Buckman's forms of parsnip would have died and only one or two survive. They were all equally adapted to the changed conditions of life.

It is a false analogy to compare man's selection with Natural Selection; because *he* takes care there shall be *no struggle*, while Nature *makes* a struggle; the conditions are thus precisely the reverse, according to the theory; yet Nature knows no two methods of evolving new forms.

According to Darwinism, then, a number of seedlings of parsnip, carrot, radish, etc., *ought to die*, a few only surviving, but they refuse to do so. Every one of the forms would tend to form a race. Human selection has nothing to do with the *origin* of the forms, any one of which might have been chosen instead of another.

On the other hand, certain wild species of plants have developed several varieties in different places, as Blackberry, Rose, Hawkweed, Willow, Knotgrass, etc.

¹ *Materials for the Study of Variation*, p. 3.

But here lies a difference. In garden plants the seeds taken from *one* individual parent-plant may grow up into *several* different forms in the same garden. Thus an eminent agriculturist speaking of the great variability of wheat, said that one could almost raise a new variety from every grain in an ear! In Nature nothing of this has ever been observed; but the many varieties of the above-named plants, as recorded in our "Floras," are found scattered over the country, and are often known as "local varieties". Thus, Sir J. D. Hooker observes¹ of the innumerable forms of Hawkweed (*Hieracium*)—"variable as the genus is, the sequence of its forms is so natural as to have been recognised by all botanists. This sequence represents to a considerable extent the spread of the forms in altitude and area in the British Isles."

I will take another instance from Sir J. D. Hooker's *Student's Flora, viz.*, the Knotgrass (*Polygonum Aviculare*). Speaking of its varieties he refers them to their localities as follows: *P. Aviculare*, proper; *Var. P. littorale*, littoral, the passage to *P. maritimum*; *Var. agrestinum*, field form; *arenastrum*, sand-loving form; *microspermum*, small-fruited; *rurivagum*, a way-side one, sub-sp. *P. ROBERTI*; *Var. P. RAII*, sandy shores.

The simple interpretation of all these "forms" or "varieties," is that they have been evolved under and through the conditions of the particular localities in which they are found respectively.

While some genera would, therefore, seem to be endowed with a very active variability, quickly incited into action by local circumstances; others, like the daisy, bluebell, heath, plantains and grasses remain the same wherever they grow.

We do not know why some plants vary so greatly under cultivation and others do not; nor why some species have no varieties, while others have many in Nature. Such, however, are observed and well-known facts.

I would now emphasise more particularly the marked differences noticeable between variations under cultivation and

¹ *Student's Flora*, 3rd. ed., p. 232.

variations in Nature. There is no evidence to show that all the seeds of any individual plant, say of one season, when sown in a new, but all in the same, environment ever grow up with appearances markedly different from one another, as they often do when they are sown in a rich and artificially prepared soil of a garden. All experiments prove that if the seedlings vary at all, *they all vary alike* in the same locality; or as Darwin says, in the passage quoted, they vary, "definitely," *i.e.*, in direct adaptation to the conditions of their new surroundings.

Now when we turn to Nature, bearing this in mind, we seem to see a distinct cause and effect in the following facts. Not only do we find plants of one and the same kind to be all alike when growing under the same conditions; but a vast number of totally different kinds have strong points of resemblance in many ways, as long as they are all growing in the same environment; *i.e.*, their vegetative system assumes the same *facies*. Thus, if we turn to hot sub-tropical deserts we are at once struck with the general spinescence prevailing; and the dense clothing of hair giving a blue-grey appearance to nearly all the plants. Again, many plants growing by the sea-side or in salt marshes are fleshy, like the samphire.

Hence, it has long been noticed that plants growing in variously composed environments are correlated with a peculiar *facies*, respectively.

On observing the universality of these correlations between climate and form; or the environment and the structure of plants, one is led to infer—by inductive evidence based on numerous coincidences—that there must be some common cause to bring about these similar "adaptations" in so many different kinds of plants, but all of which are growing under the same conditions. I say "adaptations," because all those features which collectively conspire to make up the *facies* of the floras, are so many peculiarities of structure which enable the plants to live under the special conditions in which they find themselves. Thus a submerged leaf living naturally under water perishes

if brought above the surface ; similarly a leaf ordinarily fitted for living in air, soon perishes if kept under water ; but if either plant be allowed to develop its leaves from the leaf-bud stage in the medium, opposite in kind to its usual one, it may grow and adapt itself during its development to that medium till it is fully developed, as often occurs with the water-crowfoot.

In order to ascertain, therefore, whether the peculiarities of any plant are really due to the environment, as the efficient cause to incite the variability of the plants, many experiments have been made, and in each case the results invariably showed that when a plant is grown out of its usual surroundings and in another of a very different kind ; it either fails to grow, or, if it succeed, it does so by putting on just those structures characteristic of the plants normally growing in the environment in question.

Thus, with regard to each of the groups above mentioned, it is found, *e.g.*, that if spiny plants of a dry soil or climate be grown in a moist atmosphere and soil, the development of spines is at once checked ; the plants become less and less spinescent until the spiny processes cease to be formed altogether. If very hairy plants, characteristic of a dry locality, be grown in water or in a constantly moist situation, they lose their hair to a greater or less degree and so resemble water plants which are normally hairless. If a plant usually developing a tall flowering stem in lowlands be planted on high altitudes, as of the Alps, it cannot develop it ; but becomes a dwarf, like ordinary Alpine plants, the anatomy changing correspondingly. If garden or wild plants like cress be watered with a solution of salt, the leaves develop themselves thick and fleshy like those of an ordinary maritime plant subject to the salt spray of the sea. Conversely the samphire has borne flat and thin leaves when cultivated in a garden far from the sea-side. These are but a very few samples of an abundance of illustrations furnished by experiments, which fully justify the belief that the normal characteristics of plants are in every case due to the environment, as Dr. Weismann maintains ; but contrary

to the belief of that eminent Darwinian, who would say that plants vary "indefinitely," so that Natural Selection might select about 1 *per cent.* as "best fitting to survive". The environment really so acts upon plants, that they *all* respond to its influence, in a strictly *definite* and adaptive manner; so that they develop just those structures which supply them with the best possible conditions for flourishing under the circumstances.

Having thus proved by experiments how certain characteristic features, which we find in plants growing in the same surroundings, can be produced or withheld at will, we are justified in concluding that the *facies* of desert, aquatic, maritime, alpine plants, etc., have been produced by the direct action of the environment upon all the wild plants normally growing in those different regions, respectively; and that by a long continuance, they have acquired relatively, but not absolutely fixed, hereditary characters varietal or specific.

Further, when we examine the minute anatomy of the tissues, the invariable law is soon discovered that their peculiarities are always precisely those which are best fitted for the circumstances under which the plants live.

The fact is that Darwin made an unfortunate mistake. He thought that plants varied "indefinitely" in Nature, deducing his conclusion from the numerous instances of what I prefer to call "exaggerated" individual differences, called "Forms" by Sir J. D. Hooker, in cultivation. He purposely limited his observations to cultivated plants and domesticated animals so that he was not prepared to receive the overwhelming amount of evidence to the contrary from Nature; and although Dr. Wallace is our greatest champion of Darwinism, for he said, and I suppose would still say—"Natural Selection is supreme,"¹ he was undoubtedly right when he opposed Darwin on this point in his original paper published conjointly with Darwin's in 1858.²

¹ *Fortnightly Review*, March 1895, p. 444.

² "On the Tendency of Varieties to Depart from the Original Type," *Journ. Lin. Soc.*, 1858, p. 53.

I repeat his words: "We see, then, that no inferences as to varieties in a state of Nature can be deduced from the observation of those occurring among domestic animals". He does not say so, but I presume that this is supposed to apply to plants as well as domestic animals.

To account for variations he said: "We believe we have shown that there is a tendency in Nature to the continued progression of certain classes of *varieties* further and further from the original type". Darwin, on the other hand, would not admit of this "tendency" to vary. He says: "Some authors . . . look at variability [he would seem to mean "variations"] as a necessary contingent on reproduction, and as much an aboriginal law as growth or inheritance . . . but falsely, as I believe".¹ *Variability*, is an inherent property, but *variations* will not arise, unless the environment calls the former into action.

I would repeat—as the fact completely nullifies Darwin's theory of the Origin of Species *by means* of Natural Selection—that there is no evidence to show that where the seeds of any plant are sown in a natural environment, they grow up "indefinitely," that is, with many variations; but, on the contrary, if they vary, the offspring *all vary alike*; and to use Darwin's words: "A new sub-variety would be formed *without* the aid of Natural Selection".²

¹ *Animals and Plants under Domestication*, ii., pp. 250, 253.

² The reader will find abundance of illustrations with both inductive and experimental proofs of *The Origin of Species by Self-adaptation to the Environment* in my books entitled—*The Origin of Floral Structures* and *The Origin of Plant Structures* (International Scientific Series, vols. lxiv., 1888; and lxxvii., 1895. References to other writers are given, especially to M. J. Costantin's works *Les Végétaux et les Milieux Cosmiques*, etc., and Dr. Warming's *Lagoa Santa*.

Since the preceding note was written (1903) a magnificent work has appeared by Dr. Schimper full of photogravures, etc., in thorough corroboration of the contention in the text. It is called *Botanical Geography upon a Physiological Basis* (Oxford: Clarendon Press, 1904).

M. Eberhardt has also published an article in *Ann. des Sci. Nat.*, xviii., p. 61 (1903), upon experiments made upon numerous plants grown

In proving that Natural Selection has nothing to do with "Selecting" the best fitted to survive out of an imaginary series of "indefinite" variations, I would emphasise the fact that it must not be thought that this phrase "Natural Selection" stands for nothing at all. The *datum* which both Darwin and Wallace start with is perfectly true, *viz.*, that more plants and animals are produced annually than can possibly live to maturity.

Even if they were all to vary "definitely," and be therefore in complete adaptation to the environment, still the majority *must* die, and *that* is what Natural Selection represents.

Then, again, it plays a large part among adult animals and plants which are not concerned with the process of evolving themselves into new varieties. It is their offspring whose business it is to do that.

There was a great plague of voles in Scotland a few years ago, as also of ladybirds in South England in 1868. But any great excess occasionally occurring is soon checked and Nature returns to the normal supply. Natural Selection, but of course only metaphorically, may be said to have rearranged these matters.

Similarly among ourselves an epidemic takes place; one or two victims are carried off from several families; while the rest are "selected" and survive.

A few years ago, I had two sorts of strawberries, there being three rows of each kind. When in fruit the mycelium of a fungus formed itself over all the berries of one sort, but not at all on the other kind.

One more illustration: Many European weeds have found their way into our colonies; and it is notorious how vigorous

artificially in a very dry and a very moist air. The structures, morphological and anatomical, especially developed under these conditions, were precisely those characteristics of desert and marsh plants respectively, so that this experimental verification thoroughly corroborates the inductive evidence drawn from the study of plants growing naturally in dry and moist places.

they have become, often completely ousting some of the native plants ; such are watercress and Dutch clover in New Zealand.

In various ways, therefore, the "struggle for existence" takes place, with "the survival of the strongest or fittest" as the case may be.

But in no case has it anything to do with any supposed "selection" out of many indefinite variations of structure, as Darwinians say, with the end of establishing a new variety or species.

As an illustration of the misuse of the term, I will quote the following passage :—

*"The general effect of natural selection, at least as regards higher animals, is to produce in the individual organism the power of varying proportionately . . . in response to stimulation, etc."*¹

Read the words I have italicised and the absurdity comes out, for variability, or "the power of varying" is an inherent property of organisms.

It is the changed conditions of life which call variability into action.

¹ *The Present Evolution of Man*, by G. A. Reid, p. 116.

III

ADAPTATION (*Continued*)

THE reader may be thinking that I have wandered away from my "Critical Examination of Modern Rationalism"; but since Haeckel and Büchner avowedly base their Monism and Materialism upon Darwinism, and other rationalistic writers dwell much upon it, my object has been through the preceding sections of this Appendix to show conclusively, first, that Darwinism was founded upon errors; so that the main prop and stay of Materialistic Monism has no foundation in fact. Secondly, that Darwin's alternative to Natural Selection is, after all, the true and correct interpretation of the origin of species by Evolution.

The reason why Darwinism is accepted by Materialists as the foundation of their system, appears to be because the whole process of Evolution, if based on Natural Selection, *is not reducible to any natural law*. It is a mechanical haphazard system, which Huxley called a "method of trial and error".

Since Natural Selection requires indefinite variations, out of which one or two individuals are selected, the rest perishing, there is no definite relationship between the accidental, favourable variations and the being's requirements in adaptation to the new environment. If such *happen to occur*, so far so good; but if they do not, then all must perish.

There could scarcely have been a better illustration to *disprove* the whole process of Darwinism, than Darwin's own description of an imaginary "noble and commodious edifice,"

supposed to be built of unprepared stones, in order to explain the process by which he thought species—represented by the edifice—arose by Natural Selection of accidental variations—*i.e.*, the fragments of rock picked up at the base of a cliff.

“If an architect were to rear a noble and commodious edifice, without the use of cut stone, by selecting from the fragments at the base of a precipice wedge-formed stones for his arches, elongated stones for his lintels and flat stones for his roof, we should admire his skill and regard him as the paramount power.

“Now, the fragments of stones, though indispensable to the architect, bear to the edifice built by him the same relation [literally, there is *none* at all] which the fluctuating variations of each organic being bear to the varied and admirable structures ultimately acquired by its modified descendants.”¹

Darwin admits that, with regard to the use to which the fragments of stone may be put, “their shapes may be strictly said to be accidental”; just as he acknowledges the favourable variations to be accidental, and not occurring in any necessary connection with the requirements of the organism.

The essential feature which Darwin overlooked is, that *it is quite impossible* to construct a “noble and commodious edifice” out of unhewn and unprepared stones and with no prepared mortar. No one except prehistoric man or his immediate successors has ever so built a house at all.

Consequently the argument defeats itself, and, in fact, may be utilised by the Theist who believes in Evolution by natural law; that as all noble and commodious edifices must be built with stones and bricks prepared by man, so the structure of organisms shows definite natural laws in the evolution of the tissues out of which the organs are built up.

We see here, as throughout the whole of the organic world, a marked *Directivity* of a special kind not observable in the inorganic or mineral kingdom.

Moreover, the further inference is that the architect *himself*

¹ *Animals and Plants under Domestication*, ii., p. 430.

supplies the directivity in the construction of the house, just as the mason and brickmaker do in the manufacture of the materials.

Hence, by analogy, there must be Mind, somewhere, behind the responsive power of protoplasm in making cells, in building up tissues and in the construction of organs and thereby evolving a new variety.

Now let us turn to Haeckel and see what use he makes of Natural Selection to furnish his Monism with its foundation.

He has many references to Natural Selection, especially when he treats of man's mental and moral traits. The following quotations will illustrate what he has to say on this element of Darwinism.

(1) "No authority can be acknowledged by Rationalism which is not prepared to show that its claims and teachings are consistent with fact and reason."

(2) "The tyrant who is prepared to 'wade through slaughter to a throne' becomes an angel of wisdom and love when compared with an Almighty designer who plans Evolution of a race of perfect beings from a speck of protoplasm by the tedious, wasteful and agonising process of Natural Selection."

The two passages here quoted suggest the following remarks:—

(1) If Rationalists are prepared to follow this sound piece of advice, it is for them to show that the claims of Darwinism are consistent with fact; for Haeckel and others base their Rationalism upon it.

(2) This is a sample of a common style of writing of Rationalists, when they state that it is impossible to reconcile the slaughter of animals and plants with a beneficent Creator. This will be considered on another occasion later on.

"Darwin gave us the key to the Monistic explanation." "Mechanism alone can give us a true explanation of natural phenomena, etc."¹ He quotes an observation of Kant's that "It is impossible to explain the origin of a single blade of grass

¹ See *supra*, p. 25.

by material laws uncontrolled by design," and adds: "Seventy years afterwards Darwin achieved the task which Kant deemed impracticable".¹

"Darwin has not only proved by his theory of selection that the orderly processes in the life and structure of animals and plants have arisen by mechanical laws without any preconceived design; but he has shown us in the 'struggle for life' the powerful natural force which has exerted supreme control over the entire course of organic evolution for millions of years."²

"He discovered in the principle of selection that direct cause of transformism which Lamarck had missed."³

Other Rationalistic authors, as Büchner and the anonymous author of *Mr. Balfour's Apologetics* and many others, write in the same strain, endeavouring to account for everything, material, physiological and psychical by the *Deus ex Machinâ*—Natural Selection.

It is, therefore, most important to lay emphasis on the fact that not only has Darwin, Wallace, or any of their followers never brought forward a single instance of the evolution of a plant or animal in the wild state, which could be shown to be in accordance with Darwinism; but, on the other hand, all positive evidence—inductive and experimental—establishes the totally different method of procedure which Darwin himself foreshadowed.

Indeed, Evolution by Adaptation, on the one hand, and Natural Selection on the other, afford good illustrations respectively of the *Inductive* and *Deductive* methods of reasoning, when nothing but probabilities are to be had instead of axiomatic truths.

Evolution, *per se*, is based on an enormous number of facts, of great variety and world-wide distribution, as well as revealed in the past history of life by palæontology. This inductive evidence is most strongly corroborated by "experimental proof" derived from cultivation and domestication; so that at the present day Evolution stands on an impregnable

¹ *Op. cit.*, p. 266.

² P. 276.

³ P. 80.

basis ; and the very suggestion of any alternative is quite unthinkable.

When, however, we turn to Nature and try to discover *how* Evolution has come about ; that is to say, *how* and *under what circumstances*, variations of structure make their appearance, become fixed, and so give rise to new varieties and species, we have the two alternatives which Darwin laid before us—Adaptation and Natural Selection.

The former is based on as innumerable a supply of facts as Evolution itself, because, as we have seen, it lies at the foundation of Evolution or may be said to be identical with it. Given the responsive power of protoplasm and some new conditions of life—Evolution is the result.

On the other hand, Natural Selection is based on *two assumptions* : (1) that individual differences give rise to variations of a sufficient amount and constancy to have a selective value ; (2) that when new conditions of life are present, the offspring vary indefinitely. On these two hypothetical “axioms” Natural Selection was considered as solving all problems in the organic world, including man and his psychological phenomena, and even to include death !

Natural Selection is thus quite comparable to the numerous “final causes” or “designs” of the older teleologists’ *a priori* assumptions without an inductive basis—they easily explained everything by assuming that it was “designed”. Such, at once, put a barrier to all further investigations ; and so does a belief in Natural Selection.

Bacon saw the utterly unphilosophical character of this deductive method of reasoning : “The handling of final causes, mixed with the rest in physical enquiries, hath intercepted the severe and diligent enquiry of all real and physical causes, and given men the occasion to stay upon these satisfactory and specious causes, to the great arrest and prejudice of further discovery”.¹

Natural Selection has had a precisely similar effect. It has

¹ *De Augment. Sc.*, ii., 105.

been invoked at every turn and step in biological inquiries. It has been assumed that any result, bodily or mental, could be attributed to Natural Selection.

The following example, will illustrate the difference between the ways a teleologist and an Evolutionist would regard the same phenomenon. Rev. W. Kirby, in the second volume of his *Bridgewater Treatise*, dealing with the history, habits and instincts of animals (1835), says of the hermit crabs, "whose abdomen being naked, and unprotected by any hard crust, their Creator has given them an instinct, which teaches them to compensate this seeming defect, by getting possession of some univalve shell, suited to their size, which becomes their habitation, and which they carry about with them as if they were its proper inhabitants. These crabs are particularly formed for the habit that distinguishes them." After describing several points of structure in adaptation to their abode, Mr. Kirby concludes, "This whole structure proves that they are formed with this particular view of inhabiting shells of a very different tribe of animals".

An Evolutionist inverts this interpretation. The "crabs," having chosen to live in shells for some reason or other, possibly for concealment to catch their passing prey, just as some fishes bury themselves in the mud for a similar purpose, degeneration from disuse has set in, and the hinder part has modified itself as to become adapted to the shell; so that *now* the hermit crabs cannot exist without such a protection.

Design is always in *anticipation* of a use; *adaptation* is always the result of it whether it bring about degeneration or enhancement; usually both occur simultaneously.

Hence under Evolution, as I have already stated, structure is never made *at first* in anticipation of a future requirement; but when once established by use or adaptation, then it is developed *before* its use can be employed, as in the formation of the eye of a mammal while as a foetus.

Natural Selection does not hesitate to use teleological

language, and, unwittingly it may be, is sometimes as teleological as Paley himself.

Indeed, if Natural Selection gave the death-blow to teleology, it also revived it ; for it is somewhat astonishing to read the many *a priori* assumptions of writers who attribute uses to structures without testing them by experiment. Thus one asserts that holly has spinescent leaves up to a certain height to keep off browsing animals, but that it bears non-spinescent leaves at heights they cannot reach. Not only is this by no means a common condition, for trees are often entirely spinescent from twelve to twenty feet in height ; but cows will sometimes destroy a holly bush. Moreover, when the leaves are young the spines are no protection whatever, being as flexible as india-rubber.

Mr. Poulton in his *Colour of Animals* writes : “ A very beautiful and familiar illustration is given by Mr. Wallace—the white, upturned tail of the rabbit, by which the young and inexperienced or the least wary individuals are shown the way to the burrow. . . . The tail of the rabbit only becomes conspicuous when it is needed by other individuals of the same species, and when the animal is already alarmed and in full retreat for a place of security”. Upon which Dr. James Iverach observes :¹ “ Another interpretation quite as plausible, though lacking in the conspicuous element of utility to the rabbit, is that the tail of the rabbit is of great advantage to the dog who pursues it, for it directs his path straight to the mark ; or to the sportsman who knows at once where to shoot. In these instances the possession of the white tail is of disadvantage to the rabbit.”

I quite agree with Dr. Iverach when alluding to the free use Darwinians make of Natural Selection : “ Natural Selection is itself described as a metaphor ; but as soon as we begin to work with it, its metaphorical character disappears and it becomes intensely real, and is quite capable of doing anything”.²

This is illustrated by Darwin's attempt to account for the

¹ *Evolution and Christianity*, p. 119.

² *Op. cit.*, p. 121.

structure of the mammalian eye, as comparable with the structure of an optical instrument. If the reader will refer back to my quotation of it he will find at least *twenty suppositions*. Granting these, he concludes: "May we not believe that a living optical instrument might thus be formed, as superior to one of glass as the works of the Creator are to those of man?"¹

On the other hand, I would say, recognise the universal power of response in protoplasm to external conditions—in the case of the eye it is light—then the human eye could be, and has been, evolved probably from some pigment spot on the skin.

Since the preceding was written, the second edition of the *Text-book of Botany*, by Strasburger, Noll, Schenck and Schimper has appeared (1903).

In the first edition (1898) after describing Darwin's theory, the authors mention some difficulties, such as the one often made that "organs which would be incapable of exercising their functions until in an advanced state of development," etc.

This paragraph is replaced by another in which they adopt the view of Evolution by direct Adaptation as follows: "It would appear . . . that the starting point for the origin of new species is not afforded by the 'fluctuating variations' [individual differences] which continually occur, but by more marked variations which have been termed 'Mutations'. [They are here referring to Hugo de Vries' *Die Mutations-theorie*, 1901.] The tendency is to assume the existence of a development of the organic world due to original innate capabilities of the living substance and not dependent on selection.

"The origin of the large subdivisions of the animal and vegetable kingdoms, the 'archetypes,' would be due to this sort of Evolution. These archetypes have been, and are still, continually influenced by the environment, and by their reaction to external conditions organisms have become more or less

¹ *Origin of Species*, p. 146.

directly adapted. In this way striking resemblances in external form have arisen between organisms living under similar conditions although belonging to different archetypes. [Compare *Cactaceæ* of Mexico with Euphorbias, Stapelias, etc., of South Africa.] The progressive Evolution of the archetypes as well as the direct adaptations to external conditions shown by them [cultural experiments] are independent of selection.”¹

¹*A Text-book of Botany*, Introduction, p. 3 (1903). I have already called attention to Dr. Schimper's *Botanical Geography on a Physiological Basis*. In other words, it is interpreted by "Adaptation to the Environment". He was one of the contributors to this Text-book.

IV

HEREDITY OF ACQUIRED CHARACTERS, A FUNDAMENTAL PRINCIPLE OF EVOLUTION

As the *raison d'être* of this book is the refutation of the basis of Materialistic Monism, this chapter must be considered as subsidiary to Evolution by Adaptation.

Darwin saw clearly that Evolution could not go on unless acquired characters were hereditary. But Weismann steps in with his theory of germ-plasm and limits heredity to its agency, denying that the *soma* can acquire characters which can be communicated to the germ-plasm, as being too deep-seated, and so become hereditary.

My object, therefore, is limited to proving that the *soma* does acquire characters, and that too in plants long before there are any reproductive organs present. These latter, however, *viz.*, the flowers and fruits, *do* reproduce the characters, when their seeds grow up, which were acquired by the vegetative organs of the parents.

In the third page of *The Origin of Species*, Darwin speaks of "the strong principle of inheritance so that any selected variation will tend to propagate its new and modified form".

This "tendency to heredity" was fully corroborated by M. E. A. Carrière so long ago as 1865, in his work, *Production et Fixation des Variétés dans les Végétaux*, in which he says: "Faisons aussi remarquer que les diverse combinaisons faits pour en obtenir de nouvelles, reposent sur cette loi générale que, dans la nature tout tend a se reproduire et même à s'étendre,"
(183)

que par conséquent les modifications peuvent non-seulement devenir héréditaires, mais qu'elles peuvent encore servir de moyen pour arriver à d'autres modifications, à étendre et à multiplier de plus en plus les séries typiques."

Weismann and those who agree with him, contrary to Darwin and H. Spencer, maintain that "characters acquired by the *soma* are not transmissible". Darwin based his theory on a vast accumulation of facts derived from the cultivation of plants and the domestication of animals, and thence deduced the above opposite conclusion. Take, for example, the cabbage. *Brassica oleracea* produces no varieties in the wild state. It has done so to a very large extent under cultivation. They have developed or "acquired" characters thereby, through the complex and richer soils, as compared with that of their native habitat.

The "acquired characters" of broccoli, Brussels sprouts, greens, savoys, etc., are now fixed and hereditary.

What is true for the cabbage is true for all other garden races.

If evidence is required from natural conditions, it is abundantly forthcoming. Indeed, how Evolution could exist at all without the transmission of characters acquired by the *soma* is inconceivable.

It is asserted by the present Darwinians that the earlier writers, as Herbert Spencer, Cope and Darwin, as well as the later, Haeckel, Büchner, assume the point; but bring forward no experimental evidence.

The probability is that the *inductive evidence* is so overwhelming that it becomes a "moral certainty" and axiomatic, and so needs no "demonstration". Hence Darwin never saw any necessity for demonstrating so obvious a fact.

Still, as Weismann and others have put in a negation, one must attempt to show where the fallacy lies.

Mr. Adam Sedgwick, for example, in a paper read before the British Association, 1899, and published in *Nature*, 21st September, 1899, asks the question: "Is it possible by sub-

mitting an organism to a certain set of conditions, and thus causing it to acquire certain characters, so to modify its reproductive organs, that the same characters will appear in its offspring as the result of the application of a different and simpler stimulus?"¹

He then sums up "the argument as it at present stands: (1) A change in conditions cannot affect the next generation unless the reproductive organs are affected; (2) from a consideration of the facts of the case, it is almost inconceivable that the effect produced upon any organ of a given organism by a change of conditions should so modify the reproductive organs of that organism as to lead to a corresponding modification in the offspring *without the latter being exposed to the same conditions* [my italics]; (3) the only effects which are certainly known of changed conditions upon the reproductive organs are (a) the production of sterility; (b) an increase in genetic variability."

Of these three propositions the first and second are *hypothetical*.

Would it not have been better to study Nature to see what happens; and then argue from *facts*, so as to discover whether the reproductive system does or does not bring out acquired characters in the offspring?

In the first place, to demand the re-appearance of characters acquired by an adult parent, *i.e.*, during its growth from infancy to maturity, in the *first generation*, is to ask for what Nature does supply *in full measure*; as for example in experiments with the seed of wild parsnips, carrots, radishes, etc. Not only does the increase in the size of the root "acquired" by the first seeds sown reappear in the next, but it becomes *intensified*; *i.e.*, of course, when sown in good garden soil.

But to ask if the acquired characters appear when the offspring is removed to another environment is simply to ask Nature to undo all that the parent had done for the next

¹It is not very clear what is meant by "a different and simpler" stimulus.

generation. It is to demand Nature to violate her own natural laws.

The rule is simply this, at least for plants: "Seeds are sown in a new soil. They may grow up in some respects different from the parent form by acquiring new characters. If *their seeds be sown in the same soil, under precisely the same conditions*, the characters acquired by the parent will not only be repeated by inheritance but *intensified* in the next, and still more so in each succeeding generation. They then tend to become fixed; so that after five or six years the characters are fully formed, fixed and become permanently hereditary. Such is the experience of agriculturists and horticulturists.

Any demands outside these conditions are hypothetical and unreasonable.

The reader will observe that certain points are overlooked by the Darwinian. *First*, the acquiring any new character is done by the individual during the period of its development from seed to maturity. *Secondly*, the seed of the next year *must be sown in the same conditions*. It is useless to ask for proof when the arbitrary condition of removing the offspring to new conditions is demanded. Thus the late Prof. Jas. Buckman, experimenting with seed from the wild cabbage, soon secured several varieties under cultivation, "the tendency to vary being much increased by repeated transplantation". On the other hand, he adds: "It may be remarked, as throwing light on the nature of the changes by which the cultivated varieties of this genus have been attained, that experiments with seeds of plants showing any particular tendency, and especially *if repeatedly grown in the same soil*, will ever result in an increase of the peculiarity".¹

It may be added that if the offspring did not reproduce the character *at all*, but had to acquire the *same amount* of change as the parent, how could the full amount seen in our established races of plants and breeds of cattle ever be obtained? Each generation *adds an increment* to its predecessor. I would call

¹ *The Treasury of Botany*, s. v. "Brassica".

attention to the fact that in all the cabbage tribe the acquired characters are secured *before* the flowers are developed.

I have no right to call upon a Darwinian who does *not* believe in the heredity of acquired characters to "prove a negative". It therefore is incumbent upon me to show, as I have done above, on what grounds I most undoubtedly hold to the view which Darwin maintained; so I will now state the position of a Darwinian as given to me by letter.

He says: "What is really in question is the power of the individual to transmit to its descendants, not the tendency to modification, but the actual modifications themselves".

It is easy to see how this difficulty arises in the mind of a Darwinian, for since any character which happens to have appeared was a favourable one and preserved by Natural Selection, he has nothing to account for its appearance nor why it may not be a fluctuating and transient "individual difference," or why it should reappear, especially if the conditions of life be changed.

On the other hand, according to the law of self-adaptation to the environment, it is totally otherwise.

To my correspondent's observations I would remark that the transmission of the "tendency" is only recognised by the reappearance of the acquired character, and the parent has no other means of imparting the "modifications themselves" than by giving its offspring the "tendency" and power to reproduce them.

But this is hardly a correct way of stating the case. It is not so much an *inherited* as an *inherent* tendency to respond to the environment; but having done so in one generation the next has an *increased* power of response, since it not only reproduces the *amount* acquired by its parent but *adds* to it.

Let us consider what really takes place. All organisms arise from *ova*. When the egg is discharged or laid by the parent, as in all oviparous creatures, or when the seeds and spores are shed in the vegetable kingdom, they are no longer under the influence of the parent. How, then, can any "actual

modification " which may not appear till long after the offspring is hatched have been *directly* transmitted? Is it not obvious that the only thing which the parent *can* communicate to the egg is the *tendency*, coupled of course with the *capacity*, *i.e.*, in a potential way, of reproducing the modification in due course?

In the water-crowfoot, to be described below, the modification, which has arisen in consequence of submergence, is the dissected foliage, and this "actual modification" is not in the seed; nevertheless it appears subsequently.

If it be a viviparous being, in which the "actual modifications" are looked for, as transmitted by the parents to the offspring when born; then I would say that we must still look to the *ovum* for any potentialities in the *fetus*.¹

To return to my correspondent, he says: "It may be sufficient to observe that no 'Darwinian' doubts that the individual organism can be modified directly or by the action of the environment; or that the tendency to modification [variability], being part of the congenital endowment of the individual, is subject to heredity; and *may be strengthened during successive generations by selection, whether natural or artificial*. . . . The results of cultivation, as carrots and radishes, have been reached by the aid of selection."

With the sentence which I have italicised I would at once join issue. "Artificial Selection," which really means merely "isolation," by the removal of others, has nothing to do with any "strengthening," as he calls it.

It is inconceivable to me how the mere pulling up of all its neighbours, so as to leave a plant alone, can be supposed to

¹ One generally expects the best and truest criticisms in *Nature*; in which journal the reviewer of my little book, *The Story of Wild Flowers*, thus writes: "Most open to criticism are the explanations offered of the *origin* of certain structural and habitual features, *by the inheritance* of the effects of repeated stimuli".

If the words I have italicised mean that "the origin" of anything *is due* to "inheritance," a moment's thought would have told the writer that "the origin of structural features" must come *before* they can be inherited. The cart has somehow got in front of the horse!

act in any such process. Indeed, the neighbouring plants need not even touch or be near the individual to be selected. There need be no struggle for existence at all.

What really takes place is, I repeat, the continuance of the direct or definite action of the environment ; which first induced the modification to arise ; and brings about an increased repetition of the acquired character in the offspring.

The garden parsnip, raised from seed of a wild plant, described above, would grow bigger and bigger in every generation, if only one seed were planted so as to avoid selection altogether.

My Darwinian correspondent appears to fall into the common error of attributing some *influence* to natural and artificial selection. All that selection does is *to record what lives and what dies*. Hence, its province in Nature is confined to the *Distribution* of animals and plants alone.

It is for the present Darwinian to prove what influence it can have, especially as Darwin distinctly describes it as being only a metaphorical expression.

Natural Selection, if we retain the phrase, of course, occurs everywhere. It is a "natural law," but a natural law only means "an observed order of facts".

Thus it is easily seen to be a universal feature in Nature that wherever beings are crowded, many die and a lesser number live, whether they be animals or plants. If a fever breaks out in any district in London, some catch it and perhaps die, others do not.

The *causes* of death may be due to *constitution*, etc., but in no case is it due to injurious *varietal structural characters*.

That is all that is meant by Natural Selection.

If it be maintained that Natural Selection implies more or has any "strengthening" powers, it is for the Darwinian to prove it.

I will now proceed to give concrete examples in illustration of the preceding remarks. There are two lines of "proof" open to a scientist ; who, however, should, wherever it be possible,

try to combine both. One is **INDUCTIVE**, the other **EXPERIMENTAL** evidence. Now, I seem to notice that it is mainly zoologists who deny that "acquired characters" are hereditary. Whether this is because they lay little or no value on inductive evidence—at all events, they do not always realise the fact that sufficient inductive evidence requires no experimental proof in addition—or whether it be because animals do not lend themselves so readily to experimental verification as plants, I cannot undertake to say. The latter, however, as it seems to me, afford overwhelming proof along both lines of evidence. I shall give, therefore, what I regard as convincing examples of both methods, thereby demonstrating the heredity of acquired characters.

First, with regard to *experimental verification*. Darwin based his theory mainly on observations upon *Animals and Plants under Domestication*, which he published in two volumes with this title.

I will therefore take one or two cases from the cultivation of plants.

If seed of the wild radish, carrot, parsnip or cabbage be collected and we sow them in a well-prepared garden soil they will all grow very vigorously. They need not be crowded; and at the end of the season the roots of the first three kinds instead of being slender in size but tough and wiry in texture will be found to have "acquired" a certain degree of fleshiness. Taking seed from one such plant and sowing it as before, *under the same conditions*, the roots of the second generation will be larger than those of the first generation; an *increment* has been added to what was acquired by the first generation. Repeating this process for some five or six generations a fine kitchen-garden "root" will be obtained. It will then have become "fixed," having arrived at what may be called the "average maximum" size.

Such, then, is an experimental proof of the heredity of acquired "somatic" or "vegetative" characters.

Similar experimental proof is applicable to all root crops,

as well as to all the many forms of cabbage, kale, cauliflowers, etc., which are derived from the wild plant of our sea-cliffs, *Brassica oleracea*. It applies to the various forms of parsley, beans, peas, etc., and, among flowers, to wallflowers, nasturtiums, snapdragons, foxgloves and many others which have produced "races" without the element of hybridisation, with which I am not now concerned.

If a Darwinian says that these results have been reached by "Artificial Selection" then it is for *him* to prove that it has anything to do with them.

The following are illustrations proving how a merely mechanical force can affect plants, producing characters which can not only be acquired but become fixed and hereditary.

Pliny tells us that in his day the Greeks had discovered a way of converting the "female" or long-rooted rape into the "male" or turnip-rooted form by sowing the seed in a stiff soil. I have already had a previous occasion to mention the fact that M. Carrière in raising "radishes" from the wild *Raphanus Raphanistrum*, which has a long wiry root, also found that he obtained a larger proportion of long-rooted forms in a loose soil, and of turnip-rooted ones in a stiff soil.¹

Lastly, M. H. de Varigny refers to M. Languet de Sivry's experiments with the wild carrot, and who met with precisely similar results.²

At the present day these various forms of roots have become "fixed" and "come true" by heredity. We seem, therefore, to have incontrovertible evidence of the heredity of somatic characters originating from a merely more or less obstructive soil.

Moreover, these characters are all acquired long before any sexual apparatus is present in the plants themselves that first acquired them.

¹ *Origine des Plantes Domestiques démontrée par la Culture du Radis Sauvage*. See above, p. 164.

² *Experimental Evolution*, by H. de Varigny, quoting from *Société Royale et Centrale d'Agriculture*, sér. 2, vol. ii., 1846-47, p. 539.

Let us now take a case of a suddenly "acquired size" in a native plant. M. Hugo de Vries collected seed from semi-wild plants of *Œnothera Lamarckiana* and sowed them in the Botanic Garden of Amsterdam in 1887. In 1888 a new and dwarf form appeared among them. "Ces nains m'ont donné de leurs grains une race que j'ai cultivée jusqu'en 1894." He named it *nanella*.

Similarly, in 1895, a new variety appeared which he called *gigas*. By self-fertilisation he secured 450 plants in 1897, which "sans aucune exception, avaient les caractères décrits . . . pour l'*Œnothera gigas*. . . . La nouvelle espèce était donc constante dès la première génération, sans trace d'atavisme."

He regards *nanella* as a "variety," but *gigas* and five others he names "mutantes," as being of a higher character and equivalent to new "species". "On appelle ces nouvelles productions des mutantes, comme on appelle des variantes les individus différant du type moyen sous le rapport de la variabilité individuelle. Les mutantes sont les produits directs des mutations, elles proviennent d'une autre espèce et n'ont eu, parmi leurs aïeux, autant qu'on connaît leur histoire, aucun qui ait eu la même forme."

In M. Hugo de Vries' experiments¹ here quoted, he found that actually new species—according to his opinion—appeared *suddenly* (such was *Œnothera gigas*, a robust plant) and remained fixed from the very date of their appearance. Darwin had a somewhat similar experience with a tall white-flowered *Mimulus luteus*, which came up in the third year, among his sowings. It was so prolific by self-fertilisation that it completely outstripped the intercrossed plants in the proportion of 147 capsules to 100 of the latter.²

The first and important observation is that selection had nothing to do with either the appearance or continuance of these forms.

¹"Recherches Expérimentales sur l'Origine des Espèces," *Revue Générale de Botanique*, vol. xiii., p. 5 (Jan. 1901).

²*Cross and Self-fertilisation of Plants*, pp. 79, 348.

The second is that none of the six or seven "mutantes" of *M. Vries* ever occurred wild; but resulted from their being cultivated under the artificial conditions of a garden. Such has, of course, been the case with all cultivated races of flowers, fruits and vegetables.

Hence, their characters were in all cases "acquired" in response to the direct action of the environment; and as *M. H. de Vries* proved, the acquired characters reappeared from the first generation onwards, and so proved themselves to be hereditary.

The idea that "the reproductive organs cannot be affected" is at once disproved by the acquired characters reappearing in the seedlings.

I had much talk with the late Prof. Sickenberger, of the School of Medicine, Cairo, when in Egypt some years ago; and he was good enough to give me the following information: "I have read with great interest your publication on Dr. Weismann's theory, and I am very glad to see that your conclusions are entirely in accordance with my own observations. I believe, if Weismann had had more special knowledge of botanical matters he would not have undertaken to apply his theory to plants. You have completely refuted¹ by your explanations his assertion that a continuity of germ-plasm exists in a certain series of somatic cells only. I cannot admit any essential difference of characters between species and varieties. Such being only due to greater or less degree of qualities acquired by the influence of external conditions in a longer or shorter time. Hybridisation comes in, in a secondary way, mixing those acquired qualities with another series. Hereditary persistency is, I believe, nothing else than the maintenance of those acquired qualities under the power of inertia (*gesetz der Trägheit*). The more any acquired qualities have changed the anatomical and chemical constitution of a plant, so much the more will those qualities be persistent. If

¹"Dr. Weismann's Theory of Heredity applied to Plants," *Natural Science*, vol. i., p. 171, 1882.

Weismann says 'acquired characters cannot be transmitted at all,' every day in Egypt contradicts this opinion, and the fact that 'species of plants in Egypt have remained unchanged for thousands of years' proves only that the climatic conditions of Egypt have remained all the time unchanged.

"On the other hand, seeds of 'gignut,' a variety of *Cannabis sativa* from Europe, produces by the third generation the true *Cannabis sativa* yarn. Black mustard, *Brassica nigra*, is transformed into the endemic *B. bracteolata*, Mayer, in the second generation. Also the thick-rooted celery assumes in the first year the much foliated form with a thin root-stock, like the summer spontaneous form of Egypt.

"I have had myself the opportunity of substantiating these facts several times.

"On the other hand, it must be proved that external influences are acting in other ways upon the germ-plasm than upon the somato-plasm. All action in Nature is based upon chemical and physical forces—so that really the constitution of the pretended germ-plasm must be different from that of the somato-plasm."

V

HEREDITY OF ACQUIRED CHARACTERS (Continued)

The mass of evidence now to be considered is the “inductive”. Scientists are perfectly willing to accept this line of proof in other branches of knowledge than biology.

Thus, physicists tell us they *know* a good deal about the composition of the sun. Experimental chemical proof is obviously out of the question. Their knowledge is based on the accumulation of coincidences. The first discovered was that between the line D in the solar spectrum and the monochromatic yellow bar seen in vapourised soda. So far, it was a single or merely remarkable coincidence and nothing more. But when it was found that numerous other elements could be “paralleled” with lines in the spectrum, the coincidences became so numerous that physicists accepted this induction as ample evidence to “prove” that the same substance existed in the sun.

Similarly is it with all the influences deducible from palæontology, as, *e.g.*, the famous genealogy of the horse from the five-toed primogenital *Eohippus*, or whatever it may be called, in the eocene strata through a succession of three-toed forms, as the *Hipparion*, etc., till the one-toed *Equus* is reached.

This satisfied Huxley that it undoubtedly indicated the line of Evolution of our domesticated horse of to-day.

But this conviction is based on purely inductive, that is, accumulative evidences. Any experimental verification of extinct animals is obviously impossible.

So, too, we may apply this line of argument to existing plants and animals. The difficulty only lies in selecting from the enormous mass of such evidence at our disposal.

Since it has been found experimentally how easily most plants will change their structures and forms as soon as they are grown in very different soils and climates from those of their natural habitats, one naturally infers that they will behave in Nature in a way analogous to that which they do under cultivation; provided the change of environment can furnish a sufficient stimulus, as does a richly prepared garden soil.

Linnæus long ago (1763), noticed that when he studied batches of plants received from foreign countries, there was often a certain superficial *facies* or likeness between many of them; though there need not have been any real affinities: "Primo intuitu distinguit sæpius exercitatus botannicus plantas Africæ, Asiæ, Americæ, Alpiumque, etc." ¹

Modern botanists have applied the term "representative" to plants when they live in widely different countries and may be either different species of the same genus or plants of no affinity, but assume similar vegetative forms or physiognomy.

Thus many members of the family *Cactaceæ* inhabiting hot, dry, rocky districts of Mexico, strikingly resemble species of the genus *Euphorbia* in the hot but dry regions of Africa, as well as the *Stapelias* of South Africa and *Adenium* of Arabia, etc. All these, though belonging to totally different families, yet have similar columnar, thick, fleshy, leafless but spiny stems.

In all species of *Euphorbia* living in Europe, there is *no* tendency whatever to produce the cactus-like stem. It only appears under similar climatic and other conditions of life in which the *cacti* themselves live.

The induction, therefore, is that, first, the *tendency* to produce the fleshy stem has arisen through the influences or "direct and definite action," as Darwin called it, of the specially dry environment.

But this tendency has now become a *fixed character*, im-

¹ See *Origin of Plant Structures*, p. 13.

manent in the life of the plants, so that the fleshy stem, together with its other characteristics, are reproduced whenever the plants in question are raised from seed as in England, that is under totally different conditions of life from those of their natural habitats.

So that not only the *tendency* but the *power* to produce the actual modifications is hereditary.

The above cases illustrate what happens to plants where they grow in very dry, hot and barren regions. Let us now see what takes place in water.

A common feature in aquatic dicotyledonous plants is to have the blades of their submerged leaves finely divided into capillary segments. This occurs in numerous plants of as many families and of no affinity between them. The following are a few examples: the water-crowfoot (*Ranunculaceæ*); *Cabomba*, (*Nymphaeaceæ*); water milfoil, (*Haloragacæ*); *Helosciadium inundatum* (*Umbelliferae*); water violet (*Primulaceæ*); *Ceratophyllum* (*Ceratophylleæ*); and many others might be named.

Moreover, not only do we see completely formed leaves or leaflets in allied terrestrial species as of buttercups compared with *Ranunculus trichophyllus*, or in *Helosciadium nodiflorum*, etc., but both forms of leaf may be borne by the same plant, if it have some floating on or raised above the water, and others below it; as in *Ranunculus heterophyllus*, *Cabomba*, *Proserpinaca*, etc.

Indeed, it frequently happens that a leaf is so situated that half of it develops under water and the other half in the air. When this is the case, the former is divided into fine, thread-like segments, and the latter half is flat and complete. Moreover, the anatomical tissues of the former are adapted to a submerged life, while these of the latter are equally so for the air.

It not infrequently happens when *Ranunculus trichophyllus*, which is normally entirely submerged, is growing very crowded in a small pond, that some of its branches are forced upwards so as to grow into the air; then all parts above the water-line grow in adaptation to an aerial existence; all below the line

being suited for a submerged life. Other plants, as the water milfoil, do the same thing.

On the other hand, some species have degenerated to a greater degree so that they have lost this power of adaptation. Such I found to be the case with *R. circinatus* (?) and *Elodea canadensis*, both of which sent up several shoots into the air when grown in a bowl of water; but in no case were aerial leaves produced, as they shrivelled up at once and perished just as sea-weeds do.

I think the reader will now see that coincidences between the divided modification of the leaf-blade with normal submergence are as numerous as the agreements between the absorption bands in the solar spectrum and the coloured bands of vapourised elements.

If the induction is perfectly legitimate in the latter it must be equally so in the former, which has the additional aid of experimental corroboration. The inevitable conclusion is that the dissected type of foliage seen in these submerged leaves is the "actual modification" produced by the watery medium in which the plants live. That is to say, the latter is the *stimulus* to which *the living protoplasm responds* and has brought about the structure in question.

Mr. Herbert Spencer expressed this in his generalisation: "Under new conditions the organism immediately begins to undergo certain changes in structure fitting it for its new conditions".

The next point to notice is that the dissected leaf is hereditary. When I brought this case of the dissected foliage of submerged plants before my Darwinian friend he observed: "Experimental evidence of the truth of your view as to the submerged leaves of dicotyledons is still lacking". He is not alone in not realising the fact that the above inductive evidence was amply sufficient to establish a natural law, and really needs no experimental evidence; still, as such has now been obtained, it is satisfactory to find that the inductive evidence was correct and conclusive without any experiment at all.

The proof has been found in experiments with *Proserpinaca palustris*, a plant of the United States of the same family as our water milfoil and mare's-tail (*Haloragaceæ*). This plant is amphibious; when the leaves are in the air, they are completely formed, being of a narrowly lanceolate type, with a serrated margin; but when submerged the plant bears leaves consisting of the midrib and lateral veins only, so that it acquires a "pectinate" or "comb-like" form.

In order to ascertain the actual cause of the change of form, Mr. McCullum experimented in various ways, finding that even a saturated air produced the submerged form; and that by eliminating all other probable or possible causes, water only could be credited with inducing the submerged type of foliage. He thus writes:—

"The essential feature common to the water and moist air is the inhibition of transpiration and the consequent choking of the cells and diluting the protoplasm with water. This can be tested by growing the plants entirely under water and at the same time drawing the water out from the protoplasm; or in reality causing evaporation or transpiration by means of high osmotic pressure. Plants producing water-leaves were placed in nutrient solutions of a strength not quite sufficient to plasmolyze them: also in very dilute solutions made up to the same osmotic pressure with KCl and also $\text{Ca}(\text{NO}_3)_2$. These were allowed to evaporate down, becoming gradually stronger. When they reached a strength of solution equal to about half N salt solution the water leaves ceased to form, and the air type of leaf appeared."¹

Here, then, we have the desired experimental evidence that the dissected form of foliage found in so many submerged plants is actually caused by the superabundance of water saturating and weakening the protoplasm.

Now let us return to *Ranunculus heterophyllus* or *R. tricho-*

¹ "On the Nature of the Stimulus causing the Change of Form and Structure in *Proserpinaca palustris*," *Bot. Gaz.*, vol. xxxiv., p. 93.

phyllus; for these prove that this "acquired character" of the dissected foliage is hereditary.

If the seeds of these plants be sown in a garden border they all come up and grow perfectly well. They first put forth finely dissected foliage by heredity; and the first named subsequently bears complete forms of leaf-blade, as if the plant had by that time grown so as to reach the level of the surface of the imaginary water. Hence, the acquired characters are thus proved to be hereditary; and not caused in *each* generation by its growing in water.

The whole plant, however, is altered in its *anatomical structure* in order to fit it for an aerial life. If it be transferred to water when full grown, all the leaves perish; but a new set are soon produced in adaptation to a submerged life.

This experiment will be enough, as Nature has not two or more methods of procedure in acquiring, fixing and making characters hereditary.

Without the possibility of doing this, Evolution would come to a standstill.

The Darwinian says: "A change in conditions cannot affect the next generation unless the reproductive organs are affected". But this is exactly what does happen. The enlarged fleshy root of a parsnip is the character acquired by the parent. It is formed long before the reproductive organs exist at all. Nevertheless it reappears in the offspring of the first generation; so that an *increment* is successively added in the second, third, fourth, etc., generations until the maximum size is secured and fixed, when it is hereditary.

If it be said that only the *tendency* to make a fleshy root was started in the parent and conveyed to the offspring and then "strengthened" by selection in the subsequent generations, how could this tendency be accounted for, any more than the actual character itself, if it be acquired *before* the flowers and fruit are made?

Surely the experiment proves that the whole constitution of the plant is so effected, that when the flowers and fruit of the

parsnip are subsequently formed, they too partake of the influence.

If it were not so, not even the tendency to produce a large and fleshy root would be hereditary or, as it is suggested, "strengthened by selection".

The same sized root could only be reproduced as that of the original parent.

I will now give an interesting case from the structure of tendrils.

The Virginian creeper of America (*Ampelopsis hederacea*) bears a branched tendril, homologous with, that is formed out of, flowering branches. Each little branchlet terminates in a hooked point. As soon as one of these hooks catches a depression in a rough wall the irritation induces it to swell and grow into an adhesive pad; *which is never formed unless contact is secured.*

In the Japanese species (*A. Veitchii*) the tendril develops half-formed pads on the tips of its branchlets, *before* any contact has been made with the wall.

They can only become effectively adhesive *after* contact has taken place.

The first-named species proves that the merely mechanical contact is necessary for the very commencement of the development of the pads.

The second proves that the tendency to produce them is so strongly hereditary, that they now appear *without* any contact at all; *i.e.*, the actual modification itself is, therefore, hereditary, and only requires contact to perfect it, so as to become an adhesive organ.

A similar difference resides between genera of *Bignoniaceæ* as Darwin has pointed out.¹

The few cases I have given are but samples. Similar lines of inductive evidence can be applied to all the organs of plants—and it might be added to animals. Experimental proof is

¹ *Climbing Plants*, p. 102, note.

often impossible; *nor is it needed* whenever inductive evidence is abundant.

It fully accounts for the numerous "representative" plants and animals, as the "ericoidal" or heath-like forms so abundant in South Africa and South-West Australia, the "cupressoidal" or cypress-like trees and shrubs and even herbs, as of junipers, Alpine veronicas of New Zealand, and our own lycopodiums. The "juncaceous" type is seen in the rush-like forms which betray many marsh plants, and the "muscoidal" of Arctic and Antarctic, as well as of very high Alpine forms of moss-like plants.¹

In conclusion, then, I would say that I understand by heredity—(1) that offspring, as a rule, resemble their parents in every important feature, *always* allowing for "individual" but trivial and inconstant variations.

(2) When the seed or even bulbs of plants are sown in some surroundings, markedly different from their native habitats, they usually *at once* begin to vary, often in all parts, from the wild types. If many seeds of the same kind are sown *they all vary alike* or "definitely" in all main particulars, and not "indefinitely," to use Darwin's term and as he supposed to be the case. Still, they may always show individual variations of no importance, *i.e.*, from a classificatory point of view.

In five or six generations the new and "acquired characters" become relatively "fixed"; so that they will subsequently be reproduced by seeds, even when the surrounding conditions, which first incited the protoplasm to bring about these adaptive modifications, no longer exist.

Hence I maintain that "acquired characters" *are* hereditary. Thanks to this, not only do so large a number of "races" in flowers and vegetables "come true" by seed under cultivation, but Evolution in Nature could not exist without it.

I deal mainly with plants, as that is my special province,

¹ See my paper on "Mimetic Resemblances in Animals and Plants," *Natural Science*, February, 1899, p. 121.

but the argument of Adaptation applies equally well to animals. Thus just as the dissected type of foliage has been acquired under water, so the "paddle" form of limb has been evolved by use in aquatic animals, or in some of an amphibious habit. Thus it occurs in the crustacea, in fins of fishes, in extinct marine reptiles, as the *Ichthyosaurus* and *Plesiosaurus*, etc., in modern cetacea, the seals, in penguins and auks, and in the tail of the beaver.

Similar adaptations are seen in the bilobed tail of fishes, reptiles and cetacea.

Though organs may be similar in appearance and acquired for the same purpose they may be of different origins and differently constructed. Thus the tendril of a vine is a metamorphosed flowering branch, but that of the pea is a metamorphosed leaf.

To make the tail of a cod, Nature has run the spine into the upper lobe, the lower lobe being made with "hypural" bones; but in certain extinct marine reptiles, a similar bilobed tail was made by the spine penetrating the lower lobe. Lastly, in the horizontal bilobed tails of cetacea, the spine terminates at the base, the tail having no bone within it at all.

One more instance out of thousands, which I will leave the reader to follow out for himself. If a lad wishes to walk fast, he often does so on his toes; and in a walking match the rule is insisted upon that both heel and toe must be on the ground at every step. Now, all running animals stand on their toes, as horses, dogs, gazelles, etc., the heel being permanently uplifted in the air.

Inductive evidence, based on innumerable instances, leads to the conclusion that the habit of running being habitual, the bones of the foot have become permanently adapted to the action; thereby supplying great rapidity either in escaping from the carnivorous enemy or in the latter following its prey.

I mention these few instances to show the versatile power of protoplasm; which can turn any organ to account for constructing something different, if some change is desirable, and

a new structure is to be acquired to suit the habit and convenience of the organism.

Besides hereditary structures and habits, hereditary skill must be observed. Young birds can build just as good nests, as a rule, as the old ones. "Trap-door" spiders can make exquisite "retreats," when they are quite young, in no way inferior to those of adults; though it is said that they are not always equally so; and are consequently sometimes more easily discoverable by their enemies. Still the difference between a "good" nest or retreat made as a first attempt, by an animal, and the period covered by a son in learning the trade of his father is very different.

It is impossible, too, for silkworms raised in paper trays from the egg to have learnt how to make their exquisite silk cocoons, or spiders their geometrical webs.

Skill is thus equally hereditary with the art itself; though there is no reason for supposing these instincts to have been directly impressed upon them by the Creator, but that they have been acquired and perfected through generations, and the skill has then become a fixed trait of their constitution and a hereditary feature.¹ I shall have more to say upon Instincts in Part II.

¹ As I have discussed and criticised Dr. Weismann's theory of heredity elsewhere, I need only refer the reader to my paper in *Natural Science*, vol. i., p. 171.

PART II

MAN

CHAPTER I

MAN'S ORIGIN BY EVOLUTION

WE do not know, nor can we conceive, how the first protoplasmic living being appeared on this earth. I am as convinced of continuity as any one, wherever there is evidence of it ; but I refrain from forcing my belief in it, where there is absolutely no evidence, as at the origin of terrestrial life. A time may come when the problem will be solved and continuity may bridge the gulf between the non-living and the living, but we have not yet arrived at that period.

Once grant the Origin of Life, and I see no necessity for any break whatever. Man has closed the series of living beings, as the latest and most complete.

In Genesis (i. 26) we read : “ And God said, Let us make man in our image, after our likeness : and let him have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created man in his own image, in the image of God created he him ; male and female created he them.”

Such is the Elohistic account of the creation of man. The second or Jehovistic history runs as follows (ii. 7) : “ The Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life ; and man became a living soul ”.

It may be noticed that the ideas of God are here

quite differently expressed. In Gen. i. 26 God is a spiritual Being; but in Gen. ii. 8 God is human.

The first is only compatible with a tolerably highly intellectual conception of Deity, and itself marks an advanced stage in man's mental development.

On the other hand, God being represented as a man appears to be a more child-like and primitive conception; and perhaps comes nearer to what was probably the earliest idea of a Deity, namely, a human ancestor.

Prof. Sayce has shown how the religion of Babylonia was essentially anthropomorphic,¹ and that there is a strong parallel between the story of Eden and the cosmogony of Eridu, the capital town on the shores of the Persian Gulf, as the sea was one hundred and more miles further north than it is now, some thousands of years ago.

On the other hand, the cosmogony which the late Mr. G. Smith deciphered has many points of contact with the first chapter of Genesis. Prof. Sayce says, "It belongs to an age of religious syncretism and materialistic philosophy, and is of late date".²

Both accounts, of course, represent the ideas of early thinkers about the origin of man; and how he came into existence. What truths can we discover in them?

In the first, the central idea is man's mental, not bodily, kinship with the Deity; as shown by his powers of *Dominion* over the world. It does not require much experience to know that there is *something* in man which imparts his superior power over animals. Indeed, St. James says: Man has tamed every kind of animal, but the tongue no man can tame (iii. 7, 8); that is, he cannot tame himself! Moreover, animals know that man is

¹ *The Religions of Ancient Egypt and Babylonia*, p. 498.

² *Op. cit.*, p. 387.

superior to them ; we shall see later how this comes about.

However, I will so far anticipate what I shall have to say about man's mind hereafter, by observing that what separates man from animals is his power of making *abstract ideas, objects of thought*. *This lies at the root of all his higher qualities*. Hence he alone has *volition* while all animals remain *sense-automata* and *non-moral*.

The writer of Gen. i. probably had not thought this fact out ; but he was quite aware of the supremacy of man ; and he seems to have considered that it was in *this* feature that he must be like the Deity.

Hence, he represents God as making man in his own likeness.

The mental supremacy of man, therefore, is the special characteristic of the first or Elohist account of his creation.

In the second or Jehovistic, more attention is paid to the body, both of Adam and Eve. While the supremacy of man is only feebly represented in his naming all the animals ; still, his becoming "a living soul" seems to indicate the desire of this writer to emphasise his mental qualities as being in some way different from those of animals of which nothing of this kind is mentioned.

Evolution now teaches us that man was the result of successive generations, or by "descent with modification," as it has been expressed, from the lowest animals ; but we have not yet discovered the missing links to prove by objective evidence the genealogy of the genus *Homo* from the common stock with the existing ape-family.

Unscientific people often suppose that Darwin meant that *existing* apes, or some one of them was the ancestor of man. This is not the case ; what Evolutionists maintain is that there was a common stem which embraced

both simian and human characteristics, *before* they became differentiated along separate lines. The letter **Y** will represent it. The stem is the so-called "generalised type," which gave rise to two, or very likely more than two branches, *one* of them ending in man, the other in forms of the existing monkey tribes.

If it be asked when this took place, the answer can only be based on analogies. Thus, in Greece, for example, a large number of fossil remains of mammalia have been unearthed.

They belong to the later Miocene or early Pliocene period, according to geologists. Not one single *species* there found is now living. Moreover, several of them are "generalised types," embracing features of what are *now* distinct genera of animals, which appeared in the *next* period or later Pliocene. Thus, the *Ictitherium* combined characters of the hyæna and civet. *Hyaenarctos* unites—as the name implies—the hyæna and bear. *Kuonarctos* combines the dog with the bear, and so on.

Now, in the next or Pliocene period, we find the animals becoming differentiated; and the existing genera appearing. Thus, *Equus* the horse, occurs here for the first time; whereas his three-toed ancestor, *Hipparion*, was among the remains of the preceding period.

Hence, judging by analogy, as the horse, hyæna, bear, etc., are existing *now*, so man *may* have appeared well differentiated from the *Simiada*, for the first time, in the later Pliocene epoch.

Geologically speaking, this period immediately preceded the Glacial epoch, in the northern hemisphere; and from other evidence there is every reason to suppose man to have been preglacial.

Something akin to a missing link is thought by some scientists to have been found in Java, and has

been called *Pithecanthropus erectus*, meaning "erect-monkey-man".

Haeckel does not hesitate to consider it to be at least one of the long-desired missing links; but Haeckel is apt to deduce conclusions which he wishes to have!

Whether it will turn out to be such or not remains to be seen; for the fragments are really insufficient to prove conclusively whether it be "man" or "monkey," or both combined; but that there was a long line of ancestry is fully believed in by scientists on inductive evidence; for embryology, human and comparative anatomy, as well as man's numerous "rudimentary organs," supply such an enormous amount of facts, that the probabilities are overwhelming of man's descent from the animal world.

These facts need not be repeated here, as they are well known, and may be found in Haeckel's *History of the Creation* and Huxley's *Man's Place in Nature*, etc. Such have established the affinities between man's body and those of other vertebrates beyond all dispute.

The most important question about man is: How comes it that he has developed a *mind* so much in advance of that of all other animals? Is it different in *kind* as well as greater in *degree*?

We may note that man's body differs in the much longer time it takes to reach maturity, occupying many years, whereas a dog and a horse arrive at the adult stage in a very few. Similarly man's mind follows suit in requiring a lengthened period for its development.

The late Dr. W. B. Carpenter suggested an explanation as to how this mental difference may have come about. Animals, such as monkeys as well as the carnivora, use their teeth for offensive purposes. This requires not only large canine teeth, but very powerful muscles to work the lower jaw.

These "temporal" muscles have broad bases on the external surface of the skull, one on either side, requiring large and deep depressions in which they are fixed.

These external depressions necessitate a small internal brain cavity and a correspondingly small and more or less lowly developed brain.

Now, a young monkey often has a quite globular skull; but as it grows to maturity, it assumes a longer form with the above-mentioned external depressions.

Some unknown conditions of life, perhaps insular, probably prevailed in which there was a comparative freedom from enemies, and consequently a less struggle for existence; so that as a consequence a disuse of the jaw for fighting purposes allowed the skull to retain the more globular form when adult. The brain now followed suit, and not only became larger, but more developed, in having more numerous convolutions and an increase in the amount of "grey matter" accompanied, as a correlated result, with an increase of intelligence; to which both skull and brain reacted.

A time arrived when a *new* mental power was evolved, or superadded to that which man still has in common with animals, that of *realising abstract ideas*.

As a human being epitomises the history of vertebrates in his development from an "egg" to his adult stage; so do we see in the development of a child these mental stages in progress. At first the infant is simply a living automaton with no mind at all. It soon begins "to take notice," *i.e.*, a dawning intelligence of the outer world awakens through the senses; but for a long time it is utterly powerless to realise an abstraction; and if you try to explain to a little child the idea of God, who does not appeal to its senses, it cannot conceive anything beyond a Being something like its own father.

A time comes, however, in its mental development—but you cannot say when—that its power of grasping the idea of things which do not solely appeal to the senses is attained.

At this point it passes the limits of all animals ; which stop short at sense perceptions with a corresponding reasoning power upon concrete things only.

This conclusion is the result of the study of the habits of animals. It becomes more and more apparent that their reasoning powers, which are often very considerable, always concern concrete objects, which appeal to their senses. But, besides doing this, man, and man alone, can reason in abstract ideas as well.

To make this clearer, I will quote a passage from my book *Christian Beliefs Reconsidered in the Light of Modern Thought* (1884, p. 63).

“There is no reason, *e.g.*, to suppose that any animal in the wild or natural condition ever eats except when it is hungry;¹ and as soon as the instinct of hunger is satisfied it ceases to do so. It undoubtedly derives a certain amount of pleasure from the act of eating, as shown by such as a man-eating tiger ; so far man may do the same, but here enters the sharp line of distinction between him and them, and upon which his whole moral nature hinges ; a moral nature which no other being can acquire. He alone can think of or make *the abstract idea of Pleasure* an actual object of thought. He can remember and estimate the pleasure of eating, as an abstract idea super-added to the recollection of the physical act of eating. He can, in a word, convert the pleasure of eating into an *end*, instead of eating with the natural motive of nourishing the body. He can thus *abuse* that gift of Nature,

¹ Domesticated animals, like pigs and oxen, are in an abnormal condition of life.

the pleasure which accompanies eating, and even live to eat, instead of eat to live. Such is the glutton, the epicure or gourmand. I do not mean to say one should *never* eat anything simply for the pleasure of eating, but it is the *abuse of this pleasure* which constitutes the moral evil or the vice ; which no wild animal can entertain in thought.

“Animals, however, having no power of abstract reasoning, *cannot abuse natural laws*. They cannot be moral or immoral, but remain non-moral, living automata, void of all volition.”

What I have here said of the evolution of man's mental powers from a consciousness of the *Concrete* only to that of the *Abstract*, and his passing from being an *Automaton* only to a *Volitional* Being, is reproduced in history. Thus Mr. Bussell uses precisely the same terms as the above in his work on the different philosophers of Greece.¹ He speaks of the “individual” rebelling against political restraints hitherto borne in a quiescent submission as being “now mature and fully self-conscious,” and illustrates it by the Chinese: “We call the Chinese civilisation immature, because the sense of *individuality* there is not yet awakened, but lies sleeping—buried in the torpor of immemorial traditions, and bound with the fetters of unreflecting civic morality. Man is here almost an automaton, a puppet, guided by the unseen influences of ancestral example, the spirit of the state-inherited tendencies ; he has all but lost his gift of spontaneous initiative.”

This last phrase is equivalent to *Volition* which is opposed to *Automatism*.

But we may go further. Every one of us is more

¹ *The School of Plato*, p. 66.

than half an automaton in all we do day by day. All routine is done without giving us any call for reflection, choosing or changing the order of routine. We dress in the morning automatically, it may be thinking about other things all the time, we eat our breakfast, go off to the city, work for hours, as matters come before us, as clerks or managers; we regularly return by the same train, seizing our familiar corner, and so on till we go to bed. It is practical automatism throughout. Volition is more or less in abeyance and is rarely called upon for a *deliberate choice*.

Nevertheless the will is there, always ready at a moment's notice to decide upon an act of importance which brings alternatives of procedure before us. We pass out of the automatic into the volitional state at a moment's notice as occasion requires. Animals never can. They are always automatic.

Now let us see what are the consequences of this consciousness of having the power of being able to grasp an abstract idea; that is one about anything which does not come within the cognisance of the senses.¹

The first result is that Man can think of himself, that is, his "conscious soul," as we call it, or the *Ego*. Hence man alone can be *self-conscious*, realising his own personality as something other than his body.

The next step is that he realises the existence of similar souls in his fellowmen and women; that each has his or her *Ego*, too.

Next, when he sees works in Nature very much after the fashion of his own or of other men, or when he realises that he has power to move himself and other

¹For convenience I limit the meaning to this application; though of course the word "goodness" is an abstraction in a different sense from "God".

objects, and sees objects in Nature moving, as the clouds, trees waving their leaves, the sun and moon crossing the heavens, etc., he begins to imagine the existence of some beings doing these things. Some *bodiless* beings which he calls *spirits*.

The other source of spirits is believed to be ancestral; and possibly this was a more primitive one than the preceding.¹

Early man, like modern savages, whether as the result of dreams or otherwise, somehow conceived men to *live* on after *death*, and to become more powerful when freed from the body; and as savage men are far oftener more cruel than beneficent, so there arose the idea of the necessity of appeasing them by offerings of roast meat and choice vegetables, incense and drink, whereby they were pleased and appeased. An instructive instance of this is seen on the occasion of the exit from the ark. I will quote a short passage from one of the Babylonian Deluge stories which the reader can compare with that in Genesis.

“The ark reached Nizir and rested on the mountain unable to pass. Day after day for six days the ark rested on the mountain of Nizir. On the seventh I sent forth a dove which flew hither and thither, and finding no resting place, returned. I sent forth a swallow which also found no resting place and returned. And I sent forth a raven which wandered to and fro, devouring and floating on the waters, and did not return. Then I sent the animals

¹ Prof. Sayce in his last work, *The Religions of Ancient Egypt and Babylonia*, shows how fundamental this idea was in the religion of the latter (p. 280 *et seq.*)

Col. J. Garnier endeavours to show that even celestial deities were human beings, subsequently located in the heavenly bodies.—*The Worship of the Dead*.

forth to the four winds, and poured out a libation on an altar built on the peak of the mountain, an offering of herbs in sevens, with reed, pine and simgar. The gods gathered at the smell, yea, the gods gathered at the savour, like flies they gathered at the sacrifice.”¹

Mr. Herbert Spencer accepted the theory that traces religion to the worship of ancestors,² the deities being the spirits of ancestors.

Dr. Morris Jastrow³ observes that this theory implies that “the personification of the powers of Nature likewise rests upon ancestral worship, for the dead having powers denied to the living, their spirits may choose a tree or a stone as an abiding place, and even the large heavenly bodies are conceived as remote ancestors of the living, under the influence of a primitive theory of emanation”.

Dr. Jastrow observes, however, that: “Apart from the unsatisfactory character of any attempt to derive Nature-worship from ancestor-worship, there is no reason why one should be dependent upon the other.”⁴

The story of the flood would, however, seem to show something of the sort; for while a sacrifice of roast meat would imply the presence of a once human being, who alone could appreciate it; yet the gods are supposed to be aloft and come down to enjoy it, and in the Biblical account the Deity has power “to set the bow in the heavens” as being an Omnipotent Celestial God.

Man’s automatism includes his emotions, grief, fear, joy, love, and others are spontaneously excited by appropriate causes, and form no part of his volition; though this may be brought into play to control them to

¹ *Chaldean Flood Story*, in *The Composition of the Book of Genesis*, by E. T. Frigg, p. 190.

² See *Principles of Sociology*, chaps. viii. to xvii.

³ *The Study of Religion*, p. 184.

⁴ *Op. cit.*, p. 186.

some degree. It is often observed that animals share most at least of these, omitting laughter for example, while Evolution recognises their origin in man as a result of their existence in mammalia. Indeed, since man's emotions are similar to those in animals, it has often been stated as a proof that his mental qualifications have been evolved as well as his body. Thus Romanes in his works on *Mental Evolution in Animals* and *Mental Evolution in Man*, shows that, just as man does, so do animals manifest surprise, fear, parental affection, jealousy, affection, sympathy, emulation, grief, revenge, shame and remorse. These are all automatic emotions and are identical with the same feelings in man. But they are outside the *consciousness of abstract reasoning*, the peculiarity of man. They deal with concrete objects as a rule in both animals and man ; but man can also entertain some at least of these emotions for abstract reasons, which do not appeal to the senses ; as a fear of hell, the hope of heaven, emulation for honour, shame before God, etc.

As long as an animal, as a dog, can bring a *cause* within the region of the senses, by automatic reasoning of course, he is not afraid ; as when the wind blows the leaves about ; but a dog lying by a wall was terrified when he saw an open parasol, lying on the ground, roll along by itself, for he did not know the wind had arisen. Another dog lying on the beach began to bark furiously at the wheels of a bathing machine which began to move up the beach, being drawn up by a long rope ; for the dog could not understand how it could (apparently) move of its own accord.

There does not appear therefore to be any difference in *kind* between an animal's emotions and man's ; it is only when man brings his higher conscious reasoning to bear upon them, that their effects may be altered.

This is the only difference in kind, if it be so allowed, *viz.*, that between *concrete* and *abstract*.

Whence arises this power which man alone possesses? Perhaps Dr. Iverach is not far wrong when he says: "Perhaps the greatest feat ever performed in psychology is performed by Mr. Spencer when he affirms: 'Not only do feelings constitute the inferior tracts of consciousness, but feelings are in all cases the materials out of which, in the superior tracts of consciousness, intellect is evolved by structural combination' (*Psychology*, vol. i., p. 192). That is something worth knowing!"¹

For my part, I prefer to be an Agnostic as to how consciousness arose, and still more how self-consciousness was superadded; but facts seem sufficient to warrant the conclusion that while the higher animals have only the former, man has both.

Mr. H. Spencer's interpretation conveys no definite meaning to me.

Romanes tried to throw light upon it as follows: "Receptual or outward self-consciousness is the practical recognition of self as an active and a feeling agent; while conceptual or inward self-consciousness is the introspective recognition of self as an object of knowledge and therefore as a subject, etc."

What does all this—and a great deal more—mean but that *I* am conscious of *Myself*, can mentally talk about myself, compare myself to other selves, etc., etc. I am *not* conscious, however, of having two sorts of self-consciousness. Everything outside of *Ego* comes under "consciousness" without the "self". Dr. Iverach, I think, rightly observes: "At all events, Dr. Romanes has not made clear what he means by conceptual self-

¹ *Op. cit.*, p. 164.

consciousness. Nor has he made good the distinction between outward and inner self-consciousness."¹

"Following Locke, he [Romanes] makes the power of forming abstract ideas to belong only to man. 'Therefore, I think,' says Locke, 'beasts compare not their ideas further than some sensible circumstances annexed to the objects themselves. The other power of comparing, which may be observed in man, belonging to general ideas, and useful only in abstract reasonings, we may probably conjecture brutes have not.' But does not the distinction between conscious and self-consciousness begin at an earlier stage?"² asks Dr. Iverach.

I would regard Locke to be the more correct, because self-inspection or self-consciousness is a *particular instance* of the more general property of making an abstraction, in this case, the *Ego*, an object of thought.³

The two remaining consequences of Man being alone able to entertain abstract ideas are the *Consciousness of having the power to choose* or "Free Will," and the conception of "Immortality". These will be considered hereafter.

¹ *Op. cit.*, p. 170.

² *Op. cit.*, p. 171.

³ I was not aware that Locke had forestalled me; for I drew this distinction between man and animals in my Actonian Prize Essay, *Evolution and Religion*, p. 151 (1873), and emphasised it in *Christian Beliefs Reconsidered in the Light of Modern Thought*, pp. 63 *et seq.* (1884). I gave Romanes a copy of this latter work; and he said he fully agreed with me as to what I had written. He had previously regarded "Speech" as the fundamental difference; but animals of the same kind have indubitably some power of communication between them, though it may always concern matters of sense.

I have no intention of entering upon the field of discussion about the connection between mind and "grey matter," or of consciousness and brain. The reader will find the true theories of Materialism, interaction and parallelism well discussed by Mr. Stout, who himself adopts the last as a provisional hypothesis (*Manual of Psychology*, Introduction, chap. i., p. 3, on "Mind and Body").

CHAPTER II

RATIONALISTIC VIEWS OF SCIENCE AND KNOWLEDGE

MODERN Rationalists not only take their name from Reason, but exalt it as almost omnipotent, at least as far as the material world is concerned. Thus Mr. C. T. Gorham says: "Knowledge ends with the material phenomena; beyond, conjecture holds the field, and explanation becomes guesswork".¹ In fact, whatever cannot have a rational explanation by observation and experiment is not to be accepted as a scientific truth according to him and other Rationalists.

Science and reason doubtless might be infallible, if only we were always quite sure of our facts; for *Facts* are *Truth*; but science, as representing co-ordinated human knowledge, is always progressive. Truth is only ultimately secured, not only by observation and experiment with verification, to which these authors seem to limit us, but by inductive evidence coupled with a continual elimination of unsupported deductions, *a priori* assumptions and errors.

The following will supply the reader with some of the anonymous author's descriptions of science occurring in *Mr. Balfour's Apologetics*.

(1) "Science assumes the Universality of the Law of Causation."

¹ *Faith, its Freaks and Follies*, p. 44. This author completely fuses "Faith" "belief" and "credulity".

(2) "Science lays bare the natural causes of all phenomena".¹

(3) "Knowledge courts the most rigorous investigation."²

(4) "The fabric of science is based on the evidence of the senses, and on inferences which are drawn from them."³

(5) "Science remains firmly planted on the impregnable ground of experience."⁴

(6) "The facts and theories of science receive daily an overwhelming confirmation from general consent, from success in practice, and from common sense."⁵

(7) "Science is the one thing certain" (L. Stephen).⁶

(8) "Knowledge can only be gained by means of observation, corrected and verified by experiment."⁷

"If any such knowledge of the supernatural can be shown to exist it must take rank as scientific truth."

"The so-called knowledge [of God] must be submitted to the tests of observation and experiment; if it is knowledge at all it is capable of verification."⁸

(9) "Reason declares with overwhelming force that everything which cannot be proved by scientific means is incapable of proof."⁹

(10) "Science is knowledge verified and reduced to system."¹⁰

(11) "Life in its lowest forms involves relations and correspondences with the surrounding world. And what are these but incipient knowledge? . . . From this we get brain; and we have thus living illustrations of the fact that reason has proceeded from non-reason."¹¹

(12) "The moral ideal of Rationalism is truth, and on

¹ Pp. 20, 21.

² P. 24.

³ P. 26.

⁴ P. 26.

⁵ P. 31.

⁶ P. 32.

⁷ P. 34.

⁸ Pp. 34, 103.

⁹ P. 34.

¹⁰ P. 102.

¹¹ P. 111.

no other foundation than truth can any lofty or durable system of ethics be reared.”¹

(13) “Human reason is the highest product of earthly evolution, the apex and not the ground of man’s existence.”²

I do not think this author can be a scientifically trained man; for he would have known that science can by no means be trusted so far as he writes about it. The very term “provisional or working hypothesis,” which scientific men constantly employ, indicates the uncertainties associated with the pursuit of various branches of science. Some have never got beyond it, as the proving the existence and nature of ether.

This author appears to limit science to “observation and experiment” (4, 5, 8,) and says it “lays bare the natural causes of all phenomena”.

No scientific man will endorse that statement. We can readily recall a few phenomena of which science has never yet laid bare the cause.

In astronomy, what was the original cause of rotation?

In chemistry, what is the cause of chemical affinities? Haeckel’s erotic theory is too puerile for consideration.

In physics, what is the cause of gravity and the correlation of forces generally?

In biology, what is the cause of the translation of molecular vibrations in the brain to consciousness?

Science may try to lay bare these causes, but she has never yet succeeded and probably never will.

We all know that science is not infallible now: what was it before the nineteenth century? A mass of

¹ P. 151.

² Pp. 212, 213.

empiricism. Compare the science of medicine, say of the fourteenth century, with that of to-day. Thousands of drugs and recipes as well as charms, then used in all faith, have been utterly discarded. Many were based on the *a priori* notion that "like cures like," so that ground up cherry-stones were supposed to be a remedy for stone; plants with a yellow juice, as the celandine, would cure jaundice, etc.

Who will pronounce the science of medicine to-day as infallible, or as "the one thing certain (7)"?

Has science solved all the problems of any one branch of knowledge to-day? Experts in every line know that theories and working hypotheses are all that can be held on many points.

Or again, Does modern science know no reed, broken or unbroken, upon which it leans?

Let us follow the author's words: "Science courts the most rigorous investigation". Well, I have given it in the matter of Darwinism; and the result of the investigation is that this much-valued basis of Rationalism and Materialistic Monism has not a particle of evidence to support it.

The author of *Mr. Balfour's Apologetics* replied to my observations that he ignores too much the evidence of inductive evidence (*i.e.*, the accumulation of coincidences and probabilities), and says, "I do not ignore this fact, but I would point out that all inductive evidence rests ultimately on a basis of observation and experiment. Induction is a generalisation from experience." *Experience*, however, is not *experiment*. We experience the difference between day and night; but no experiment can prove that the sun does not go round the world in twenty-four hours. A pendulum set swinging north and south will soon appear to be swinging between north and

east; but this is no *proof*; it is only a *corroborative probability* that the earth is rotating under it. He denies that my illustration of the spectroscope is a just one, and says: "We actually subject the photosphere of the sun to observation and experiment". I unhesitatingly deny this; for if the photosphere be composed of gaseous iron, sodium, etc., not one of these elements ever reaches us. Nothing but ethereal vibrations arrive at the spectroscope. These, we believe, *indicate* the presence of those elements; but it is only an inference. My object in quoting the above paragraphs is to show, first the exaggerated value put upon Reason by Rationalists, and their inconsistency in not recognising the importance of inductive evidence where experiment is impossible.

Now let us turn to Haeckel's views on science.¹

(1) "Truth unadulterated is only to be found in the temple of the study of Nature; and that the only available paths to it are critical observation and reflection—the empirical investigation of facts and the rational study of their efficient causes. . . . The Goddess of Truth dwells in the Temple of Nature. . . . The rich gifts which the Goddess of Truth bestows on us are the noble fruits of the tree of knowledge and the inestimable treasure of a clear unified view of the world."²

These quotations will be sufficient. Other Rationalistic authors write in the same strain; but all true scientists will recognise this as hyperbolic language, which far exceeds the modesty of a Newton! The serious omission, however, which I have emphasised, and shall do so again, is the almost invariable want of any due appreciation of inductive evidence; which can be quite equivalent to a mathematical demonstration; as in the *Truth* of the rotation of the earth.

¹ *The Riddle of the Universe.*

² Pp. 345, 346.

If we turn to metaphysicians, we find, on the other hand, that reason is from one cause or another somewhat slighted in certain directions. Thus Prof. H. Jones says: "No age has employed reason more, nor trusted it less, than our own".¹ He contrasts the estimate of reason in two regions by saying: "If, on the one hand, the great mass of the 'expert evidence' of philosophers, psychologists and theologians is condemnatory of human reason, the practical confidence of the day in the uses of the intelligence remains, on the other hand, quite unshaken," . . . but "scientific men themselves are unable to deny that their premisses are only 'working hypotheses,' and their whole procedure, in the last resort, only tentative".

He is here encroaching upon, if not contradicting, the Rationalist's creed. For Materialistic Monists, as we have seen, base everything on what they believe has been thoroughly "reasoned out," *vis.*, Darwinism, though it is proved to have been based on a false premise.

Then Prof. Jones adds: "Thus at the very moment when human reason is charged in the high places of abstract thought with every weakness, it is believed to be bringing in a richer harvest of practically valid truth than the world has seen at any other period of its history".

He then classifies the sciences as follows: "It may be maintained, and with some truth, that it is only in the field of physical inquiry that man's natural powers have unequivocally proved their strength. The supraphysical sciences, such as Biology, Physiology, Psychology, Anthropology, Political Economy—not to mention Ethics, Social and Political Philosophy, Theology and Metaphysics—lack the demonstrative security and the predictive power of the Mathematical and Physical sciences."

¹ "Reflective Thought and Religion." *Hibbert Journ.*, i., p. 229, etc.

This quotation brings us to the point. He appears to be comparing, or contrasting, if he be not putting one against the other, *viz.*, *Deductive* and *Inductive* reason. He does not recognise the value of the latter in these so-called "supraphysical" sciences. The former is that employed by Euclid and other mathematicians. It is safe for them to do so, because there are only a few axioms or postulates upon which the whole of the superstructures are built; and if the steps in their logical sequences of any proposition are correctly made, they cannot arrive at any other conclusion than a Q. E. D.

In astronomy the occurrence of eclipses can be foretold with accuracy hundreds of years in advance, if necessary.

The laws of heat, light, electricity, and magnetism are known; so that they can be trusted to do their work, and utilised, as their effects are constant. But in biology it is not always so. Data are more complex on which to reason; but inductive reasoning now meets the case, so that to an enormous extent the conclusions of biological scientists are perfectly sound and equivalent in value to mathematical demonstrations.

In astronomy it has to be trusted; thus, I repeat, the conviction that the earth revolves on its axis in twenty-four hours is solely founded on inductive evidence. Similarly is our knowledge of the elements in the sun established on faith in the accumulation of coincidences, on which probabilities are based. These are of so high an order, that they force the moral conviction, and any alternative becomes unthinkable.

It is solely on inductive evidence that the Copernican system has superseded the Ptolemaic.

In biology the great doctrine of Evolution is largely based upon induction; for probabilities pour in from all

quarters—palæontology, comparative anatomy, embryology, transitional forms of living beings, etc. ; such are more than ample to establish the truth of it ; so that any alternative proposed at the present day to Evolution (whatever be the actual process in Nature) is absolutely inconceivable.

In fact, we live upon inductive evidence every day of our lives. We trust ourselves in trains because the probability that we shall arrive at our destination safe and sound is of a high order, *i.e.*, a practical but not absolute certainty.

Circumstantial evidence is another example. No one saw the crime committed ; but the supposed criminal was condemned from the accumulation of facts which all pointed to the one probability of the man having done the deed.

Now Rationalists are inconsistent ; they cannot but admit the foregoing, yet refuse to believe in God, freedom and immortality, because they (as they assert) escape “practical demonstration,” but they can be all shown to be *overwhelmingly probable* : and that is all we want in this world. We must live by faith (*i.e.*, inductive evidence) in the spiritual world and not only by sight.

Darwinism, however, was not based on inductive reasoning, but solely on *a priori* assumptions, that is, deductive reasoning, on an assumed basis ; but without any axiom or postulate which could not be gainsaid. “Indefinite variations” might be called Darwin’s axiom ; but unfortunately they only existed in his own imagination.

Now it is strange to find Rationalists so strongly maintaining the supremacy of reason, yet all bowing down in abject obeisance to authority in the form of Darwinism ; which they regard as the very “basis of Monism”.

Natural Selection of Darwinism is, in fact, a *Deus ex machinâ* for Haeckelian Monists and Darwinians like Weismann. It comes in handy whenever and wherever some explanation is wanted. It can do anything and everything, without giving one the trouble of thinking or investigating the causes of phenomena.

Thus, the Mind and Reason are equally regarded as being due to Natural Selection; so too is the æsthetic sense, while Morals follow suit. Thus it is said: "The capacity of the human intellect is in conformity with what we might expect, on the theory that it has been evolved for practical purposes by the process of Natural Selection".¹

"Reason is 'the roof and crown of things'; it is the final result of a long process of Natural Selection."² "The development of the æsthetic sentiments may be explained as one of the inevitable results of the operation of Natural Selection."³

Since, however, Darwin came to see that self-adaptation to the "definite" action of the environment is the cause of new variations in animals and plants: experience shows us that æstheticism and tastes for forms of art are matters of cultivation. This means that the more we exercise our brains in studying these things, the more the brain will *respond* and become *educated*.

Such is only a particular instance of the universal process of "response to the environment," perfectly analogous to the education of reason and other mental traits by practice. It thus falls under the law of use, by which structure is developed in the bodies of animals and plants.

As another trait of the mind, is the love of beauty.

¹ *Mr. Balfour's Apologetics*, p. 87.

² *Op. cit.*, p. 93.

³ P. 71.

Here Materialism enters into the strangest opposition to Christianity it is possible to conceive. This is what Haeckel says : “ Monism enters into its strongest opposition to Christianity on the question of beauty. Primitive Christianity preached the worthlessness of earthly life, regarding it merely as a preparation for an eternal life beyond. Hence it immediately followed that all we find in the life of man here below, all that is beautiful in art and science, in public and private life is of no real value. The true Christian must avert his eyes from them ; he must think only of a worthy preparation for the life beyond. Contempt of Nature, aversion from all its inexhaustible charms, rejection of every kind of fine art, are Christian duties.”¹

Could anything be more grotesque? What do all the art galleries of England and the Christian world mean?

Haeckel has an eloquent passage upon the lovely forms of life discovered during the nineteenth century ; but says : “ This progress of modern times in knowledge of the true and enjoyment of the beautiful expresses, on the one hand, a valuable element of our Monistic religion [?] but is, on the other, in fatal opposition to Christianity.”²

Every reader will perceive what a travesty this is of true Christianity. Whence Haeckel derived this absurd idea, I know not. Christianity not only prepares man for the next world, but ennobles his life on earth. A true Christian enjoys his life in *company with his Maker* ; for he reads “ sermons in stones and good in everything”. Not a flower or an insect, nor the lilies of the field and the fowls of the air, but tell him of his Creator as well as remind him of Christ.

The very fact that he can *enjoy* life, as well as *all*

¹ *The Riddle of the Universe*, p. 347.

² *Op. cit.*, p. 352.

creatures, each in its several way, is a witness to the presence of a Mind who could evince His love for all his creatures, by evolving a nervous system as the physical basis of mental enjoyment.

But Monists see nothing of this! They must have *physical proof* of God.

“Science,” writes the anonymous author of *Mr. Balfour's Apologetics*,¹ neither affirms nor denies the existence of God; she has no need to trouble herself about any such hypothesis. . . . It is altogether excluded from the domain of science, which can recognise nothing that is not based on knowledge. . . . The so-called knowledge must be submitted to the tests of observation and experiment; if it is knowledge at all, it is capable of verification, and the verdict must be final.”

Inductive evidence is here, I repeat, utterly ignored.

¹ P. 102.

CHAPTER III

RATIONALISTIC VIEWS OF PSYCHOLOGY, REASON AND INSTINCT

AFTER having accumulated *facts*, as a basis of *knowledge*, and then co-ordinated them according to their various relationships, and so classified them *scientifically*, we endeavour to trace out the *natural laws* or the invariable orders of sequences.

In so doing one observes not only distinct causes and their effects; but definite *objects* secured by the various forces at work. This is called *Reason* in Man.

When we look for evidences of reason in Nature, other than man, such being acts done with some apparently *special motive* and not merely automatic repetitions only, we find it exemplified through the whole of the organic world, not only in animals but in plants. As reasoning in animals has been denied by some, it is as well to give an instance recorded by Romanes which that observer regards as distinctly proving reason in a dog. His definition is that "for an action to be rational it must be performed with conscious deliberation, or with thoughtful adaptations of means to ends".

"I drove with the dog from its country home, as a present to a friend who lived in a town some ten miles distant. Several weeks afterwards I again drove to visit this friend, and when my horses were being harnessed for the return journey the terrier must have reasoned from

analogy that I was about to return home, and thereupon formed the resolution of accompanying me to the hunting ground of his puppyhood. But he must further have reasoned that since on the occasion of my previous visit I had purposely left him behind as a present to my friend, I should not on this occasion be inclined to take him home. Lastly, he must have reasoned that there was one expedient whereby he could solicit my protection on the homeward journey without the danger of being imprisoned, and this expedient he adopted; for after we had vainly searched for Skye, to prevent his following my dog-cart, I started, and when two miles on my way home, I overtook him, lying in the middle of the road, with his face towards the town, evidently expecting my approach. And as the dog had clearly contemplated, the distance was too great for me to return with him to town, so that, as he had clearly intended, I had to take him with me to his old home in the country.”¹

He gives another story of a dog lying down in a kitchen while the cook was trussing a fowl. As soon as she left the room, he seized it, carried it out and buried it. He then came back and lay down as before, mimicking innocence. Unfortunately for the dog the gardener saw him bury it, and brought it back.

The following is reproduced from the *Daily Telegraph* of 9th March, 1903: “A burglar has just been detected, a fortnight after he had assisted in the work of the robbery, by a wonderfully sagacious dog belonging to the gentleman at whose expense the depredation had been committed. The owner lives in Paris, and his villa at Charenton having been ransacked, he had stocked it with new furniture. After a heavy morning’s toil, he was pro-

¹ “Animal Intelligence,” a lecture by G. J. Romanes, 1879.

ceeding to a restaurant to recruit exhausted nature when the spaniel suddenly ran after a well-dressed man who was walking about fifty yards in front and began to bark loudly. The owner hurried after the animal to call it back, but, instead of obeying him, it attacked the stranger, fixing its teeth into his trousers and holding on for all it was worth. The gentleman then perceived that this was one of his garments, which had disappeared on the night when his villa was pillaged, so he spoke to a wood-ranger who happened to be passing, and the man was conducted to the police station, where he was forced to confess that he had had a hand in the burglary, though he declined to give the names of his accomplices. So the dog had turned out to be an excellent detective."

If one may recognise reason in animals whenever such "reasonable" acts are done, *i.e.*, when certain means are employed to secure special ends, which are outside their normal procedures, then we *apparently* can see such in the actions of animals which possess no brains at all, but only a nervous system.

Thus, if the head of a frog be cut off, and a little acid be rubbed on the inner side of one of the legs, the other leg is instantly drawn up and turns the foot to try and rub off the acid from the other leg.

This may be called a "reasonable" act, but it is simply an unconscious, mechanical, reflex action from the spinal cord; for if a long needle be now thrust down and destroy the cord, all action of the leg ceases immediately.

A frog which has been deprived of its cerebral hemispheres, swims perfectly in water and is indeed obedient to all sorts of stimulus. The reflex action which accounts for all its movements shows an entire want of any *spontaneity*, and is purely *automatic*, as it takes place precisely in the same way under the same stimulus. Unlike

stimuli associated with consciousness it can learn nothing by experience.

If there be any feeble consciousness associated with such reflex action, it cannot be determined; but the consciousness of the higher animals and man, which is often obviously accompanied with reflex action, depends upon the efficiency of the superficial grey matter of the brain over and above the sub-cortical tissues.

Thus is it all through the animal kingdom from man to an amœba, that innumerable actions evincing all the characteristics of reason are done by unconscious protoplasm alone.

Even in the actual construction of cells, the rule is for the nucleus in the middle to divide into two leaving a space between them. Then a "cell-plate," to form a new wall, is laid down between them; thus dividing the cell into two. This process is repeated *ad infinitum* till the animal or plant ceases to grow.

Two special cases have been described above,¹ but I will here repeat where difficulties had to be met. When the nucleus was situated at the side of the cell, it began to divide into the two halves which travelled across the cell, laying down the cell-plate as they went along, until they reached the opposite side.

In another case the cell-plate was made by means of the nucleus bulging out into a flattened spheroid till it touched the opposite sides.

Practical protoplasmic reasoning might very well define this behaviour; though it was undoubtedly due to unconscious automatism which performs these apparently rational proceedings. That is precisely what it is, from the formation of cells to the habits of a monkey.

¹ Part I., chap. xii., pp. 62, 64.

The reasoning is always automatic and connected with concrete matters, which *suggest* to the nervous system or the brain or protoplasm generally what should be done, and the protoplasm in every case does it accordingly.

Similarly nine-tenths of man's reasoning is of the same kind, and is known as "common-sense" when external objects and circumstances suggest to the brain a course of action which it follows at once. He does many reasonable acts from morning till night, as already explained, but none of them make any special call upon his volition. His will, however, is always ready to respond, if there is any occasion for *choosing* between two courses of action, which may involve or require some abstract motives wherewith to decide upon the most desirable.

The question arises, Does this inherent property of reason, seen in all organic beings and in the very cells of which they are built up—not to add the inherent power the nucleus possesses to build up different forms in response to new conditions of life, the basis of evolution—indicate Mind though "the reasonable acts" be themselves automatically done (whether consciously or unconsciously)?

One writer I have quoted would ask after the manner of Philip, "Show us your God?" Of course, this is impossible; but may we not say in the words of Sir Oliver Lodge: "Look for the action of the Deity, if at all, then *always*; not in the past alone, not only in the future, but equally in the present. If His action is not visible now, it never will be, and never has been visible."¹

If Paley's watch did not require a visible watchmaker

¹ *Hibbert Journal*, i., p. 214.

to substantiate the Argument of Design, neither does the doctrine of Evolution require God's visible presence to substantiate His Reason in Nature.

I need only refer the reader to Paley's work for instances in the animal kingdom ; so now let us take a few illustrations from the vegetable world.

If a man has to cross an arid desert, he carries water with him. If plants live in dry rocky places, where rain falls for a few weeks only in the year, they provide themselves with water-storage tissues.

If plants have weak stems, they often convert their leaves or flowering branches into tendrils, and moreover provide them with a sensitiveness to touch, so that they coil spirally around any object with which they may come into contact. So, men make rope ladders.

As the embryo of seeds would perish on germination if they had not food to live upon until roots and leaves are made, Nature provides them with the necessary substances in reserve, wherewith to fight the battle of life ; just as a convoy accompanies soldiers on the march.

Similarly many plants have found out methods of propagation without seeds, as potatoes. To do this reserve food materials are stored up for the "eyes" or young shoots to live upon until they have roots and leaves, like germinating seeds. These are but a few of "reasonable" processes whereby "means" for "ends" are provided by the plant in view of future contingencies, etc.

Such processes are all effected by automatic protoplasmic "reason," if it be permissible to use the term in this sense where consciousness is absent.

Haeckel, indeed, does attribute a "soul" with all its properties to primordial cells, that is, in fact, to protoplasm ; but I should prefer to limit "reason" to acts associated with *consciousness*, and use the word "adapta-

tion," which covers the whole ground, however "reasonably" the process of adaptation be carried out.

Now the question follows: Suppose we use the word reason, first, for its recognised use by a most accomplished metaphysician, who deals entirely with abstract thought. Secondly, with the concrete applications of man in everyday life; as well as on the part of the higher animals, who never get beyond such concrete use of it.

We then pass it on to apparently "reasonable acts" of reflex action and instinct, till at last we find it in the protoplasm of a cell; for "means" to secure "ends" occur throughout from top to bottom of the living world. Then are we not justified in concluding that the highest form of reason as seen in man, substantiates the belief that an even higher Mind than his is behind the whole series; that this *Logos* or "Directivity" proves by inductive evidence a conscious reason in the recognised Power behind Nature?

This conclusion Rationalists may not regard as scientific, but it is philosophical.

There is a type of reasoning which is called "common-sense," to which I have just alluded. This appears to be "reasoning about very obvious matters and experiences".

An example is the best way of illustrating this; as it is simply a generalisation from experiences.

Suppose it has been showery in April all the morning but clears up about noon, and the sun breaks out. A man and his young son go out for a walk. The father puts on his greatcoat and takes his umbrella.

The son seeing the sun shining does neither. Another shower comes up in an hour. The father says: "Why didn't you put on your coat and bring an umbrella? You might have known (or 'your common-sense' might have

told you) that another shower was likely to come up in April."

The father had "common-sense" based on experience; the boy had none.

If an adult be deficient in common-sense, we call him "stupid," and we commonly say "he did not stop to think". The boy acted on a deduction from insufficient data—*Because* the sun was shining, *therefore* it will be fine. The boy went through a process of intuitive or automatic reasoning; but as it was a pure deduction, it was fallible.

This covers a large field of man's imperfect reasoning, lying between conscious, reflective reasoning, where all the data available are mentally collected; and the process of "jumping to conclusions," *i.e.*, deductive and *a priori* assumptions, which generally turn out to be erroneous.

If the word reason be only legitimately restricted to conscious acts performed with some definite end in view; then instinct in many cases also stands for many acts performed with some definite ends in view, but without the creature knowing what the "ends" may be. It partakes therefore, of an automatic character, due to some inherent directivity independent of the creature's knowledge.

In themselves the acts may have apparently all the characteristics of reason. This leads one to suppose that they *were* truly reasonable acts in the ancestral performers; but have now become fixed and inherited traits or instincts.

This may not imply to all, for some are at present quite inexplicable. With regard to Instinct, there are different views. Herbert Spencer has described it as "compound reflex action"; but Mr. Romanes would add the

element of "consciousness". Mr. Reid would define it as follows: "The faculty which is concerned in the conscious adaption of means to ends, by virtue of inborn inherited knowledge and ways of thinking and acting".

He then gives an example: "The young alligator or the young turtle instinctively seeks the water on emerging from the egg, *i.e.*, they seek it by virtue of their inborn and inherited knowledge and ways of thinking and acting. Instinct is clearly transmissible."¹

In this case Instinct seems synonymous with inherited memory of the water as the medium in which the parental alligator and turtle lived.

But numerous instincts—*i.e.*, at least habits, which would be now called "instinctive," can be grouped or classified with what must have been "reasonable" acts and done through "conscious adaption of means to ends". I will take one or two instances.

Little pigs go at once to the sow's teats. That is *instinct*; but the sucking process itself is regarded as due to *reflex* action. The calf's habit of butting the udder is common to all and can only be instinctive; certainly it is not taught to do so by the mother cow.

Prof. A. Newton regards the instinct of the cuckoo in putting its egg in the nest of some other bird as an inherited habit. "Everyone who has sufficiently studied the habits of animals will admit the tendency of some of these habits to become hereditary. That there is a reasonable probability of each cuckoo most commonly putting her eggs in the nest of the same species of bird, and of this habit being transmitted to her posterity, does not seem to be a very violent supposition."²

Mr. O. H. Latter after criticising the above observes:

¹ *Op. cit.*, p. 137.

² *Dictionary of Birds*, p. 123.

“In spite of these criticisms I am compelled by the results of my investigations to admit that I now believe Prof. Newton’s theory to be, in the main, correct”.¹

If hermit crabs, to which I have already alluded, now supply instances of an hereditary instinct converted into an absolute necessity, their enemies supply reasoning in adapting their habits towards them; for it has been noticed that a very young octopus will at once seize a hermit crab; but as the latter had fixed stinging zoo-phytes over the shell [by reason], the octopus recoiled and let its prey escape. Subsequently it was observed to avoid hermit crabs. But older animals of the same species managed cleverly to pull the crab out of its house without being stung.²

If the acquiring of any habits come under what Mr. Reid calls “psychological change,” *i.e.*, from a previous state, when no such habit existed; and the habit in this case probably arose from the direct, conscious adaptation of means to ends; then, such are obviously inherited, and the fact that these habits run in direct descent of particular genera or species is an additional evidence that they have become fixed, automatic traits in the race in question. Hermit crabs now have the *instinct* to go searching for “houses to let”.

Let us take another example.

Soles, as fry, are, like other fishes, bilaterally symmetrical; but they soon assume the generic habit of lying flat on the ground more or less embedding themselves in the shingle. The bodily form changes in conformity with this changed and acquired habit; as the form of the fry indicates the ancestral type.

Their present habit suggests the primary purpose of

¹ *Biometrika*, i., p. 166.

² Stout’s *Manual of Psychology*, p. 257.

trying to hide themselves at the bottom of the water to escape their enemies. Both form and habit have now become perpetuated and hereditary.

For a hen to scratch up the ground is a reasonable procedure. It was a direct act of reason in the first that did it. Experiments prove that it is now instinctive in chickens; as Mr. Reid shows in the following instance. "Without any opportunities of imitation when kept quite isolated from their kind, chickens begin to scrape when from two to six days old. Generally, the condition of the ground was suggestive." Some chickens were hatched on a carpet, where they were kept for several days. "They showed no inclination to scrape, because the stimulus supplied by the carpet to the soles of their feet was of too novel a character to call into action the hereditary instinct; but when a little gravel was sprinkled on the carpet, and so supplied the appropriate or customary stimulus, the chickens immediately began their scraping movements."¹

In this case, therefore, we have a primary act of *Reason* to start with. It becomes an *Instinct* in the race; which is then performed by *Reflex Action*.

Dogs bury bones. Such an act is due first to reasoning powers, with the object, presumably, of keeping them hidden from other dogs, so that they may eat them on some future occasion. This has now become a hereditary habit. Even a puppy in a room has been watched trying to bury a biscuit in the corner, first, by scratching at the boards to make a hole; then after placing the biscuit where it imagined the hole to be, it tried to bury it by pressing it down with its nose. It came away apparently quite satisfied with the result. Any "common-sense" was conspicuous by its absence.

¹ Experiments of Dr. Allen Thomson, F.R.S., *op. cit.*, note, p. 159.

Mr. Reid compares the three processes as follows : " It is to be noted that instinctive action is as sharply divided from reflex action by the fact that it results from consciousness, as it is divided from rational action by the fact that it is due to inborn not acquired knowledge and ways of thinking and acting."¹

If he means " not acquired " by the individual itself, he may be right, though prolonged habit may become *instinctive* in animals, as it does *automatic* in man ; but from the cases given, instincts seem certainly in some cases to be hereditary reasonable acts, but done automatically, the adaptation of means to ends being lost or grotesquely imitated. Thus a tame beaver kept indoors is said to have made a " dam " in the corner of a room by collecting all the small articles it could get, such as brushes, sticks, etc. This seems to be a case of " instinct at fault ".

Some writers say " instinct never fails," but this is incorrect ; for example, I have found the solid spine of an echinoderm pierced by the boring of some carnivorous univalve. Woodpeckers have injured telegraph poles.

Again one instinct may clash with another. Thus swallows which had built and hatched eggs too late in the season, abandoned the brood when the instinct to migrate was present.

A great deal has been written on Instinct in animals ; the majority of cases (if not all) seem to be hereditary habits originally acquired by use and adaptation to the surroundings. I think we may regard this principle of Adaptation to the Environment as applicable to the origin of *habits* as well as *structures*, as explaining at least most of them. Thus various kinds of birds always build pre-

¹ *Op. cit.*, p. 147.

cisely the same kinds of nests, as of thrushes, blackbirds, rooks, etc., respectively. Evolution will not allow that any particular kind of bird *first* built one of the shape and structure now peculiar to the species, other than as a *result of experiment*. I mean, the bird could not have had any previous instruction as to how it should be built.

But having once succeeded to its satisfaction, the same nest becomes, so to say, an hereditary feature; and the power to make it an heirloom.

It is thought the young birds receive instruction from their parents. It is very possible, not to say likely, that such is the case; but experiments have shown that it is not always necessary. Thus a greenfinch's egg hatched under a canary proved to be a hen and subsequently built a normal greenfinch's nest. A young bullfinch taken early has been known to do the same thing.

Whether trap-door spiders learn how to make nests, I do not know, but those of very small spiders I possess are just as beautifully made as if by full-grown individuals.

Similarly, habits of instinct seen in insects seem to have been originally successful experiments, which having proved to be useful are repeated *ad infinitum* by heredity. Thus certain wasps paralyse spiders, but do not kill them, for food for their grubs. The exact spot where the nerve ganglion is may have been originally found by "trial and error"; but once discovered, the stinging the victim there has become hereditary.

Birds and insects are said to change their usual habits if they alter their habitats, if it be necessary to do so, under the influence of the environmental conditions; just as their own bodies become modified giving rise to new varieties or species.

It is said, for example, that the hive-bee has been known to abandon the hexagonal cell, and lapse into

forming the circular form, after the ordinary type of the humble-bee. While trap-door spiders make excellent doors to their chambers in Mentone, our English species makes none, but simply tears a hole in the wall to drag its prey inside and then mends it again.

This method appears to have now become a fixed and instinctive habit.

On the other hand, there are some instincts which are still inexplicable such as the so-called "homing" of animals. Dogs and cats have been taken long distances by train, and yet have found their way back across several counties. No one at present seems able to explain how it is done.

With regard to the homing instinct Romanes records "Evidence of a cat finding its way home from London to Huddersfield, a distance of 200 miles; of a dog returning to its home in Sutherlandshire from Berwick-on-Tweed, having been taken to Berwick by sea, and returning by land, etc. In such cases short cuts are often made over third sides of triangles; but it is interesting that in one of my cases, communicated to me by an intelligent correspondent, some horses, in taking a short cut for home, were brought up, after a journey of several hundred miles, on the end of a peninsula, where they do not seem to have had sense enough to double back."

Homing instinct cannot be identically the same thing as that of a carrier pigeon; for as Prof. Loeb says: "It seems to be certain that the carrier pigeon finds its way back by the visual memory of the locality from which it started." He says the same thing of solitary wasps, bees and ants.¹

Prof. Loeb remarks: "It always seemed to me one

¹ *Comparative Physiology of the Brain*, p. 196.

of the most wonderful arrangements in Nature that, in many species, the female lays her eggs in places where newly born larvæ find just the kind of food they require. The fly lays its eggs on decaying meat, etc., and it is on these substances that the young larvæ feed.”¹

I cannot see where the difficulty lies, for the fly was a grub itself once : and has only to remember what it fed on before it fell asleep and woke up as a fly !

Another instinct is that of amusement. Probably all animals, if we did but know their habits sufficiently, amuse themselves in some way or another. It is particularly noticeable in domesticated animals, especially the young. It is also very patent in insects, as gnats, flies, butterflies, etc. But what is very apparent is that each kind of animal plays in precisely the same manner generation after generation. We never seem to see any initiative now, though their games must have originated at some time. Thus, flies darting backwards and forwards, pirouetting when they meet, is a familiar instance. Such is a habit which is now evidently hereditary.

Dogs, cats, and savages as well as mediæval knights at “play” mimic fighting. This suggests the probable origin of that custom ; while the sexual instinct may account for the “pirouetting” peculiarities of insects.

Birds again afford many curious habits, each kind amusing themselves after their fashion. Thus the peculiar custom of constructing and decorating “runs” of the bower-birds is characteristic of the genus and an hereditary instinct.

They know exactly what they like and where to put it. If the bird has placed a brightly coloured object at a particular spot, and it be intentionally shifted by the

¹ *Comparative Physiology of the Brain*, p. 186.

owner of the birds (in captivity), it is at once put back into its place.

Instincts have often been confounded with reflex actions ; and it is, indeed, not always easy or possible to differentiate them. A moth flying to a candle has been called an instinct ; but Prof. Loeb shows that it is probably nothing but a mechanical response to the excitement of light.¹

V. Hartmann would define instinct as "purposeful action without consciousness". This definition, however, would apply equally well to shrinking in one's sleep from a touch, or a frog trying to remove a drop of acid from its leg, without a head, or swimming without a brain ; those being obviously reflex actions.

Darwin's greatest difficulty was the cell-making instinct of worker bees, which can never leave offspring to inherit the habit.

A very simple theory will explain it. Eimer has shown that when a female grub, which would become a worker, is made to become a queen bee, she attains not all the many points of structure but the physiological peculiarities of a queen.

In other words, these latter are potentially present in every female egg the queen lays.

Hence, all that is required to be assumed is that the ancestral queen used wax to make hexagonal cells and collected honey and pollen ; but queens have now ceased to do these things, it having been taken over by the workers, in whom these traits are hereditary. In the case of wasps of the genus *Vespa*, not only do the workers but the queen still makes hexagonal cells.

My sole object in discussing thus briefly the question

¹ *Comparative Physiology of the Brain*, pp. 179-183.

of instinct is to show that the idea of Natural Selection having anything to do with it is superfluous.

Leaving animals and coming to man we observe that all children pass through the various stages of reflex action, instinct and reason, first in concrete matters, then finally with abstract ideas.

As an illustration of the first, if one places the fore-finger across the open palm of a baby's hand, its fingers at once close upon it, like the tendril of a pea on a stick. Such an act is simply due to reflex action in consequence of the stimulus excited by touch.

As an example of childish instinct a little child will run away from a stranger like any wild animal, through instinctive fear.

A little girl in a poor cottage was observed nursing a hearth-brush; its parents were too poor to buy it a doll—The "maternal instinct" was there but somewhat mis-applied!

A child seeing his father going out goes and fetches his stick. It has automatically reasoned that its father will want it on his walk. So far its reason is concerned (like that of all animals) with a *concrete* matter; but if it be old enough, it will reason, still automatically, that its father will be pleased at its *thoughtfulness*. The child is then entertaining an *abstract* idea, but it is not conscious of reasoning it out.

To make my position clearer, and in order to show that *conscious reasoning* may pass into *unconscious automatic reasoning*, let us suppose a man looks at his watch. It is 11.30 P.M., his usual bed-time. He takes out his watch key and proceeds deliberately, attentively and consciously to wind up the watch. At that moment a servant enters the room, his attention is called to the servant. When he has gone, *he cannot be sure that he wound up his watch*

or not, and tries it with the key, and finds that *it has* been wound up.

Hence his hand had automatically done the *reasonable act* which his consciousness had previously determined to do.¹

An interesting passage in St. John's Gospel illustrates three stages of mental perception which may be described, first as merely a *sense-percept*; secondly, where *mental attention* is added; thirdly, an *abstract reflection* is super-added to the previous observations. Casual and attentive observation are both possible in animals, but the third is *not*.

I allude to the account of John and Peter going to the tomb of our Lord.² John arriving first, looks in and in the semi-darkness "sees" the linen cloths "lying". Peter enters and "beholds" them as well as the napkin that was about His head, not lying with the linen cloths, but "rolled up" in a place by itself, *i.e.*, on the usual head-rest.

The meaning of this is that the long linen bands with which a corpse was bound, as referred to in the case of Lazarus, were still "lying" (*κείμενα τὰ ὀθόνια*) flat on the stone slab, just as if they were still bound round the body of Jesus, enclosing, it is presumed, the spices, as no mention is made of them being scattered about. The napkin too, retains its form (*ἐντετυλιγμένον*) as if it were wrapped about the head. In a word, *the body had disappeared without disturbing the cloths and the napkin*.

The disciples leave the tomb, and John, at least, now not only "sees" or "beholds," but "knows" the meaning of it all. He realises for the first time (for as yet they knew not the Scriptures) that the Lord has risen indeed.

¹ I have frequently done this myself.

² John xx. 1-10.

Observe the three words used for “seeing”. John first “sees” (βλέπει)—*i.e.*, he saw the cloths lying but they implied nothing peculiar. Peter enters and “beholds” (θεωρεῖ)—*i.e.*, his *attention* is aroused by some strange fact. Lastly, John comes away having “seen with his mind” (εἶδεν) and understood the meaning of what he saw.

CHAPTER IV

METAPHYSICAL CONCEPTIONS OF THE SENSES

A RATIONALISTIC author says: "We deny that the senses even occasionally deceive us".¹ Let him place his hand in water at 35° F., and then in water of 60°, when the water will feel decidedly warm; but if he had first placed it in very hot water and then transferred it to water at 60°, this latter temperature would feel quite cold. "Colour blindness" most certainly does "occasionally deceive us," and hearing sounds is by no means infallible.

So again he says, "The testimony of the senses is ultimate and irrefragable truth,"² and that there is "no such firm basis in Religion".

It is easy enough to deceive the senses, not only that of touch but that of sight. A person looking in a stereoscope for the first time would suppose the single object was one of three dimensions or *solid*; whereas he would find two pictures and both of them *flat*.

Again, looking at a mask on the hollow surface or inside, with a strong light upon it, the mask will appear solid like a face, so that to say the senses are an ultimate test and irrefragable is scarcely true. One sense must be corrected if possible by another, but this is not always practicable.

By reducing psychology to physiology Haeckel would

¹ *Mr. Balfour's Apologetics*, p. 22.

² *Op. cit.*, p. 28.

bring all mental and moral phenomena into line with bodily secretions. But it cannot be done. Worship and bile are as incompatible as to ask for a gallon of knowledge or reduce life to foot-pounds in weight.

So with Religion, it is said we gain nothing by calling "force" "God". Names are not of importance: but it is, to believe in God as a Living Being, whom you, at least, think you can trust and look to for help in distress—not for temporal matters, as Rationalists suppose we only do—but for spiritual help to bear up against the trials and troubles of this world, the continual source of wholesome discipline for man's soul. Those who know what this means, laugh to scorn the impotent wailings of the Rationalist; who is continually carping at the so-called "physical evils of this world (as incompatible with a "good and merciful God") because he has not perfect conditions about him.

The Christian can no more escape from tribulation than the Materialistic Monist, and, from his point of view, it would not be the best thing for him if he could. "No Cross, no Crown" is the Christian's motto; while faith leads him to believe that "eye hath not seen, nor ear heard, nor hath it entered the heart of man to conceive what God hath prepared for them that love Him".

His experience is that it is better to live by faith as well as, and not only by sight—with the sure and certain hope of Everlasting Life. Far better and happier and encouraging than to look forward to annihilation at death!

The intellectual Rationalist and Haeckelian Monist may do so philosophically; but his creed will *not* help the untutored masses to be pure in heart and body and righteous as a "social duty" only. If you have no taste

for virtue, why be virtuous at all, as long as you do not violate the laws of the land?

“If by ‘religious truth’ be meant the doctrine of the existence of God and of human immortality, we think it would be difficult to show that there is any general ‘need’ to believe in these things” (*Mr. Balfour’s Apologetics*, p. 28).

It is easy to say this; but the whole history of man belies it. I will contrast two writers on this point. No one will gainsay that Prof. E. B. Tylor’s authority is practically final: “The assertion that non-religious tribes have been known in actual existence, though in theory possible, and perhaps in fact true, does not at present rest on that sufficient proof which for an exceptional state of things we are entitled to demand. The evidence given is often mistaken, and never conclusive.”¹

On the other hand, Haeckel, to support his monistic views, boldly asserts: “It has been absolutely proved by modern comparative ethnology that many uncivilised races of the earliest and most primitive stage had no notion either of immortality or of God”.² He mentions “the Veddahs of Ceylon,” “several of the earliest groups of the nearly related Dravidas,” “the Indian Seelongs,” “some native Australian races,” “several of the primitive branches of the American race in the interior of Brazil, on the upper Amazon, etc., have no knowledge either of gods or immortality”. I have no means of verifying or disproving this; but am inclined to trust Tylor rather than Haeckel.

It is admitted that the senses are developed by Evolution. The eye came from a pigment spot. The ear from a feeble perception of aerial vibrations, etc. The author

¹*Primitive Culture.*

²*The Riddle of the Universe*, p. 196.

alluded to reminds us that "Helmholtz has shown that there is a mathematical correspondence between the atmospheric vibrations which produce exquisite harmonies and the physical effects of these vibrations on the nervous system. Thus in all his musical developments man has done little more than lay bare [and develop?] the natural correspondences which exist between himself and the universe."¹

We all know that a man's "ear for music" can be cultivated; that is to say, it responds to the more and more highly complex musical compositions that it hears. The "definite action" of the orchestra plays upon the protoplasm of the ear, which thus responds more and more to it, thereby building up structures which enable the man to appreciate "classical" compositions more than he did at first.

The author is right, as I have already shown, in saying man can only "lay bare" or reveal the eternal harmonies of sound waves, which must have existed potentially ever since air came into existence.

The question arises, Did harmony between certain notes arise *sua sponte* in accordance with eternal laws of vibrations; but the air which conveys them was not eternal; or did some conscious Power have something to do with it? Had He any intention in framing the laws of sound for man's delectation; as he is the only being who can discover and reveal them?

Of course, Nature gives no answer. "Notes" certainly give pleasure to birds, and possibly to other animals which cannot sing,² but they are only sequences of different wave lengths, without the *order* in which man alone

¹ *Mr. Balfour's Apologetics*, p. 76.

² A friend had a mare which became very unmanageable in her stall when the band played in the street, till she was taken out to hear it.

can arrange them. No two birds have ever been known to sing a duet.

But when we see what intense pleasure music affords man, from the tom-tom to Handel's "Messiah," we take it as *one* of the innumerable coincidences which point to *Intention* between the supposed Creator and His creation.

The same argument applies to the appreciation of works of art—the "æsthetic sense" from the primitive drawings of animal forms on bones by pre-historic man to the pictures in the National Gallery.

Further, as C. Kingsley thought, we cannot exclude Fun and Humour from our list of "Intentions". Fun is abundantly displayed among animals, but humour, wit and laughter appear to be confined to man. Certainly it is so when based on abstract ideas. But monkeys seem to be humorous about concrete things; as when I saw a monkey at the Zoo snatch a lady's pocket-handkerchief, wrap his head up in it and then bound off from perch to perch.

Man is often spoken of as the only laughing animal. It mainly arises in consequence of strong incongruities presented to the sight or imagination; but why we should laugh—though it gives us pleasure—is inexplicable. Thus, a clergyman had hung a number of pictures of sacred subjects in his vestry for some time for the instruction of his villagers. The village attendant on coming in after their removal, burst out laughing and said: "How funny the vestry looks without the pictures". Is it possible to explain *why* one should laugh at any unaccustomed contrasts? At all events it *is* a natural law that they somehow cause us amusement. This is why conundrums hold their ground so tenaciously among us; and they are especially "funny" when the abstract

and concrete are brought violently into contrast ; thus, to avoid being either too suspicious or too credulous when attending a spiritualistic seance, you should try to "*hit the happy medium*".

With regard to the preceding and all other kinds of "play of our feelings" the author quoted says: "We know that any explanation lies within the realm of physiology"; but physiology and psychology are only names for co-ordinated observations on the phenomena of life. What is it which has primarily caused the phenomena which we group under the terms of physiology and psychology? All the examination of brain and nerves would never have suggested the results of pleasure and enjoyment, of wit, fun and laughter and all the æsthetic pleasures.

The author makes the postulate, "given life and feeling," then everything else follows. Possibly so ; but Who first gave the Life and the Feeling ?

We have now seen what a Rationalist has to say about the senses and God. The Monist Haeckel declares that there is no God ; while Secularists and Agnostics assert : "I do not know what you mean by the term. There may be one but the word God conveys nothing to my mind" (Bradlaugh).

Now let us turn to a Metaphysician. The latest exponent of a conception of God is given in a work by Mr. Herbert Rix.¹

He begins by saying that there is "the need of a Faith"; a statement which no one will dispute ; and he recognises enthusiasm, as in art, etc., as worthy of the name of religion. In this he has followed the late Sir J. Seeley in his *Natural Religion* ; but this is *not* what

¹ *A Dawning Faith, or The World as a Spiritual Organism* (1903).

ninety-nine people out of a hundred understand by the term.

“We need religious thought and theory; a view of the universe as vital and as the *expression* of a living Power.”¹ This may be thought acceptable in a way; but he soon tells us that in his view the “universe is nothing else than the *manifestation* of a Living God”.² One notes the change of terms I have italicised.

He starts to prove this by misusing the word “universe”. “It implies unity, but to most people it is a ‘sum-total’”.³ He thus omits the “—verse” while retaining the “uni—”. Prof. Skeat, however, says that the word means “combined into a whole”; and that *is* a “sum-total” of innumerable differentiated units.

“Faith in a universe obliges you to believe that there is but one self-existing being. Call it God, call it Matter, call it Mind . . . there is only One.”⁴ So, too, Haeckel reduces everything to Matter and Force and calls *them*, *One Substance*.

To prove his theory Mr. Rix tells us to suppose a number of independent realities, as souls. Souls are *finite*, such as men, and if existent without bodies, will still presumably be *finite*; but the author suddenly shifts his ground and adds: “If there are more than one, they must in some sense or other be mutually exclusive”.⁵ But this would be characteristic of “*infinite* or self-existent souls,” not “souls” as we understand the term, as signifying independent realities.

He says, then, of “souls,” “If they be in space they are not independent, your beings are not self-existent”.

If we assume them to be human souls—indeed, we know of no other kind—the consciousness of one soul *is*

¹ *Op. cit.*, p. 14.

² P. 58.

³ P. 33.

⁴ P. 36.

⁵ *Op. cit.*, p. 38.

independent of the consciousness of another soul ; and no one supposes human souls to be self-existent.

Consequently, being no metaphysician, I am at a loss to understand the use of the original supposition of imagining what does not exist.

If he means that there cannot be two infinite souls co-existent in space and time, why not say so, and the matter is settled?

He further adds : "Annihilate space and they fall into identity or nothingness" ; but as it is impossible to annihilate space even in thought, no finite mind can foresee what would happen, *if matter be not annihilated too*, of which he makes no mention.

He thus seems to begin with what is finite, quickly changes it into the infinite, and then imagines what will happen, if all be swept away, apparently, very like a conjurer's trick.

Mr. Rix then describes in detail the Conservation of Energy as reducible to One, and all matter equally so to a possible single element ; then he fuses matter and force together and so, *Hi presto!* gets his "uni—" omitting the "—verse".

In doing this he makes two strange errors : one, that nitrogen is peculiar to the animal kingdom and that an "atom" resembles the " x " of an algebraical equation in being "no more a real thing than that". But x has a very real value, namely, the answer to the equation ; it only represents it, as long as it is unknown.

"Either Matter or Energy," he says "is, taken by itself, an abstraction and not a reality."¹ Is there nothing "concrete" in the Universe? "Motion apart from matter is, in fact, unthinkable." But it is perfectly conceivable

¹ P. 56.

as vibrating in ether, and ether is not regarded as Matter.

Hence Mr. Rix comes to the conclusion of "One Entity, that of Energised Matter = Universe = God".

He then discusses the universe as an "organism" and says there can be unity with diversity. He starts with the assumption "Nature lives". . . . "It is all life . . . nothing is inert, even a stone is not inert." But non-inertness is not what we understand by "life". He is here merging or confounding physical molecular motions with life. A stone is *not* all alive, as he asserts. To say so is one thing, but to correlate its internal vibrations with life in any organism, is quite another matter: and so he comes to the conclusion that "the Universe which we call material is in every particle and shred of it alive".¹ It can only be said so, by quite illegitimate abuse of terms and their meanings. Stones do *not* grow and propagate as all animals and plants do, and until Mr. Rix or other metaphysician can find flints breathing, digesting or breeding, I, for one, utterly refuse to recognise molecular vibrations as synonymous with the above phenomena, characteristic of life.

Haeckel traces "soul" to a protoplasmic cell and "life" to ether; but has scarcely reached Mr. Rix's position.

His next point is "the world you see is not so certain as the visual sensation itself". . . . "Sight is more certain than the existence of anything that is seen".² He says there is no place for that which we call matter, it is a phantom and a dream.

But is he right? How about colour, which is a purely "visual sensation". Indeed the author disproves his

¹ P. 67, he is by no means alone in this idea.

² P. 92.

own statement by confessing to be himself "colour-blind"!

For, in the first place, how can we have any visual sensations at all, if there be no objects external to cause it? We only see them by aid of the light derived from them, and light *must* have a source.

But, secondly, the structure of the eye, the optic nerve and the brain itself, all being composed of matter, fall under his expression "the world you see," and are therefore nothing but *phantoms*. How can the "visual sensations" themselves, which depend entirely on things which he admits are "uncertain," "phantoms," "dreams" be *more certain* than these things themselves?

Similarly with touch, taste, smell and hearing. They are all only "feelings". He says "even in forms (as of a book) there is nothing but feeling, nothing but mind or spirit, whichever you like best". "The only thing of which we have any certainty is spirit."

How Mr. Rix can say this, when his own eyesight habitually deceives him, is incomprehensible.

But how is it that he can *write* about "mind" or "spirit" at all? If a man had no senses he could have no "mind". *He* would be a *blank*. His mind and spirit have to thank his senses for their very existence in a practical sense. He certainly could never be a metaphysician or realise the Universe as an Organism. Metaphysics, he tells us, supply the only proof. And that proof arises by mental concepts, that must be, therefore, by means of phantom eyes and phantom ears. How, then, are metaphysicians to be trusted any more than their bodily senses, upon which they primarily depend?

Mr. Rix makes no allusion to the theoretical origin of matter from vortex-rings of ether; about which Prof.

Dolbear is so far convinced that he says: "It is either that theory or nothing, there is no other that has any degree of probability at all".¹

If matter be really composed of vortex-rings out of ether, then it might be called "etherial" instead of "material"; just as we speak of a "copper" because it is made of copper; but both words are necessary; for it is not usual for us to call any manufactured article by the name of the material of which it is composed; but the very fact of there being any visual perceptions *at all* possible, implies *something* external to the eye, corresponding to these perceptions of the mind. All that reaches the retina are vibrations, which, the reader will remember, collectively make a minute *inverted* picture on the sensitive membrane of the retina. This is mysteriously present to consciousness as an *erect* picture, not microscopically small, but in full dimensions of the objective source of light as a landscape.

Defects of structure make the picture sometimes untrustworthy or mental hallucinations create non-existent, but apparently true, external objects. But inductive evidence based on sound conditions of eyes, nerves and brains of the whole human race, furnished by the widest experience of ourselves and others, establish the truth of an external world beyond all question; corresponding to what our "visual perceptions" mentally realise.

As long as a man is a compound being of matter and mind, not to add a bundle of physical forces, it seems to one who is no metaphysician somewhat absurd to confound these two things, and ignore one at the expense of the other.

¹ *Op. cit.*, p. 43; see above, Part I., chap. iv.

As long as they are obviously mutually dependent in a living being, so must they stand or fall together.

Though Mr. Rix approaches very near to the "Monistic Religion" of Haeckel, who sees nothing but "blind and unconscious" matter and force, he tells us, "There is a Universe and . . . it is spiritual, and this spiritual universe or universal spirit is what we mean by 'God.'¹ Is it a Self-conscious Being?"

"In ourselves," he adds, "we all recognise within the circle of conscious experience two dissimilar kinds of experience; which we term psychical and physical, mind and matter or self and not-self."²

Haeckel, we may remember, unites them, making psychology a branch of physiology.

"But this distinction fails in the Universe," because, "if the universe is indeed one, then to that one there can be no beyond. . . . He [God] *is* the Universe. . . . To Him, there is no matter as distinct from mind."³

Now Mr. Rix, as before, so here, overlooks one phenomenon, and that is ether, which is not matter. Matter may perhaps be formed out of ethereal vortex-rings, but ether is ether and not matter. As it is the great vehicle of forces, pervading the universe, inclusive of all material objects, so God is a Spiritual Energy as well. Hence, if we may use the term, I repeat, ether would seem to be "the vehicle of Divine power".

Still, the question is not yet answered—"Is God a Person who thinks and loves?"⁴ "Of course He can—He thinks in *you*, thinks in *me* and in every thinking being. Your thought is God's thought. . . . He becomes the individual and sets that individual thinking."⁵

An obvious question arises—Why, then, can two

¹ *Op. cit.*, p. 137.

² P. 139.

³ P. 141.

⁴ P. 147.

⁵ P. 149.

persons be ever totally at variance in their opinions upon the same subject? Why do men tell lies if it be God who speaks their thoughts?

I suppose we must discover, if we can, some sort of answer in Mr. Rix's statement that "the Universal Spirit has all that we have, but without its imperfections and its bonds." But if the Universe is God, "all our imperfections and bonds" must be part of the Universe as much as all that is perfect and free, and therefore part of God.

Mr. Rix finally attacks the question of a future life. He says: "Death *absolute*, both our scientific creed and our idealistic philosophy entirely deny".¹ Haeckel, however, says that "immortality is that highest point of superstition which is regarded as the impregnable citadel of all mystical and dualistic notions".²

He first alludes to the decomposition of the body at death, and its elements passing into other compounds, but never becoming annihilated. This, of course, is true; but the "body" *is* annihilated as much as a house is destroyed when pulled down and its bricks are used again for building some other and totally different structure. Then he argues by analogy, that the soul follows a similar course. "The individual (like matter) cannot die absolutely. . . . It may lose its present individuality and mingle with other and diverse individuals; but no particle of it can cease to be."³

If that be true, then the individuality *is lost*, just as that of the house or body is at death. It will afford no satisfaction to know that one's individuality is dissipated, whether by transmigration or any other sort of trans-
fusion, into some other soul.

¹ P. 192.

² *Riddle of the Universe*, p. 192.

³ P. 197.

The other alternative Mr. Rix offers, is for the individual "to lose itself in the Universal Soul," and he compares us with buckets of sea-water let down again into the ocean. "Well!" he says, "this is the worst that can happen, this mingling with the infinite."

In conclusion, Mr. Rix makes many statements which I cannot agree with or refute; because they convey no sense to my unmetaphysical comprehension; such as: "What we call 'matter' is only 'soul' misapprehended"; "there is no gulf between matter and mind"; "matter is but the plane where the mind of God meets the mind of the creature," etc., etc.

If all this and much more be edifying, instructive or consoling, I am glad I am not a metaphysician.

I have taken Mr. Rix's book as a type; for others write in much the same strain.

CHAPTER V

INDUCTIVE REASONING AND THE FAITH OF THEISTS

TURNING now to the consideration of the question how far Science and Reason are compatible with Faith or *vice versa*: I will take Prof. Henry Jones' article¹ as a basis for a short discussion.

Prof. Jones tells us that philosophers and theologians level charges against the ratiocinative use of the intelligence, especially in regard to the "principles of our moral and religious life"; and he speaks of "our failure to justify the faith that founds our practice, etc."

Now is not the controversy between "Science and Faith,"² based on a misunderstanding of the term "Faith"? What the Church has too often demanded of the "faithful" is not "faith" but "belief," if not "credulity". Prof. Jones quotes Mr. Balfour as saying "the causes of belief are not Reasons. It is Authority rather than Reason."

It is well, therefore, to be clear as to what one means by the terms used. The *Century Dictionary* says "Faith is a firm belief based upon confidence in the authority and veracity of another, rather than upon one's own knowledge, reason or judgment". But with the Disciples

¹"The Present Attitude of Reflective Thought towards Religion, *Hibbert Journal*, i., p. 228.

²The subject of Sir Oliver Lodge's paper in the same journal, i., pp. 46, 209.

it was based not solely on our Lord's authority, but on His whole life, as He stood confessed before them. They *knew* Him, they *reasoned* out that He was the Christ; and His life was, in their *judgment*, the life every one should imitate. This was pure inductive reasoning, upon which they resolved to die for Him if called upon to do so. The result of their Faith was loyalty to Christ. It was reasoning, but coupled with personal love¹ and aspiration, though this latter was at the time misdirected.²

First, then, by "Credulity" I mean accepting anything, merely because somebody has asserted it utterly regardless of there being any likelihood of its being true. Thus are gross superstitions spread; all reasoning is totally absent. "Belief" is the acceptance of a statement in the same way, but there is some show of authority for the statement. Thus the Creeds are presumably based on Scripture, but are enforced on the authority of the Church.

Thirdly, "Faith" is a totally distinct matter. One of the best descriptions of Faith is given by the late author of *Ecce Homo*. It runs as follows:—

"When Christ rejected the test of right conduct which society uses, He substituted the test of faith. It is to be understood that this is not strictly a Christian virtue; it is the virtue required of one who wishes to become a Christian. . . . He who, when goodness is impressively put before him, exhibits an instinctive loyalty to it, starts forward to take its side, trusts himself to it, such a man has faith, and the root of the matter is in such a man."³

If we ask *why* should any man do this, or what *reasons* has he for so doing, the answer is that it was

¹ John xxi. 15-17; note, our Lord uses the verb ἀγαπᾶν but Peter, φιλεῖν.

² Matt. xx. 20, 21.

³ *Ecce Homo*, chap. vi., on "Christ's Winnowing Fan".

really inductive but nevertheless automatic reasoning, tinged with the emotions and aspiration of love for Jesus, evincing itself in perfect loyalty to Him.

When the Apostles said, "Lord increase our faith,"¹ this request, following our Lord's remarks upon forgiveness as often as a man repents, was an outburst of longing to attain to that perfection, which they saw in their Master, so far above their own powerlessness to forgive. It was a proof, too, that they saw Jesus was right and that the thing was possible.

This is but a sample of what Jesus appeared to the Apostles. They, as we say, *instinctively* felt, *i.e.*, they *automatically reasoned*, that His character was perfect, and that it was their duty to imitate Him. Their faith was *reasonable confidence*, based on experience in Him and intensified by love. The basis of their induction as to Christ's perfection was the innumerable points of character and conduct, His manner of speech and teaching. It was, adds Sir J. Seeley, especially "the temperance in the use of supernatural power, the masterpiece of Christ. . . ." It was "the inimitable unity" in His Love and Power combined that made Him *unique*, indicated by the word *μονογενής*. It was, in fact, the accumulation of coincidences all conspiring to this one end, which constituted their inductive reasoning, which we call "Faith in Jesus Christ". To say, therefore, that reason is not to be trusted, is to say that nine-tenths of man's intelligence is useless. Of course, if the premises be insufficient or false, then the reasoning based upon them is false too; and it is this which throws so much discredit upon deductive reasoning. Thus Queen Mary is reported to have said that she could not be doing

¹ Luke xvii. 3-5.

wrong in burning heretics, as God would otherwise do it in hell.

“Credulity” requires no *Thought*; neither Head nor Heart is concerned in it.

“Belief” is based on *Head Knowledge* only.

“Faith” combines *Induction* and the emotions of the Heart as well.

My object in making these remarks is to lead up to my contention that there need be no hostility between Science and Faith, Christian Ethics and the three doctrines of God, Freedom and Immortality; for Reason has the same basis for all, namely Induction.

And, further, as Science looks to find experimental proof in addition, so does Religion. St. Paul repeatedly tells his readers “to prove,” “themselves,” or “what is good,” or “their own work,” and lastly he writes to the Thessalonians: “Prove all things; hold fast that which is good”.¹

St. James boldly identifies Religion with practical experiment, namely, by maintaining purity in oneself and showing love towards others.² The knowledge gained by this practical experiment in ethics confirms the inductive evidence or Faith, and ratifies the promise that “if any man willeth to do His will, he shall know of the teaching whether it be of God”.³

By Faith and experiment in holy living man discovers a Natural Law unknown to him before, which is called “Regeneration”. He wants no authority of man or the Church. He only wants, as Sir J. Seeley said, “Goodness placed impressively before him,” and experiment soon proves that his inductions were sound, represented by his “Faith”; namely, that the Christ-

¹ 1 Thess. v. 21.

² Jas. i. 27.

³ John vii. 17.

life is the best for him to live, as long as he is on this earth.

Prof. Jones says: "The 'true' derives all its value from the 'good'. In itself it is an abstraction . . . and is incapable of satisfying the spiritual needs of man." Of course it is. No abstraction can possibly do so. That is just why the preaching of morals will never regenerate the masses of mankind, as Aristotle said.¹ It is just because the 'true' must come down from the clouds of metaphysics and take a concrete form in a *Person*; Who *is*—not the "true" but—the "Truth," that "Faith" may grasp it as a living principle. The experiment has been tried. Jesus Christ was, and is accepted, not as the "true," or as the "good," but solely on the grounds that He *was* the living *Truth* and living *Goodness* personified.

Rationalists are repeatedly asking, What is there *new* in Christ's teaching? The following is Harnack's reply: "You ask, 'What was there that was new?' The question is out of place in Monotheistic religion. Ask rather: 'Had what was here proclaimed any strength and any vigour?' I answer: Take the people of Israel and search the whole history of their religion. Take history generally, and where will you find any message about God and the good that was ever so pure and so full of strength—for purity and strength go together—as we hear and read of in the Gospels? . . . Pharisaical teachers had proclaimed that everything was contained in the injunction to love God and one's neighbour. They spoke excellently, the words might have come out of Jesus' mouth. But what was the result of their language? That the nation condemned the man who took the words seriously. All

¹ *Ethics*, book x., chap. ix.

that they did was weak, and, because weak, harmful. Words effect nothing: it is the power of the Personality that stands behind them. But He 'taught as one having authority and not as the Scribes'. Such was the impression of Him which His disciples received. His words became to them 'the words of life,' seeds which sprang up and bore fruit. That was what was new."¹

Prof. Jones says: "Truth is not an end but only means". This does not seem to have been St. Paul's idea. "I count all things to be loss for the excellency of the knowledge of Christ Jesus my Lord;"² who was the Truth. What he meant was that he longed to arrive at, and embody in himself to the full, the "Truth" or the Perfect Character and Conduct, as represented in Jesus Christ. That was the "end" of his aims.

Nor am I disposed to admit that "even Natural Science now acknowledges that its province is limited and that within that province itself its premises are assumptions and its conclusions only proximately valid". It is certainly limited by the number of known animals and plants and objects of the inorganic world; and as investigations proceed, assumptions are of course necessary as "working hypotheses"; but a vast number of conclusions are perfectly valid. The Doctrine of Evolution, for instance, has long passed out of the stage of an hypothesis, and any alternative is now unthinkable. "Darwinism," on the other hand, or the theory of the "Origin of Species *by means of Natural Selection*," was a pure assumption and based on errors; as I have shown above. Physics are a branch of Natural Science, and our knowledge of the laws of physical forces is valid; and with regard to biology and physiology, which Mr.

¹ *What is Christianity?* p. 48.

² Phil. iii. 8.

James calls "supra-physical," and says they "lack the demonstrative security of the mathematical and physical sciences," he seems to completely ignore the process of induction, upon which the laws of living beings are based. New truths, *i.e.*, facts, are added to our knowledge every day. Formerly plagues and zymotic diseases were thought, on *a priori* grounds, *i.e.*, deductive reasoning on insecure *data*, to be visitations of Providence. We now know that they are due to microbes and insanitary conditions; and if natural science has not the "predictive power of mathematics," it is a pretty safe conclusion that if vaccination ceased the small-pox would flourish.

Inductive evidence is practically equivalent to a Demonstration. Prof. Jones admits that "the age of Faith in natural science is also an age which believes in God". Whence arises that faith in science, if it be not itself inductive proof?

Apart from growing Rationalism, this may be true; but the growing Ritualism indicates a degeneracy from faith, through belief to credulity. But if there is a *faith* in natural science, it is simply because *inductive reasoning* is regarded as *conclusive*. Even in the exact sciences it is present. We interpret all the physical phenomena of the rocks seen in the various strata deposited through geological ages of the past by induction alone.

Prof. Jones seems to me to ignore inductive evidence when he says: "We do not seem to have the necessary data for dealing with God, freedom and immortality". "Reflective men are not able to give a reason for their faith."

With regard to the first, Evolution has greatly strengthened Paley's argument, which is mainly concerned with biological facts, while the moral argument is as strong as ever or stronger.

If omnipotence be regarded as an attribute of God ; then we can see it practically conferred on protoplasm.

To judge by the past and present, it is not too much to say, Given but a single speck of living protoplasm together with its nucleus, nothing more is wanted, from which the whole of the animal kingdom, including man, and the vegetable also, past, present and future, has been, is being and will be evolved.

The "creative capacity" of protoplasm is practically infinite. It has perpetually evolved structures with all the appearances of design. Hence the belief in God as the First Cause behind the veil of the Living World is based on inductive evidence of a very high order indeed.¹

With regard to Freedom and Immortality, these will form the subject-matter of other chapters.

The matters dealt with in this chapter are most ably discussed by the late Auguste Sabatier in his *Religions of Authority* and *The Religion of the Spirit* (Book iii., chap. iv.), Williams & Norgate. The reader might also profitably consult Pfeleiderer's *Evolution and Theology* and other essays (A. & C. Black), especially No. ix., "Is Morality without Religion Possible or Desirable?" In this he points out both the untenability as well as the impossibility of such ethics as Secularists and Rationalists profess being accepted permanently by the masses without any religious sanction.

¹ I make no apology for repeating this and other arguments for emphasis sake ; as a friend says "You would make Theism stand or fall by Darwinism". It stands on a far wider basis than Adaptation ; but I am not concerned at present with other lines of induction.

CHAPTER VI

FREE WILL AND AUTOMATISM

IT will now be as well to say a few more words on Volition, or Free Will as it has been called, for some misunderstanding appears in the writings of Rationalists. They deny it altogether, because they say it is regarded as being "free" from all "motives" and "circumstances".

If such be thought to be the condition of Free Will, nothing is more absurd.

The will cannot be in evidence at all, unless some circumstances call forth its exercise. There must be, at least, two courses of action, or the possibility of doing or abstaining from doing something. Moreover, there must be some motive for one or the other course of action. A man's will is only "free," in my estimation, in that his volitional actions are not automatic.

A dog may have two objects before it, say a plate of meat and to go for a run with its owner. It automatically leaves the plate and obeys the whistle, solely because the latter acts automatically upon him as the more powerful stimulus at the moment.

Another dog will run after a fowl and kill it if it can catch it; all the whistling in the world may not stop it; for the fowl is a greater attraction than the whistle.

But suppose a man has a chance of making money by cheating another under certain circumstances. He is

conscious of the power to choose. It is this *consciousness* (being an abstraction) of which a dog knows nothing.

The man then balances in his mind abstract motives and probable consequences, the sense of right and wrong, the influence upon character, etc., etc. He then mentally returns to the choice and finally sacrifices the desire for illicit gain and refuses to cheat the man.

The word "free" may not be a good adjective for will ; but all it means, as I, at least, understand it, is that man is *conscious* that he *can* deliberately choose ; whereas a dog is bound by *determinism* and is therefore not "free" at all.

Both man and dog are finally guided by the strongest motive ; but in different ways, *viz.*, by Volition and Automatism, respectively.

Let us suppose, as another illustration, that a man drives up to a door and leaves his horse and carriage outside the house, for he knows the horse will remain there. After a time the horse gets impatient and paws the ground as a sign it wants to be off ; *but it cannot move.* Why does it not go off on its own account ? Solely because it *is* an automaton and cannot realise that it has the power to go ; nor has it the *will* to move, however much it may have the *wish* to do so.

The late Dr. W. B. Carpenter has developed this subject admirably in his *Mental Physiology*, wherein he says : "The Power of the Will is exerted in the *purposive selection* (from among those objects of *consciousness*, which Sensations from without and the working of the internal Mechanism of Thought and Feeling within, bring before the Ego) of that which shall be determinately followed up. This state is what is termed *Attention*.

"It is solely by the *Volitional direction of the Attention*, that the Will exerts its domination.

“ It is in virtue of the Will that we are *not* mere thinking *Automata*, mere puppets to be pulled by suggesting-strings capable of being played-upon by every one who shall have made himself master of our springs of action ”.¹

Since the above-mentioned book was published, I find Locke, Schopenhauer and other writers have entertained the same idea. Thus the German philosopher, writing on Reason, says : “ It has always been understood to mean the possession of general, abstract non-intuitive ideas, named *concepts*, which are denoted and fixed by means of words. This faculty alone it is which in reality gives to men their advantage over animals.”²

As an illustration of what I call “ automatic reasoning,” I should regard *tactfulness*. Some people have, as we say, “ great tact,” in others it is often conspicuous by its absence. The former seem to do or say just the right thing at the right moment ; the latter generally do the wrong one. Why is this? Neither have time deliberately to think out the situation, and choose the wisest words or best thing to be said or done on the spur of the moment. The spontaneity of tact is its charm.

In the one person the mental qualification is present, in the other the brain is lacking something. Such a tactless person is one of whom it is sometimes said that “ he has not two ideas in his head,” *i.e.*, *consecutive* ones. He blurts out his first thought.

In a tactful person, the same thought might arise, but it is instantly and spontaneously checked by a following tactful alternative ; so that the thought may occur to the tactless man *afterwards*, when he sees the result of his observation, “ what a fool I was to say that ” ; but he could not help it, for his volition was not equal to the occasion.

¹ P. 258.

² *The Basis of Morality*, p. 71.

Mr. Mallock in writing upon "the seemingly absolute dependence of mental conditions on physical," alludes to the deterioration or absence of the will in certain cerebral diseases as a proof of such dependence. He says: "Since the brain is shown to control the will in those very domains of conduct in which freedom is most vehemently claimed for it, to suppose that the will is a separate and independent force which imposes its orders on the organism of which it shows itself so frequently to be the slave, is to indulge in a supposition for which science not only affords no evidence, but which all the evidence collected by science contradicts".¹

It is an axiom now that all the mental phenomena, whether of man or animals and the physical basis of the brain are intimately connected, and can mutually influence one another. Thus a *tendency* arising from some abnormal cell-development can be suppressed by the will, as that for drink, too often hereditary; then the abnormality after a time ceases to have the same powerful effect on the inclinations. Similarly, in a healthy brain, study will affect the molecular structure of the brain itself, the corresponding section was perhaps feebly developed, physically; but it will become strengthened in response to mental efforts determined by the will.

Hence, as to the question of the brain determining the will under *normal* conditions of health, the very fact that Mr. Mallock has to appeal to diseased conditions for his evidence—when a man is an idiot, mad or a confirmed drunkard, etc., and has no will at all; but is simply an automaton—is pretty conclusive that it is not so under normal conditions of health. It is not the "will" which becomes the "slave"; for the man's will is

¹ *Religion as a Credible Doctrine*, pp. 141, 142.

in abeyance ; he “lets himself go” and merely follows the automatic impulses of his brain.

Physiologists have done much to localise sections of the brain as controlling various actions of the body, and thus undoubtedly are they also the physical bases of many traits of character which are often hereditary.

Now this is absolutely necessary with animals. Thus, for example, if one is attacked by another, it should have combativeness and courage. These traits are at once automatically called out by the onslaught of its enemy.

Again, animals are automatically impelled by the sexual instinct (based on the cerebellum) at certain periods.

In graminivorous animals the fighting instinct has degenerated ; anger and courage are more or less confined to the males. Timidity is developed instead, and has induced them to crowd together, not for any altruistic or mutual aid ; but for self-interest and self-protection ; as the chance of being caught by a carnivorous enemy is greatly reduced for each individual.

Dr. F. Galton observed in South Africa that if a particularly timid individual happened to find itself at some distance from the herd, it rushed back, and was not satisfied until it had “bathed itself” in the midst of the others.

It is admittedly true according to many persons that fixed regions of the brain of man are correlated with traits of character as well as necessary bodily actions.

But the difference between Man and Animals is that while these traits are entirely automatic in animals—certain traits for example are peculiar to certain breeds of dogs, respectively—in man they would also be so precisely as in animals if he had no *self-consciousness* ; so

that he alone can, so to say, look in upon himself, make each trait of his character an object of thought and discuss with himself their effects as being good or bad, as he is *conscious* of their relative powers and effects. He then regulates their automatic action by volition.

This *consciousness* may have a definite tract to itself—but it is not known where—and when that section is abnormal or diseased, the man becomes an automaton like an animal, his volition or will being arrested.

In health, however, it is the will which controls the automatism of the brain and makes him a moral being.

Huxley was the great champion for automatism in man ; and no one can deny that he brought a formidable array of argument to prove that he is—*but not entirely*—an automaton.

Huxley argued on the grounds of human and comparative physiology, from his evolutionary history and from the remarkable case of a French sergeant who had been shot in the head and recovered. In his normal state he was perfectly sane and a moral man ; but he had fits of abnormality when he would make cigarettes of shavings, etc., and steal everything he could lay his hands upon.

Now, the immediate inference from this case is that men are *not* altogether automata, if they only become such when suffering from brain lesions, when volition is wanting or is in abeyance ; as in the case of the criminal here mentioned ; for the following is a good illustration of the difference between Automatism and Free Will. It was presented to the judge trying a man for snatching a scarf pin from an earl.

The prisoner handed in the following extraordinary document : “ My Lord,—Before passing sentence, I think it but justice to myself that I should honestly and sin-

cerely tell you what motives led me to commit the crime. In the first place, I candidly admit that the robbery was deliberately planned. I saw the Earl go into a shop, but I waited till he came out. I had time to reflect on the crime and its consequences, but the devil was too strong for me. I felt reckless with the recklessness of despair. I snatched the pin and made off, but an unknown irresistible power made me turn back and walk into the gentleman's arms (laughter). In the whole course of sixteen years of crime and infamy I have never felt so unutterably miserable and so hopelessly cast down. . . . My lord, the desire within me to commit a theft is great, but believe me to be sincere when I tell you that sorrow and remorse are not strangers to me. How often the thought has flit across my mind that if I only had the will and determination to reform and amend my life I would brighten the last days of my old parents. I would be good, but evil is strong within me. Many and many a time, when coming out of prison, I have formed good resolutions for amendment of my life. I have tried over and over again to get an honest living, but always failed for want of a helping hand."

But if my position be granted that when the brain had reached a stage of development, *beyond* that of all other animals, it permitted man *to reason abstractedly*—so that he alone, it might be added, can be a metaphysician—we obtain the clue to what is *called* "Free Will," but which I should recognise simply as the *consciousness of the power to choose*, whether they be concrete objects or abstract motives, presented to the mind.

Besides Huxley, we find by their writings that the Haeckelian Monists or Materialists, all deny the Freedom of the Will in Man.

It is as well to consider therefore the untenableness

of their position. It seems based upon the idea of the inevitable actions of natural law and the obvious automatism in the greater part of man's behaviour. ∴

But no one will deny that man is answerable to law for his actions, *viz.*, civil laws of his country and the moral laws of religion. If he break the former he is *guilty* and is punished by the Court. If he break the latter he *sins* and has to answer to his God.

Now, insane people often do those things which in a sane man would make him guilty or a sinner. We do not recognise them to be so. Similarly, animals often do what look like guilty acts; as when a horse viciously kicks his master and lames or kills him; or a dog which bites a man. We may muzzle it, but we do not punish it.

It is, therefore, quite clear, and the reader could easily multiply similar cases, that our universal practice is to regard animals much in the same light as the insane, so far at least as that "they are not responsible for their actions". What do we mean by that expression?

What is that something which is equally wanting in the insane man and in animals? We never consider a horse or a dog to be a morally responsible being. Why has common consent established this distinction in practice in the treatment of the insane and animals alike?

The underlying cause of the difference is the *want of a consciousness of volition*.

The term "Free" seems to have misled some writers. They regard it, I repeat, as meaning "free from motives" and "free from circumstances". Thus the writer referred to says: "The most ardent advocate of Free Will would be annoyed if he were told that his choice was undetermined by reasons and motives. . . . A man's choice is wholly determined by circumstances and motives, over

which he has no control.”¹ The author here begs the question, and leaves out of sight the man’s *consciousness* of the motives and the *consciousness* of the power to choose one of two or more courses. If he would recognise the fact that man *can* select his own reasons and motives for doing one thing rather than another, he would see that it is just that wherein his “freedom” comes in.

On the other hand, no animal has this consciousness of the power to reflect upon courses of action ; but simply rushes blindly to the strongest motive of the moment which appeals to his senses. Such is pure automatism, which makes all the difference between man and animals. The former alone has volition.

To give an example of human automatism. The late Prof. Adam Sedgwick was apt to be very “absent-minded”. One day he was walking up and down his room, thinking perhaps of the Silurian strata with his mind in Wales. Every time he approached the fireplace he rang the bell. Again and again the servant came ; for he said he had not rung it ; but at last he noticed that the cord was still oscillating. The fact was the sight of the bell-rope automatically suggested to his brain the act of pulling. His volition was in abeyance during his reverie. It was a purely automatic action, there being no *attention*, as Dr. Carpenter says, or *consciousness* present. We thus see that precisely the same act may be done under two totally distinct states of the mind. On the occasion mentioned Sedgwick was for the time a pure automaton.

But suppose he wanted his servant at half-past one o’clock. He would go to the bell to ring it, but suddenly remembering that his servant might be at his dinner, he

¹ *Mr. Balfour’s Apologetics*, p. 56.

hesitates. Herein steps in a new element that is the *consciousness of choice*. And abstract reasoning deters him.

A Determinist would say that he was just as much *restrained automatically* as when he rang the bell automatically. It is perfectly true that he had a *motive* for not ringing the bell; and that motive was based on *circumstances*; but his *attention* was awakened, and he would be perfectly *conscious* of the *choice* before him. And that is all, as I understand it, that is meant by Free Will.

I will now make some quotations from Mr. Mallock's *Religion as a Credible Doctrine*, wherein he states the case of the Determinist, and see where he appears to me to be wrong.

"The act of will, as known to us by our own experience, is an act which invariably is determined by the strongest motive; and motive, again, is determined by two things—the talents and temperament with which an individual is endowed at his birth, and the circumstances by which, from his birth onward, he is surrounded."¹

He would thus reduce Volition to Automatism; but the reader will have seen that an act is precisely the same whether it be done *unconsciously* or done with *attention* and *consciously*, as in pulling the bell-rope.

In the latter case Will or Volition is present; in the former it is in abeyance. As soon as Attention and Consciousness of the power to choose come into the mind, Volition decides the act.

The story of the ass placed between two bundles of hay and starving because both were equally tempting is grotesque, but theoretically true—for an ass; because it

¹ P. 90.

is an automaton. Practically, the slightest turn of the head would be sufficient to save his life, for it would attack the bundle then seen.

But put a tempting dish of oysters as well as some other equally tempting before a man. He might reflect upon the possibility of the oysters being contaminated and the consequent probability of some "illness" (an abstract idea) accruing. His attention, conscious concentration of thought, are awakened. Abstract motives enter his brain. He is fully alive to the importance of exercising a prudent course of action; and thus Volition decides the choice.

Besides our natal characteristics Mr. Mallock adds: "As surely as our characters determine our will and our brains determine our character, so do our physiological antecedents determine the idiosyncrasies of our brain".¹

But we are *not* altogether and entirely so automatic as all that; though nine-tenths of all we do is probably done automatically. *Consciousness* saves the situation.

It is quite true that a man known to be thoroughly honest is certain to act honestly next week; but we do not know what contests he went through, what resolutions his will had made, *before* he became the man we know him as "automatically honest".

A man grows up it may be with certain inherited qualifications (as drunkard's children are often predisposed to drink) but *he was not born with his environment*. He grows up to be a man, and goes into business; temptations to dishonesty surround him. He sees others dishonest and thriving accordingly; but he fights the inducements to go wrong. If he were solely an auto-

¹ *Op. cit.*, pp. 93, 94.

maton he would yield ; but he gets the mastery by his Volition, and so acquires the character and the reputation for honesty. All through the struggle there was the *consciousness* of the power to choose. The abstract ideas of "honour," "honesty" are continually forcing themselves upon his *attention*. All this and much more may form *motives*, before he has deliberately "made up his mind" to be *always* honest.

Something like this appears to have been the process our Lord's mind went through in His temptation in the wilderness. "This," writes Sir John Seeley, the late author of *Ecce Homo*, "was the excitement of His mind which was caused by the nascent consciousness of supernatural power." . . . "He is awe-struck rather than elated by His new gifts ; He declines to use for His own convenience what He regards as a sacred deposit committed to Him for the good of others. In His extreme need He prefers to suffer rather than to help Himself from resources which He conceives placed in His hands in trust for the kingdom of God. Did ever inventor or poet dare to picture to himself a self-denial like this? The chief point in His temptations was to use force (as was expected of the Messiah of the Jews) in the establishment of His kingdom."

No one can read that wonderful "Temptation in the Wilderness" and regard it merely as a piece of automatism on the part of Christ. Attention, concentration of mind, powerful, abstract motives, circumstances, *Conscious Power of Choice*, firm deliberation and final issue, all conspire to illustrate one of the most powerful displays of Volition that the world has ever heard of.

Mr. Mallock says : "Any act which we consciously will to perform and do not perform automatically, or under presence of physical coercion, we perform and will

to perform because our nature is such that we look on the results of such an act as desirable".¹

The latter part of this sentence seems to refute the first, for if "our nature" is the mainspring of the action, then what we have done *is* performed "automatically"; though his expression: "Any act which we consciously will" removes it from automatism. And he further concludes: "The bondage of our wills, in every act of willing, to the sole desire, or the strongest desire of the moment is absolute, necessary, invariable. It admits of exceptions no more than does the law of gravitation itself."²

But there is no "bondage" in a *conscious choice of motives*; the bondage comes in when you *have not the power to choose* and are unconsciously bound by the external and strongest motive; when your will is wanting or too weak to protest; and you allow yourself to be an automaton, as the criminal described above.

A hypnotised person when told to clap his hands will go on doing it until the hypnotiser stops him. I have witnessed this; and the performer's attention being elsewhere directed, the man fell exhausted under the table but could not cease clapping his hands. He was then an automaton, pure and simple. On the other hand the hypnotiser, when his *attention* was drawn to him, and was *conscious* of the possible harmful effect, at once brought his *volition* to hear and un-hypnotised the man.

Mr. Mallock³ refers to a work by Dr. Ward, in which that author says that desire is of two kinds. He calls one "spontaneous impulse," the other he calls "resolve". These are only other phrases for "Automatism" and

¹ *Op. cit.*, pp. 96, 97.

² *Op. cit.*, p. 101.

³ *Op. cit.*, p. 106.

“Free Will”; and Mr. Mallock in combating it falls into the error of supposing “freedom” means “irrespective of circumstances”.

It is here where, as it seems to me, lies the fundamental error; namely, in assuming that because the word “free” is attached to “will,” that it must mean “free from motives and independent of circumstances”.

It is only by the *circumstances* that the *attention* is aroused. Then follows the *consciousness* of the power to choose and the mind enters upon a train of abstract reasoning about *motives*, etc., which finally settle the question of Volition.

Mr. Mallock may well ask: “How is it possible that the desire which we call resolve can arise independently of the circumstances?”

I should not make “resolve” a synonym for “desire,” but the final result of a mental procedure of which “desire” was the first term. For we may put the two alternatives thus. Some circumstance occurs which raises a *desire*. We may follow it blindly, *i.e.*, automatically, without making any *resolve* at all.

Or, we may reflect upon the consequences of pursuing that desire and then make a resolve *not* to follow it up. In that case it has passed under the Volition.

Is not the Determinist, then, misled by the term “Free”? Whoever first suggested it, could not have thoroughly grasped the real conditions of the “will”. I repeat that the very same act may be done, on the one hand, *automatically*; or, on the other, with the *attention* and *conscious intention*. In the first case Volition is in abeyance, in the second it is present.

There are thus two very distinct conditions; and the Determinist has no right to confuse them as one.

I will take one more illustration from Mr. Mallock's book.¹

“In reality, so far as reason and observation can guide us, the one is the result of circumstances no less than the other; both are equally mechanical; and if resolve differs from spontaneous impulse at all, it differs only as a donkey engine differs from the main machinery of a locomotive with parts of which it now and then puts itself into gear.”

But a donkey engine is of the same nature as a locomotive; both work automatically as soon as an impulse has been received from without; they both illustrate the unconsciousness of human automatic actions.

But neither of them can represent the presence of *Attention* or of a *Consciousness* of the power to choose; or the mental, abstract deliberations undergone by what we call *Volition*.

Automatism may be considered as having different degrees, according to *the amount in the want of attention*, and when there is none.

The extreme condition is that of the hypnotised person clapping his hands or one in reverie like Prof. Sedgwick ringing the bell quite unknowingly. In both cases the acts are done through *suggestion*.

But it often happens that we do things, while thinking of something else, but do not altogether lose sight of what we are doing; as in eating one's dinner and talking to one's neighbour simultaneously. One remains still conscious of the plate of food, but the process not requiring special attention, the eyes and the hands do their work almost entirely on their own account, and the teeth follow suit.

Similarly a whole page of a book may be read aloud,

¹ *Op. cit.*, p. 115.

the correct modulations of the voice according to the sense being given ; yet the mind may have wandered away and be thinking of something else ; and the reader at the end may not have the slightest idea of what he has been reading about. I have often done this myself.

I have repeatedly wound up my watch while going upstairs to bed ; but on reaching my bedroom could not say whether I had done it or not, and had to try the key to find out.

On the other hand, as an illustration of Attention and Volition, Dr. Carpenter alludes to a person learning to play the piano. At first great attention has to be paid both to the notes and fingers. These are compelled by volition to go down on to the right keys. But a practised musician has been known to play waltz after waltz when actually asleep. All the dancers had to do was to begin another tune when a change was wanted, and the suggestion was automatically followed up by the sleeper.¹

To illustrate these stages, Dr. W. B. Carpenter distinguishes the automatic cough as arising from some irritation in the throat. This may take place in sleep with unconsciousness ; or when we are awake, with consciousness. He compares this with the volitional cough ; when an audience intentionally cough to interrupt a prosy speaker. But even this, as it seems to me, need not be volitional ; the inducement to stop the speaker suggests to the brain to cough, and the cough automatically follows.

But suppose one of the audience says to another, "Don't cough, it's rude, and he is doing his best" ; then volition wakes up, the man hesitates, and finally deliberately suppresses the rising cough.

¹ Dr. Carpenter told me of this incident which he had received from a correspondent after reading his book.

The controversy between the Determinists and Volitionists is interminable. Why is it confined to man alone? No allusion is ever made to free will in animals, yet if man has it not, why is he not classed *entirely* with them; as he would be a pure automaton. But let that pass.

The matter is put thus:—¹

“There is no effect without an antecedent cause.”—Granted.

“What then of the human will; does it act without a cause?”—Certainly not.

“Does it cause itself?”—Certainly not.

“Is the will merely the result of forces—namely desires [or motives]?”—Yes, the strongest motive prevails.

“Consequently the action follows the strongest inclination, *i.e.*, the man yields to the most powerful influence?”—Yes, certainly.

And so the Determinist claims the victory!

But he has overlooked the most important element of *Consciousness in the process of a deliberate selection of motives suggested by the circumstances.*

Precisely the same act may be done when the man is *automatically* impelled by the strongest motive, just as when the elements of mental *attention, consciousness* and *deliberation* are present.

Take the case described by Mr. Forester. He says: “A man with a liking for spirits *deliberates* [but to ‘deliberate’ at once destroys determinism] as to whether he shall drink a glass of brandy. He has been told by his doctor not to drink brandy. He thinks it will probably do him harm [here we have *abstract reflection*] and may be a downward step in a course which will ultimately

¹ See *The Faith of an Agnostic*, by G. Forester, chap. xii., “Some Old Riddles”.

be his ruin [here *motives* begin to appear]. He has a strong desire to avoid such evils. On the other hand, he has a physical craving, a strong desire to drink the brandy [here he is *conscious of choice*; and of the *power to choose*]. According as the one or the other of these desires prevail, so must he act."¹ Precisely so; but the presence of *consciousness* makes all the difference between acting "deliberately," as Mr. Forester admits, and acting "automatically" where there is no "consciousness of choice," but merely involuntary impulse; as that which impels an habitual drunkard, who seizes the glass and drinks it; having allowed himself by degrees to be automatically impelled by the very sight of liquor.

To continue arguing against the volitionist, by saying the will acts *without a motive* or *free from circumstances* seems to be absurd and useless.

No act can possibly be done without them. You cannot be angry "without a cause".² But you can allow your temper to rise in the heart without suppressing it, and give vent to angry words and deeds. Or, on the other hand you can restrain the impulse and show no outward signs.

Something or some one gave occasion for your angry feelings to assert themselves within you. That was the "circumstance". You had abstract reasons for thinking it was wrong to give way to angry passions. There was the "motive". You were *conscious of the choice*, and by an effort of will restrained yourself.

A dog cannot do this. Being a pure automaton, his exhibition of temper is in exact proportion to the internal excitement which has been aroused in him.

Man alone can be conscious of the power to restrain

¹ *Op. cit.*, pp. 265 *et seq.*

² These words are struck out of the revised version (Matt. v. 22).

himself, or else to give vent to his passions; and *that* makes just all the difference between Volition and Automatism; between *morality* and *immorality* in man and the non-morality of an animal.

The difficulty in which a Determinist is landed by trying to reconcile moral responsibility with automatic response to influences is well seen in Huxley's contention:—

“A man's moral responsibility for his acts has nothing to do with the causation of these acts, but depends on the frame of mind which accompanies them”. Mr. Forester, who quotes this, well observes that “the ‘frame of mind’ is, like other things, the effect of antecedent causes; and how is it alleged that one is morally responsible for such causes or their effects?”

It is sometimes asserted by Determinists in proof of his complete automatism, and that the will is not really “free,” if one knew a man's character, one could foretell what his actions would be under every circumstance.

This is only partially true. Take, for example, extreme cases. It is perfectly certain that a habitual drunkard will drink a glass of spirits if offered to him. It is equally certain that a thoroughly honest man will not take a bribe. But with nine-tenths of mankind, it is quite uncertain how a man will behave under certain previously untried circumstances; and it is not until the critical moment arises, that the very question of Free Will may come in at all (see below, p. 323).

Determinists argue as if man was altogether automatic. Nine-tenths of his daily routine may be; but there is the fact of our *not* being able to foresee which of two choices—both equally moral or non-moral, both equally useful or equally anything else, as far as an outsider could judge—the man will decide upon; inasmuch

as *we cannot follow the abstract reasoning in his mind, which supplies him with the final motive for choice.*

All this is common experience, and the two extremes prove it; because the drunkard has "let himself go". He has allowed the law in his body to get the upper hand; and has not willed the law of his mind to contest the lust for drink. He has become a complete automaton. What volition he had is practically gone.

On the other hand, the true Christian has overruled the law of his body. He has acquired such an ascendancy over his inclinations to evil, so that he too has also become an automaton; but for goodness; such is now habitual to him, and all inclination for wrong-doing has gone. He will now certainly act righteously when a choice is presented to him.

He has become a "natural law" for good unto himself, as the drunkard has become a natural law to himself for drunkenness, though they stand at the very opposite poles of conduct.

I think we may also see how Altruism could now arise from abstract reflection. We start from parental affection in animals, and the automatic care for offspring, till they become independent; but rarely longer; for although it is said that weak animals, as *Cervida*, *Bovida*, etc., herd together for mutual aid; yet if one is sick the others worry it to death; or if a wolf of a hunting pack be shot, the others fall upon it as prey. These facts show that there is more *self-interest* than *altruism* in herding.

But when we come to man, who can entertain abstract reflections about other men as well as himself, his first altruistic idea would probably be "do not do to others what you do not wish them to do to yourself".

This is the primitive and purely negative law, exemplified in the old Jewish morality.

The next stage appears to be that of the Greek philosophers—to do good to blood relations. Thus a speaker in the *Republic* of Plato defines “Justice” as doing as much good as one can to one’s friend and as much harm as possible to one’s enemy.

In both stages foreigner and enemy were identical, as seen by the words ἔκθρος and *hostis*.

Christ’s “new commandment” was “Love your enemies”. The word for “personal love” in Greek was *φιλία*; but it was Christ who converted it into an “Enthusiasm for Humanity,” and He sanctified the word Ἀγάπη.

Agape is *philia* spiritualised.

CHAPTER VII

THE ETHICS OF RATIONALISM AND CHRISTIANITY

WITH regard to ethics and their origin, Haeckel regards psychology as a branch of physiology, and invents a form of protoplasm which he calls "neuroplasm" or nerve-plasm, as the organic source of it.

The author of *Mr. Balfour's Apologetics* does not touch upon this physical origin of ethics, but remarks that, "The human heart has a deep reverence for justice, love and mercy—a reverence which in higher natures is instinctive, and which has been engendered in the whole race, in varying degrees of strength, by millions of years of family and social life."¹

The following are passages dealing with ethics:—

(1) "If Rationalism may be said to include a religion at all, one half of it at least consists of ethical truths and ideals, and no impartial observer would deny that leading Rationalists have been distinguished by an intense devotion, both in conduct and in precept, to the great moral principles which embody the highest wisdom and the loftiest aspirations of the race."²

(2) "The moral law has grown out of the needs of man, and springs from the human heart. That man should do justice, love mercy, speak truth, and help his needy and suffering fellows, are injunctions which are

¹ *Op. cit.*, p. 29.

² *Ibid.*

valid, binding and beautiful, because, if they are set at naught, human society becomes impossible.”¹

(3) “However men may differ as to the origin of morality, they tacitly unite in subjecting all ethical maxims to the test of practice, and in judging them by the standard of results.”²

(4) “It is the struggle for existence which gives these things all their force and meaning, and which alone makes possible the existence of vice and virtue.”³

(5) “By ‘holiness’ we mean high moral character, and affirming that morality could be developed only under such chequered conditions as this world affords, we hold that altruism or holiness loses none of its beauty when we discover that its origin may be found in the instinctive yearnings of lowly parent organisms towards their helpless offspring, and that it forms part of the machinery of natural selection which aims at the preservation and elevation of the race.”⁴

(6) “The ages of faith were ages of ignorance, immorality and crime. The growth of civilisation is dependent upon the growth and spread of Rationalism ; and few persons will deny that the modern rise of the rationalistic spirit has been accompanied by a slow but sure uplifting of the manners and the morals of the people. Sound rationalist doctrine has a wider and firmer hold of the human mind than at any previous period in the history of mankind, and we think no well-informed observer will deny that in the Western world the average ethical standard is higher than it has ever been before.”⁵

(7) “The Rationalist hopes and believes that while at present the reconciliation between Egoism and Al-

¹ *Op. cit.*, pp. 41, 42.

² *Op. cit.*, p. 43.

³ *Op. cit.*, p. 49.

⁴ *Op. cit.*, p. 50.

⁵ *Op. cit.*, p. 60.

truism may not be possible in the case of each individual, it will one day be effected for the race.”¹

(8) “Considering that man is the denizen of a universe which can only be known to him through sense-perception . . . supernatural religion may perish at its touch, but the religion of duty and virtue will become more virile, and will acquire a firmer hold upon the human heart. The moral ideal of Rationalism is truth, and on no other foundation than truth can any lofty or durable system of ethics be reared.”²

(9) “Taking the human race as a whole, it is clear that Christianity cannot be specially identified with ‘the main stream of religious advance’ (Balfour).”³

(10) “Other things being equal, a man’s happiness is in direct proportion to his virtue.”⁴

The author’s appreciation of the New Testament can be gathered from the following passage:—

(11) “The New Testament contains nothing original or important in the shape of speculation. The system which we find in its pages is mainly a compound of Jewish theology and demonology with the myths of Paganism, modified by some admixture of neo-Platonic philosophy, and the ethical maxims which had filtered slowly into the Greek and Roman world from the Far East. It is one of the commonplaces of criticism that Christianity possesses nothing of ethical importance which is not shared to an equal degree by other religions, such as Buddhism and Zoroastrianism.”⁵

(12) Speaking of Christ’s death the author puts it in this form: “It is conceivable that one of the Caesars might have sacrificed his only begotten son for the sake of some petty hamlet containing not more than twenty

¹ *Op. cit.*, p. 62.

² *Op. cit.*, p. 151.

³ *Op. cit.*, p. 181.

⁴ *Op. cit.*, p. 190.

⁵ *Op. cit.*, p. 187.

inhabitants. . . . This would be infinitely larger in proportion to the Roman Empire than is the earth in proportion to the Universe. If there be a personal being who has created all things and who sustains them by the force of his will, it is antecedently incredible that such a being would assume the form of one of his humblest creatures, and would allow himself to suffer an ignominious death while thus transformed, in order to save these creatures from his own eternal vengeance.”¹

The author concludes his book with the following sentiments :—

(13) “Men are turning with disgust from the dark jungles and miasma-laden valleys of supernaturalism to the sunny plains and green hill-sides of Nature, illumined with the light of Science, and glowing with *the ever-expanding influence of universal brotherhood and love*. . . Theology may perish, but humanity will survive, and will work out its salvation from ignorance and wrong not with the aid of mystic doctrines and narrow religious dogmas, but through the magic power of science, joined with *the wondrous force of human self-sacrifice and love*.”² The reader will note that the sentences italicised are entirely due to Christianity alone.

I now propose to make some comments upon the passages quoted and numbered.

To begin with his preliminary observation, I do not know whence the author obtained his idea of “millions of years for the human race”. Man could not have appeared earlier than the Pliocene epoch at most, judging by analogy with other mammalian animals all of the preceding or Miocene epoch being now extinct, whereas

¹ *Op. cit.*, p. 197.

² *Op. cit.*, 228. (My italics.)

the Pliocene saw the introduction of man's contemporary the horse, etc.¹

This, however, is not a point of any great importance.

(1) The reader will note the author's insertion of the word "leading" before "Rationalists". They may be what he describes; but the old question arises, How about the "masses," the "millions" that Mr Gould would wish to annex?² The great complaint is the want of enthusiasm among the followers of Rationalism; and as we have seen in the first two chapters of this book, the past thirty years have proved the powerlessness of Secularism or Rationalism to satisfy the demands of the feeling of reverence in the heart of man.

(2) The author here says, "The moral law springs from the human heart". Religion, as Christ taught us, does, but pure morality was a matter of discipline. Love, justice, mercy, truth, helping the needy and suffering are no doubt *now* valid and binding; but were not so universal as he would seem to imply. History, certainly, does not support this idea; pity for a foe was regarded with contempt.

As an example, where the above traits would be expected to be first seen, as a broad general rule the wife was bought and remained a chattel or slave—as with the Kaffirs of to-day. The children were no better off; the Roman parent had the power of life and death over them; and female infants were regularly exposed to death, if not wanted, as they are in China to-day. "Millions of years" have not done away with this abominable custom.

The true family life began with Christianity. Yet

¹ See above, p. 210.

² "The New Secularism," *Agnostic Annual*, 1903, p. 16; see above, pp. 11 *et seq.*

Monistic writers show a strange distortion of this obvious truth. Thus Büchner says: "It is clear from many passages in the Gospels that the founder of Christianity was an enemy of the Family. . . . One day, when he was teaching the people and was called by his mother and brothers during his discourse he asked, annoyed at the interruption [?], 'Who are my mother and brothers?' and answered himself by pointing to his disciples. According to Luke (xiv. 26) he made the hatred of one's own parents and sisters a condition of discipleship, etc."¹ To such absurdities will *literalism* carry people, who cannot "read between the lines," or see deeper than the actual words.

The reader will find the true interpretation of our Lord's words in Seeley's *Ecce Homo*: "He could have neither part nor lot with men destitute of enthusiasm . . . and once when it seemed that the magic of His presence and words would draw His entire audience into the number of His followers, alarmed lest He should find Himself surrounded by half-hearted or superficial and merely excitable adherents, He turned suddenly upon the crowd, and with one of those startling expressions which He seldom, and yet all great reformers sometimes, employed, declared that He could receive no man who did not *hate* his father and mother and his own life."²

Illustrations of this come only too often in practical life: for it is a common thing for one member, say, the wife, to see no harm in smuggling lace; but it jars against the husband's conscience, or *vice versâ*; and *unpleasantness* at least ensues: or a husband tries to pass his son as under age when over twelve. The wife is the more conscientious and remonstrates. It is not the *person* one

¹ *Last Words on Materialism*, p. 88.

² P. 138.

is called upon to hate, but his or her want of a truly Christian conscience.

Again, with regard to nations, in all the past history of the world, love and mercy were practically unknown virtues. To show pity for a conquered foe was thought contemptible. It was not done till Christ came and taught mankind the true nature of brotherly love (*Agape* in Greek) which lies at the root of the Christian family, race or nation ; as well as international comity.

It was this which broke down the wall of partition, first between Jew and Gentile, and then between all Gentile nations, respectively.

The author says that one half of Rationalism, at least, consists of ethical truths and ideals, which he describes in the words of Jesus. It is remarkable that the ethics of Jesus Christ are found to be enforced by Unitarians as Channing and Martineau, by Renan, whose Jesus is an "impossible man" ; and now by Monists, Secularists, Rationalists, etc. In fact, Christ's ethics have lived in spite of erroneous creeds and persecutions. They have outlived disbeliefs, and are accepted by modern Agnostics, Secularists, Materialists, Monists, Rationalists and avowed Atheists !

Never was a prophecy more completely fulfilled than that even the Gates of Hell should not prevail against them ; for they are the Spirit of His Church !

Modern Rationalism here asserts that moral truths and ethics have been simply developed out of the needs of man ; that certain rules of conduct as, "Thou shalt not kill," etc., have been formulated by human societies for their well-being and maintenance. . . . "The Jewish laws of the Old Testament well represent this origin, so does the Roman law, etc. . . ." This is quite true ; but the ethics of Jesus Christ stand on a different level. They

are *not* simply moral maxims or a code of laws like the Decalogue.

It is repeatedly urged by Rationalists that Jesus Christ said nothing new; that all His moral teaching is to be found in that of the past reformers of the world who preceded Him.

But there is this fundamental difference. No reformers had previously been able to *enforce* their moral maxims upon the great majority of their contemporaries. They have all died and left no important religious results. It was so, first because they never possessed any sufficiently strong motive power wherewith to enforce them.

Philanthropic maxims, for example, fall unheeded upon the ears of the masses of mankind, because no altruistic spirit is universally present in man. The beauty of virtue and purity may help a noble-minded man, already predisposed to be virtuous, "to keep himself unspotted from the world"; but it is waste of words to tell this to the selfishly vicious man; or indeed to the multitude.

Moreover, it was never Christ's intention to give us moral maxims only; but *Living Principles*. In fact, as the author of *Ecce Homo* so well says: "On the greater number of questions on which men require moral guidance, He has left no direction whatever".¹ Seeley, too, has well described the profound difference between Christ's method of moral legislation and that of the philosophers. He says: "Instead of giving laws to His society, He would give to every member of it a power of making laws for himself. . . . A man's actions result from the state of his mind; and if that is healthy they will be right, if not, they will be wrong. Such language

¹ P. 135.

was new in the mouth of a legislator. . . . Philosophers had always made it their study to bring their minds into a healthy condition . . . but we do not find Him in agreement with philosophers. . . . They placed it in reason . . . He in enthusiasm.”¹

The ancient Greek philosopher who succeeded by aid of his reason to control his passions from committing acts which according to his ideas of morality were unadvisable was called “virtuous”. But “Christ went further and pronounced the desire in the heart, when the gratification of it would be culpable, to be sin”. Such a man as subdues his *thoughts* and not merely suppresses the *outward* act is called in Christian language “holy”.

Seeley contrasts the two thus: “The one, so far as he is virtuous, is incapable of crime; the other, so far as he is virtuous, is incapable of temptation”. Again—“A virtuous man is one who controls and coerces the anarchic passions within him, so as to conform his actions to law; a holy man is one in whom a passionate enthusiasm absorbs and annuls the anarchic passions altogether, so that no internal struggle takes place; and the lawful action is that which presents itself first and seems the one most natural and most easy to be done.”²

What then was the “enthusiasm” which carries all before it? The law-making power or root of morality in human nature, trained and developed into the Christian spirit, was *ἀγάπη*; “the love not of all men nor yet of every man, but of *the man* in every man”. . . . “It is natural to man to love his kind, and Christ commands us only to give nature play.” “What the law of love and the golden rule did for mankind was to place for the first time the love of man as *man* distinctly in the list of

¹ Pp. 136, 137.

² P. 141.

virtues, to dissipate the exclusive prejudices of ethnic morality and to give selfishness the character of sin.”¹

Now follows the important question, how is this enthusiasm for purity and love to be kindled; when we think of “What an ardent enthusiasm He demanded from His followers, and secondly, how frail and tender a germ this passion naturally is in human nature”.²

It was by the force of example:³ “The most lost cynic will get a new heart by learning thoroughly to believe in the virtue of even *one* man. Our estimate of human nature is in proportion to the best specimen of it we have witnessed. This then it is which is wanted to raise the feeling of humanity into an enthusiasm; when the precept of love has been given, an image must be set before the eyes of those who are called upon to obey it, an ideal or type of man which may be noble and amiable enough to raise the whole race and make the meanest member of it sacred with reflected glory.

“Did not Christ do this? Did the command to love go forth to those who had never seen a human being they could revere? Could His followers turn upon Him and say, How can we love a creature so degraded, full of vile wants and contemptible passions, whose little life is most harmlessly spent when it is an empty round of eating and sleeping; a creature destined for the grave and for oblivion when his allotted term of fretfulness and folly has expired? Of this race Christ Himself was a member, and to this day is it not the best answer to all blasphemers of the species, the best consolation when

¹ P. 151.

² P. 152.

³ As many Rationalists and others may not have seen this passage, I quote it in full as one of the many eloquent ones in Sir J. Seeley's *Ecce Homo*.

our sense of its degradation is keenest, that a human brain was behind His forehead and a human heart beating in His breast, and that within the whole creation of God nothing more elevated or more attractive has yet been found than He? And if it be answered that there was in His nature something exceptional and peculiar, that humanity must not be measured by the stature of Christ, let us remember that it was precisely thus that He wished it to be measured, delighting to call Himself the Son of Man, delighting to call the meanest of mankind His brothers. If some human beings are abject and contemptible, if it be incredible to us that they can have any high dignity or destiny, do we regard them from so great a height as Christ? Are we likely to be more pained by their faults and deficiencies than He was? Is our standard higher than His? And yet He associated by preference with these meanest of the race; no contempt for them did He ever express, no suspicion that they might be less dear than the best and wisest to the common Father, no doubt that they were naturally capable of rising to a moral elevation like his own. There is nothing of which a man may be prouder of than this; it is the most hopeful and redeeming fact in history; it is precisely what was wanting to raise the love of man as man to enthusiasm. An eternal glory has been shed upon the human race by the love Christ bore to it. And it was because the Edict of Universal Love went forth to men whose hearts were in no cynical mood but possessed with a spirit of devotion to a man, that words which at any other time, however grandly they might sound, would have been but words, penetrated so deeply, and along with the law of love the power of love was given. Therefore also the first Christians were enabled to dispense with philosophical phrases, and instead of saying that they loved

the ideal of man in man, could simply say and feel that they loved Christ in every man."¹

But there was something more. "Christ believed it possible to bind men to their kind, but on one condition—that they were first bound fast to Himself".

The history of Christianity is *replete* with characters in whom "self was lost and found in Christ" from St. Paul to to-day.

Christ Himself has been the One and only Motive which has been all sufficient for a holy life. Well, again, does Seeley remark: "Among all the men of the ancient heathen world there were scarcely one or two to whom we might venture to apply the epithet 'holy'. In other words, there were not more than one or two, if any, who besides being virtuous in their actions were possessed with an unaffected enthusiasm of goodness, and besides abstaining from vice regarded even a vicious thought with horror. Probably no one will deny that in Christian countries this higher-toned goodness, which we call holiness, has existed. Few will maintain that it has been exceedingly rare. Perhaps the truth is, that there has scarcely been a town in any Christian country since the time of Christ when a century has passed without exhibiting a character of such elevation that his mere presence has shamed the bad and made the good better, and has been felt at times like the presence of God Himself. And if this be so, has Christ failed or can Christianity die?"²

(3) It is quite true that practical experience is the only test of the worth of any maxim. Hence was it that our Lord said: "If any man willeth to do His will, he shall know of the teaching, whether it be of God, or whether I speak from Myself".³

¹ Pp. 154-156.

² P. 161.

³ John vii. 17.

The whole Christian world has thus verified Christ's words, and Rationalists also recognise them as true in spite of their rejecting Him as the Divine Master.

(4) This author, like Haeckel and Büchner, attributes everything to Natural Selection as having caused it. There is an intense "struggle for existence" between what St. Paul calls "the law in his members" and "the law in his mind," or between the tendency of evil and the aspiration to goodness. That is the sphere of the struggle, and the issue is either debasement or nobility, which may be called the "survival of the fittest," if the latter prevail through the power of the will.

The primary cause, however, is overlooked ; and that is the *consciousness* of the struggle, and of the power to determine which of the two "laws" shall win the battle. Therein lies man's moral responsibility. Animals can entertain no such struggle ; they are non-moral.

(5) In this paragraph he speaks of "holiness," but does not seem to realise that, as Seeley says, it was a word unknown and unsuited to man *before* Christ came. As in the use of this word, so is it often the case that Rationalists adopt the Christian phraseology, but attribute Christian ethics to natural causes rather than to Jesus Christ, the true source. Though altruism may find its natural source in parental love, and in what Seeley calls a spark of "natural kindness," it could never have been formed into a flame of enthusiasm by any other means than by a Divine Personality. Plato saw that and Christ proved it to be true.

The ethics of Jesus supply the clear historical origin of the development of Christian love, or *'Αγάπη*.

It was intensified in the family circle ; as shown by the elevation of the wife to her proper sphere as a help meet for man ; in the realisation of the sacredness of

child-life. It was expanded in the relationship between master and man, by the abolition of slavery. It closed up the breach between them, and destroyed the natural hatred among nations ; or, as it is described, Jesus broke down the partition wall between Jew and Gentile, for Christianity regards *all* men as brothers in Christ.

It is the beneficent *Gesta Christi* to which we look for all this and much more. Natural Selection, which has nothing whatever to do with the *origination* or the development of anything, could never do anything of itself. It was Christ who poured this Spirit of Love upon the world. In His short life on earth the fundamental principles of all true spiritual religion were founded. No further developments are needed or possible. Christianity is *Final*.

(6) In this paragraph the Rationalist takes credit for what is really due to Christ. It is perfectly true that when Christ came, Greece and Rome were sunk in ignorance, immorality and crime ; but it was the leaven of Christ's teaching that in time brought about a revolution in these things. It was by the example of all that was pure, good, loving and noble as seen first in Jesus Christ, and afterwards in the followers and martyrs that won heathendom from vice and immorality. It is due to this and *not* to Rationalism that the "average ethical standard is higher than it has ever been before".

(7) In this paragraph we have a good example of the common fallacy about the "race". Like the terms *genus*, "crowd," "congregation," a race is only a word to stand for a multiplication of the individual. Thus a pug dog is an individual, all pug dogs form a "race" or "breed".

The Church of England limits a "congregation" to three individuals.

The very essence of Christianity is that the race, *i.e.*, all men, is "saved" by the salvation of each, individually. Salvation is simply the Christ-like character and conduct. No "race" can be saved if its individuals be not; for the term is simply an abstraction. How then can the author's hope for the reconciliation between egoism and altruism be true for the race, if that reconciliation be not found in the heart and life of *each individual* of the race?

It has been said that Nature is regardless of the individual, but is careful of the type. No biologist can endorse that. The type is the "species" or "genus," or whatever word stands for a "group" of individuals. How then can Nature care more for the type than for the individuals of which it consists?

But what does Evolution say? Travelling back through the past history of the world we find types have come and gone over and over again. They have been swept away as soon as the individuals vanished.

It has often been observed that Christianity differs from Judaism, in that Christ proved the love of the Father and Himself for *each individual soul*; whereas a Jew was a unit in the race, for which Jahweh only cared. That may have been generally the human way of thinking; but there is plenty of evidence that many regarded the God of Heaven otherwise—as a God of mercy, the God of the fatherless and the widow; as One, who though inhabiting Eternity, could yet dwell with the humble and the contrite man.

It is this trait of the Deity which Christ especially taught by imparting a new meaning to "Father". In the Old Testament as "Father," He was the Creator only, as Father in the New Testament, we have a living Parent who will, so to say, speak to us face to face.

(8) Though supernatural religion may not be ap-

preciable to sense-perception, to which Rationalists and Materialistic Monists would seem to reduce everything, yet we may reasonably ask—knowing the past history of Christianity—why will Duty become more virile than it has been among Christians? Duty to whom, we ask? Who or what is there that can command Duty, if there be no God to whom obligations are due?

The Secularist would reply—Duty to one's fellow-creatures: so does Christianity.

History does not corroborate the author's conclusion. A mentally strong and naturally virtuously disposed person—such as the author may be—must not judge of the masses of mankind by himself. He says: "The moral ideal of Religion is Truth": so is it with Christianity; which is based on Christ, who proved Himself to be the Way and the Truth; and we may adopt his words—"On no other foundation than Truth can any lofty or desirable system of ethics be raised"—no other name under Heaven is there by which man can be saved.

The author need not claim for Rationalism what history distinctly proves to have been due to the Spirit of Christ.

(9) It is Christianity alone with which the main theme of religious advance can be identified, as Mr. C. Loring Brace has so admirably shown in his *Gesta Christi*.

(10) That a man's happiness is in direct proportion to his virtue is not a discovery of Rationalism; but the assurance of Jesus, who told His disciples that "their joy should be full"; though men—as He warned them—might kill them thinking they were doing God service.

This result of His ethics—the peace He left with us—is a natural law and as such is to be traced to God as its author, whose "peace passeth all understanding".

(11) If there is really nothing original or important in

the New Testament, why was it written? Why has more literature been written about that little cluster of writings than on any subject in the world? How is it that men, far more learned than this anonymous author—who is perhaps wise in not disclosing his name—have unanimously found proof of a revealing of God the Father in the “Unique” Person (*Μονογενής*) of Jesus Christ; as well as of the promulgation of the Brotherhood of Man (*Ἀγάπη*); and the means of reconciling man to God (the great At-one-ment)?

(12) To write in the year 1903 that Christ died “in order to save these (humblest creatures), from His own eternal vengeance” simply shows a profound ignorance of the truth, and is self-condemnatory, and needs no comment.

(13) Nature never supplied “the Universal Brotherhood and Love” nor “the wondrous force of human self-sacrifice and love”. He may not know it, but strange to say they were first promulgated and established by Jesus Christ in these Gospels, of which he speaks so slightly!

If this author and other Rationalists wish to know what is meant by “the Spirit of Christianity,” I would strongly recommend the three following books—Sir John Seeley’s *Ecce Homo*, Harnack’s *What is Christianity?* and the third book of A. Sabatier’s *Religions of Authority* (Books I. and II.), and the *Religion of the Spirit* (Book III).

CHAPTER VIII

RELIGION AND RATIONALISM¹

WE are now approaching the all-important question as to the use of Religion. Monists like Haeckel, who put God aside as non-existent, and regard the universe as the issue of blind unconscious forces, can have no religion at all in the ordinary sense of the word, which always implies the existence of some spiritual Power upon whom man believes himself to be in some way dependent. The Power is always supposed to be conscious, in some sort analogous to man who possesses consciousness.

Nevertheless, Haeckel devotes a chapter to the "Monistic Religion". Let us see, therefore, what he has to say about it. In drawing a comparison between Science and Christianity, he says: "One of the most distinctive features of the existing century (nineteenth) is the increasing vehemence of the opposition between Science and Christianity".²

This is a somewhat too strong expression ; for many scientists have been, and many are now Christians. But is not Haeckel here confounding Christianity with ecclesiasticism or perhaps Roman Catholicism of the continent including his own country? Did he clearly perceive

¹I would refer the reader to Pr. Loof's *Anti-Haeckel*, for a refutation of Haeckel's chapter xviii., on "Science and Christianity" in his *Riddle of the Universe*. It is published by Hodder and Stoughton, 6d.

²*The Riddle of the Universe*, p. 316.

that Christianity, in the only true sense of the word, is nothing else than the *Christ-like character* as seen in and taught by Jesus Christ Himself and His apostles ; and the pure religion is that defined by St. James,¹ the bitter opposition which Rationalists, Monists and others express towards the Christian religion would greatly subside.

“Primitive Christianity” is discussed by Haeckel and he adds : “Christ Himself, the noble prophet and enthusiast, so full of the love of humanity, was far below the level of classical culture ; he knew nothing beyond the Jewish traditions.”²

It is a common thing to depreciate Christ among Rationalists ; thus, *e.g.*, Mr. Charles Watts writes of Him :³ His character was “weak”. His teaching “objectionable” ; there is nothing “original” in His ethical teaching, His conduct was “narrow-minded”. He was in “no sense perfect”. His precepts are “unreliable”. His language was “unrefined”. He lacks “a true method of reasoning and a uniformity of character”. He exhibited an “injudicious example”. He was “severe” when He should have been “gentle”. When He ought to have been “firm” He was “vacillating and cowardly,” etc. Then Mr. Watts asks : “Who would really believe in His teaching to practice self-mutilation or to hate one’s relations, or to accept a premium for deserting wife ?”

If Mr. Watts and Haeckel are right, have all Christians, learned and unlearned, been stupidly blind, awaiting for nearly 2000 years downwards, for Mr. Charles Watts’ interpretation ?

Will Rationalists ever be able to learn that Christ

¹ Chap. i. 27.

² *Op. cit.*, p. 319.

³ *The Miracles of Christian Belief.*

spoke metaphorically and not *literally*? “Without a parable spake He not unto them.”

Haeckel's observation—that Jesus Christ knew nothing beyond the Jewish traditions—is so remarkable that it is difficult to conceive, not only how he came to make it, but that he could believe any intelligent reader of the New Testament could accept it.

To take one point only. The religion of Judaism was based on a ritual of *outward forms* and ceremonies as well as traditions. Christ placed religion in the *heart within*, on principles, abolishing the whole of the Jewish ceremonial as well as the traditions of the elders altogether.

In alluding to St. Paul Haeckel says: “The remarkable personality of Paul, who possessed much more culture and practical sense than Christ, is extremely interesting, from the anthropological point of view, from the fact that the racial origin of the two great religious founders is very much the same. Recent historical investigation teaches that Paul's father was of Greek¹ nationality and his mother of Jewish.”

“The statement of the apocryphal gospels, that the Roman officer Pandera was the true father of Christ, seems all the more credible when we make a careful anthropological study of the personality of Christ.” Later on, Haeckel puts the supposition as a certainty—“The name of Christ's real father, ‘Pandera’ points unequivocally to a Greek origin”.²

Every reader of St Paul's epistles knows that what Haeckel said of him was not his own estimate of himself, that his great ambition was “to apprehend Christ,” and feared lest he might be considered “reprobate”.

¹ *Op. cit.*, p. 321.

² *Op. cit.*, p. 337.

Haeckel's appeal to the Apocryphal Gospels for evidence must be a somewhat desperate resort !

He goes on to say: "The ethical craving of our emotion is satisfied by Monism, no less than the logical demand for causality on the part of Reason".¹

The ethical craving may be perhaps satisfied in highly intellectual individuals ; but neither Haeckel nor English Rationalists can bring forward any proof that it is so among the masses of men and women. If the preaching of Morality has been found to fail, Monism will certainly not succeed. As with Rationalism, there is the want of Motive Power ; which, as we have seen, is felt so keenly by Rationalistic writers.

"We do not seek a mighty *revolution* but a rational *reformation* of our religious life. And just as 2000 years ago, the classic poetry of the ancient Greeks incarnated their ideals of virtue in divine shapes, so may we, too, lend the character of noble goddesses to our three rational ideals. We must inquire into the features of the three goddesses of the Monist—Truth, Beauty and Virtue ; and we must study their relation to the three corresponding ideals of Christianity which they are to replace."²

The fallacy underlying all this is that the average man cannot worship an ideal or an abstraction. He can feel no emotion for them any more than for Comte's *grand être* ; or than one can for gravitation. Religion cannot stand upon any other basis than reverence for a Conscious Being.

But Haeckel rejects the only Being who has and can excite enthusiastic reverence.

"We must reject what is called "Revelation," the

¹ *Op. cit.*, p. 340.

² *Op. cit.*, p. 344.

poetry of faith, that affirms the discovery of truth in a supernatural fashion, without the assistance of reason. . . . In this respect it is quite certain that the Christian system must give way to the Monistic. . . . In our search for truth we have to devote ourselves solely to the study of Nature.”¹

But the Christian system of religion is something which will not fall under observation of, or experiment with, Nature. It deals largely with spiritual matters which do not appeal to the senses. But, to say that the belief in a Conscious Being we call God, which lies at the basis of Religion, is not founded on reason, is not true. It is the object of this book to show that many lines converge to establish the belief in God by inductive evidence ; for we have no other. It is, however, ample ; and this process of reasoning in the spiritual world is known as Faith—“the proving of things not seen,”² *i.e.*, it is the accumulative proof or “moral conviction” of Truths which cannot be brought within the sphere of the senses.

“The idea of the good, which we call Virtue, in our Monistic religion coincides for the most part with the Christian idea of virtue ; *vis.*, of the primitive and pure Christianity of the first three centuries. . . . The best part of Christian morality, to which we firmly adhere, is represented by the humanest precepts of charity and toleration, compassion and assistance.”

“However, these noble commands . . . are by no means original discoveries of Christianity. They were derived from earlier religions.”

“Moreover, Christian ethics was marred by the great defect of a narrow insistence on altruism and a denunciation of egoism.”³

¹ *Op. cit.*, p. 345.

² Heb. xi. 1.

³ *Op. cit.*, p. 346.

Of course, one has no quarrel with Materialistic Monism or Rationalism for accepting Christian ethics. So far, they are Christians in spite of their infidelity ; but when Haeckel says Christ insisted upon a "narrow" kind of altruism with a "denunciation of egoism," he is conspicuously in error. Duty to oneself is as much insisted upon as duty to one's neighbour ; whether the former be purity and honour, to which St. James refers in his well-known definition of religion ;¹ or to working for a livelihood.² Where the "narrowness" of altruism appears in *Ἀγάπη* one is at a loss to comprehend. The Christian knows nothing of it.

"Two things certainly remain beyond dispute—the lofty principle of universal charity and the fundamental maxim of ethics, the 'golden rule,' that issues therefrom ; both, however, existed in theory and in practice centuries before the time of Christ."³

"In this greatest and highest commandment our Monistic ethics is completely at one with Christianity."⁴

It is gratifying to hear this conclusion of Monism ; but it is quite obvious from all ancient history that the "golden rule" was practically a dead letter, both among individuals and between nations. Moreover, if the truth could be recognised by Haeckel and Rationalists, the above lofty sentiments would never have been known to them had not Christ come.

¹ Chap. i. 27.

³ *Op. cit.*, p. 322.

² Eph. iv. 28.

⁴ *Op. cit.*, p. 359.

CHAPTER IX

THE ORIGIN OF MORAL EVIL

VOLUMES have been written on the origin of moral evil and sin in man. Until the middle of the last century the story of the fall as given in Genesis was supposed to be historically true. Therefore, all the literature which was based upon the theory of original sin is now out of date and superfluous.¹ The question at the present day is—What has Evolution to say upon the subject?

It is simply this—We have seen how man's power of realising an abstraction in his mind at once and entirely separates him off from all the rest of the animal creation; in that consequently he alone can form some conception of God. He is conscious of the power to choose, or what is called free will.

Then he finds out for himself, or is told by others from their experience, that he will suffer if he does certain things. Such is his first idea of a natural law: but so far there is nothing moral or immoral about it; just as all animals are non-moral.

But when a community or tribe is formed, it is soon found that certain restrictions are necessary to be put upon each individual. Then a moral law is framed; such as "Thou shalt do no murder," *i.e.*, within the community. Such may be enforced by penalties.

¹I would strongly recommend to the reader Mr. F. R. Tennant's book on *The Origin and Propagation of Sin*.

We thus get at the stage known as "guilt," *i.e.*, the violation of a duty to the state.

The higher stage, in which a man believes himself bound to duty to a God, brings with it the sense of "sin".

So that what we call "falling" is really, and indeed obviously, "a conscious violation of law". It is just what the serpent is represented to have foretold; that being possibly the familiar experience of the writer of the story.

Most of the acts of guilt, as theft and murder, were not considered such in early days when every man's hand was *naturally* against every other. Even nearly up to our Lord's time, every nation of the East had been naturally hostile against every other whom they might attack, slay, despoil at will, not because of any quarrel—there need have been none—but solely because they were foreigners and that there had been no treaty. It was Rome which gathered together into one heterogeneous mass all the nations of the then world; and so made a rough field more or less prepared to be sown with the seed of the gospel.

Now, the whole matter as to the origin of evil is put into the short sentence of St. Paul: "I had not known sin but by the law . . . for without the law sin was dead".¹

The story of Adam and Eve puts the case very clearly. The writer, apparently wishing to account for the origin of wickedness prevalent in his day, invents the story and shows how the *First Law* given to man, *brings in* the possibility of *Sin*, by its violation. The command is like an order given by a parent to his

¹ Rom. vii. 7, 8.

children playing in an orchard ; who were never told before *not* to do anything.

Adam and Eve were non-moral before ; but the moment they receive the command, "Thou shalt not eat of the fruit of the tree," potential morality and immorality is present ; so that what would have been a non-moral act becomes an immoral one.

Law, therefore, is the indirect cause of guilt and sin, by pronouncing certain previously non-moral acts to be immoral.

It is not that man "fell," but that his eyes were holden till he realised, as soon as he experienced it, what would be the effect of violation of law on himself.

The story, then, represents *the Discovery of Conscience* after the pronouncement of law, the possibility of guilt or sin, with its concomitant shame.

With the powerful aid of a "conscience towards God," constantly warning and shaming man, he has learnt how he is now able to rise to a divine height ; though he is equally conscious that he may sink lower than the beasts that perish ; for without law man would for ever remain on the same dead level of animal non-morality, when nothing is good, nothing is evil. There would be *no Contrast* and no need for *Volition*.

Let us then consider this all-important Law of Contrasts, which supplies the basis both for man's moral elevation as well as for his possible degradation, since no evolution ever takes place without a possible devolution or degradation in some other direction.

A most important result of man's powers of abstract reasoning, and of his consciousness of the power of choosing, is the origin of this conception of evil—whether that word be his estimate of physical occurrences *without*, or what is called "sin," *within* himself.

The so-called "physical evils" in the world are those events which he does not like; but they are relative matters. A storm ruining his nearly ripe corn he calls an "evil"; but coming after a drought has prevailed, when the seed is germinating, it is a "blessing".

The old saying "It is an ill wind which blows nobody any good," implies how rare such an occurrence is. It represents the fact that all events imply their *contrasts*.

If there were never these uncertainties in Nature, we could not, *e.g.*, speak of good and bad weather. If we were never ill, we should not know what to be unwell meant and we could not speak of health as "good," for it is only by comparison that we are aware of health at all; as we are perfectly unconscious of the working of the internal organs of our body until something goes wrong.

Such contrasts prevail everywhere, and we talk of heat and cold, light and darkness, etc.

Similarly with regard to man's moral conduct, we describe it as good or bad. But why? What regulates Conduct? The answer is "Law". "I had not known sin but by the law," writes St. Paul;¹ but laws, as made by man, at least, are very variable not to say capricious or even contradictory; for we often find one race of men regarding as correct what another thinks incorrect, as the "religious" practices of the ancient Greeks compared with Christian conduct.

Thus, if a comparison between Judaism and Christianity be made, we find rites and ceremonies to be the essence of the one, their utter abolition to be a fundamental feature of the other. The highest ideal of a Rabbi was to multiply and endeavour to perform the greatest number of the traditions and religious ceremonies

¹ Rom. vii. 7.

possible. Such was his idea of the "Righteousness of the Law".

We turn to Christianity and we find the whole of the ceremonial law was a mistake, and "Righteousness of Faith" takes its place.

Hence we discover a fundamental contrast between these two laws of Judaism and Christianity, respectively.

If it be asked why some men follow one line of conduct and others follow a quite different one; both thinking they are right in obeying law, it is just because human-made laws are never perfect nor universal; whereas Spiritual laws—as revealed by Jesus Christ—are found by experience to be applicable to all races at all times.

But whatever law men believe to be right and obey, that is, act up to their light, feeble though it may be, they cannot be called in question. If he obeys, we may call him relatively moral, and relatively immoral if he disobey it.

But Law may be "natural" as well as human.

By "natural law" is only meant an "observed order of facts"; that is, certain events always take place under the same circumstances. This uniformity is said—metaphorically—to be in obedience to law. It represents what always *is*. It only differs from human laws, in that these represent what man always *ought to be*.

Now animals, by not having the power of abstract reasoning and possessing no consciousness of the power to choose, *i.e.*, volition, cannot be moral or immoral, but are simply non-moral or living automata.

Man, alone, on the other hand, can be both moral or immoral, for he alone is *conscious of the universal law of contrasts*, and can *use* or *abuse* nature's laws, say of health; and he can also obey or disobey human laws.

Herein, then, lies the application of Free Will to the spiritual world.

It is the consciousness of having the power to restrain oneself from abusing natural or other laws, whenever circumstances demand our attention to decide upon our course of action, and to do so from strong motives. Those—as far as Christians are concerned—are love to God and His Christ; for this includes all terrestrial motives, as of nobility of character, and love to fellow-creatures (*agape*).

If a man restrain himself from violating human laws, through fear of punishment on breaking them, he exhibits an outward, formal or prudential *morality* only. If he restrain himself for the love of God, he is guided by a *religious* motive and the aspiration for holiness.

Thus do we realise the difference between guilt and sin. A law court only knows the former; whereas the latter implies a previous firm conviction of the existence of a Holy God.

Consequently, no nation in the world realised to the full what sin meant before Christ came, unless we except the psalmists and prophets; but even they had not reached a full realisation of sin against the Father. The words in Hebrew and Greek meant “missing one’s aim”; and mainly referred to failures in ceremonial duties.

Whatever man-made law lays down at any period, such, of course, must be obeyed at the time; but such laws become obsolete, are repealed, and new ones substituted to fit later times and conditions.

On the other hand, God’s laws, moral or religious, are eternal. Such are the Laws of Philanthropy, Edification, Mercy and Forgiveness.¹

¹ As enumerated by Seeley (*Ecce Homo*).

Such are only appreciable by their contrasts ; and it is our free will which is called upon to decide our actions in obeying these laws and to overcome the inducements to abuse instead of use them, *i.e.*, to be loving and philanthropic instead of churlish and selfish ; instead of boldly resenting it, acquiescing feebly in wrong-doing. To forgive seventy times seven, if an erring man repent, rather than harbouring an unforgiving spirit in the heart. It is only by thus ruling ourselves, that we gradually tend to become at last *automatically* pure, holy, loving and forgiving. Such is the highest possible state for man to acquire—"To be perfect as the Heavenly Father is perfect," or as St. John says : "A child of God *cannot* sin".

Determinists say, as a proof of a man having no "free" will, that you can tell beforehand how a man will act if you know his character. This is perfectly true, and especially so of the perfect Christian ; because whatever a man's character *has become*, it is finally the issue of his own will. The perfect Christian of forty years of age has passed through the period when his will determined that he would *not* be immoral. Another may, at the same age, have the character of a *roué* ; because he made no effort to restrain his passions, but gave full rein to the "law of the flesh" ; which now, at forty, has the mastery, and he cannot restrain himself any longer.

Now, is it only *Utility* which lies at the bottom of conduct, or is the motive power for self-restraint the duty to self and others ? The former is the Secularist's assertion. Is it only because "honesty is the best policy" that a man does not defraud his neighbour ?

There is something else, and that is *Conscience* ; we recognise it by *sensations*, either an unpleasant feeling arises in the mind on one occasion or a self-satisfied one

on another, following certain actions we have done, respectively.

Whence does it arise?

As long as we are compelled to obey man-made laws for fear of punishment, conscience is for the most part a very feeble affair if it exist at all. The Greek could only say, "I know nothing against myself,"¹ if he had done the prescribed duties of the state; just as the young man said to Christ, "All these have I kept from my youth up". Similarly, schoolboys are, as a rule, obedient to the master's orders, through fear of punishment; but if they can find a quiet corner where they can light a cigar, they do not hesitate to break the rule, and think none the worse of themselves for so doing.

Again, many people, even in Christian England (to say nothing of Orientals), "see no harm" in cheating the Government, by evading taxes in part, in smuggling, or a railway company, by trying to pass a child over age, as if he were under, etc. Though the same persons would hesitate before doing a "dirty trick" to their neighbours.

A fully developed conscience is only in correlation with the belief of a Holy God.

A dog will sneak away ashamed of itself, if *found out* in having done something for which it has been beaten. So, too, to be discovered is in the eyes of a non-conscientious person the real "crime," not the act itself. Shame only *follows* on discovery, if it come at all.

But with a "conscience towards God," as soon as *reflection* follows the act, shame is felt, whether one's fellow-men know of it or not.

Herein is seen the keen insight into human nature

¹ The verb *συνείδεται*.

of the writer of the story of Adam and Eve ; for he represents shame as following the act of disobedience *before* its discovery by God.

A beautiful picture by Mr. Long called "Christ or Diana," well illustrates the awakened conscience. A girl, who has become a Christian, refuses to put incense on the altar of the goddess. A score of figures at least are around her ; but not one understands why she refuses. It is merely a state ceremony ; a state law orders her to do it ; it is a political test. To put some incense on the altar was less as an honour to Diana than obedience to the state. That young girl, alone of all the crowd, knows what conscience means.

The state, of course, has no alternative but to send her to the arena.

The occasion has arisen ; the "circumstances" are all there. She is *conscious* of the power of her *will* to submit or to refuse. The *conscience* supplies the *motive* for refusal. A more powerful motive than that of obeying the state is present in her mind, *vis.*, the *Abstract Conception of Duty to her Master*, Christ. The *Will* has been called into action, and she refuses to belie her conscience¹ at the expense of saving her life.

It is hardly necessary to add much on Original Sin. The conception that all men became tainted through being descended from Adam and Eve is, of course, a pure

¹ The Greek word for "conscience" is *συνείδησις*. It does not appear to be of common occurrence in Greek literature, being only known in a passage quoted from the lost works of the poet Menander. St. Paul uses it, and even quotes a line from Menander—"Evil communications corrupt good manners". This shows that the *idea* of *conscience* was not at all prominent to the Greek. Nor, indeed, could it have been, when we consider what the moral conduct of the gods and goddesses was supposed to be. It was Christianity which brought about the development of a "pure conscience towards God".

fiction; but all men *can* fall by excessive yielding to their natural and *per se* sinless feelings; that is by *abusing* and not *using* natural laws of their body and mind.

As a rule these lower properties are stronger than the tendency or wish to rise above them; and every one will readily echo the words of St. Paul: "Oh, wretched man that I am, who will deliver me from this body of death?" And the remedy is supplied by himself; while prayer will strengthen the will to restrain oneself instead of yielding automatically to impulses.

It has been said by a believer in Natural Selection, that the animal "propensities are inevitably strong in man, because they are, or once were, useful or necessary to life, and were therefore through countless ages intensified by Natural Selection; so there is no reason left for referring their clamorous importunity to an evil bias or a corrupted nature".¹

If the habits of animals be observed their instincts are so completely regulated by natural laws that they are strictly periodic and *never abused*, for it is "use," as the ancient philosopher said, not "Natural Selection," which strengthens any habit.

Man alone can think of the abstract idea of "pleasure," and can therefore abuse natural law, by exceeding and repeating the use to an abnormal and excessive degree. It is this which intensifies the craving whether it be drink or the sexual passion. Natural periodicity has been completely broken down, or at all events not observed.

The tendency to possess the "craving" becomes only too often hereditary; and it is in this limited sense and degree to which science would abbreviate the term "Original Sin," and convert it into "parental taint".

¹ *The Origin and Propagation of Sin*, F. R. Tennant, p. 93.

CHAPTER X

RATIONALISTIC VIEWS OF PHYSICAL EVILS; AND THE LAW OF "INIDEALITY"

ALL Rationalists make much of so-called "physical evils," and ridicule the idea of their being consistent with a good, just and Loving God who cares for Humanity and other creatures He has made.

For if God be the author of Creation, He must knowingly have made the world so that man should suffer by catastrophes, such as storms, deluges, volcanic outbursts, etc.

Of course, this so-called paradox has perplexed men from time immemorial, before and after the days of Job.

The question is, What is the Christian interpretation?

The Old Testament idea of "judgments" has long ceased to be held, since our Lord alluded to the Tower of Siloam; but He taught us to read a moral lesson from accidents and catastrophes.

Why is it that some men, such as Rationalists, seem to see something very terrible and inconsistent in Nature's forces, when man suffers from them; but Christians, who see them too, do not feel them to be so heavy a burden on the mind? May not the answer be that the Christian has no fear of death; while the man who believes that he will vanish altogether and not survive it, regards it as terrible?

There may be no hereafter or there may; but the Christian has an ideal life in prospect in hope.

He knows he must die sooner or later, according to natural law, and he is prepared to go, whenever his turn may come. As long as he is in this world he uses it without abusing it. All his faculties, æsthetic, pursuit of knowledge, love of science, etc., as well as moral and ethical traits are exercised to the full. Why should he fear death? "Perfect Love casteth out fear."

Why is it that so many Rationalists write pages of pessimistic words about physical evils? Thus writes the anonymous author in one of several passages of his book: "Does God, as revealed in Nature, show more regard for the moral growth of man than for the stability of the heavens? The answer of every thoughtful and candid observer must be that he reckes no more of man and his physical and moral growth than of the flies which in early autumn are swept out of existence by the blighting frost of a single night. What does God care for the moral growth of the multitudes of human beings whom he destroys by the frightful agency of earthquakes and volcanic eruptions?" . . . "Mr. Balfour may reply that this physical destruction is not of cardinal importance in connection with his argument, and that the moral growth ceases here only to be resumed in some celestial sphere. But how does he know this? . . . In the absence of evidence to the contrary, we are bound to conclude that death is the end of man, and that the moral growth which is extinguished on earth is extinguished for ever."¹

This is the writer who says: "This so-called knowledge [he is speaking of the knowledge of God] must be

¹ *Mr. Balfour's Apologetics*, p. 201.

submitted to the tests of observation and experiment; if it is knowledge at all, it is capable of verification, and the verdict of science on the subject must be final."¹

I have already had occasion to point out that science is ready to accept inductive evidence as equivalent to a demonstration where none other is possible; that science by no means limits her requirements of proof to "observation and experiment"; and it is perfectly obvious that the "proof" of immortality cannot be so tested; but, like the rotation of the earth, the probability is of a very high order, and has proved amply sufficient for millions of believers in a hereafter.

That probability will be considered later on.

Three papers appeared in the first number of the *Hibbert Journal*, p. 114, upon "Catastrophes and the Moral Order" (Martinique and St. Vincent, May, 1902). In the first, by Prof. G. H. Howison, that author says, in referring to Monists and Rationalists who assert the incompatibility of catastrophes with a good Providence, and ask, "Can such things be, and the supposed Author and Ruler of Nature still be merciful and just and good?"

—"In this outcry we come upon the real burden of the problem of Evil, and discover its source. Its source is the traditional form of our Theism, and its burden comes from attributing to God the authorship of Nature, with all its apparatus for cruel torture, as we know these now. To Materialism, to sheer Naturalism, to Atheism, there is no *enigma* of Evil; thinkers of all these types have Evil before them as a *fact* simply; they have no Almighty Intelligence to blame for it; their only business with it is to avoid it so far as man can, and to bar it finally out of life, if perchance that be possible." If not, then the

¹ *Op. cit.*, p. 103.

words may be said—"But brothers, you can end it when you will".

But to the Theist the question remains: "Can this problem of Evil be solved?" This author seems to think not; that attempts hitherto have all been failures and "must forever remain a failure". "The fatal mistake has been the attempt to unite this universal causality of God with His essence as Love."

He concludes by saying: "Indubitably, we stand in need of a new idealism, which shall be so thoroughly pluralistic, as to avoid both forms of literal Creationism—whether the Dualism of the Hebrew or the Monism of modern thinking—and which, while it refers Nature and all its woes derivatively to minds, presents as the minds other than God, and places God in a purely ideal or final-causal relation to them, and thus to the system of Nature dependent upon them".

This appeal to "minds other than God" does not seem feasible in the face of the Laws of Continuity and the Conservation of Energy.

Rev. R. A. Armstrong in the second essay begins by reminding us that the St. Vincent catastrophe is by no means peculiar, and that 215,000 people were overwhelmed by a wave in the Ganges in 1891. "In fact they are no more terrible or more sad than the normal," and minimises the effects by adding: "Death left mourners few and rare. A multitude were spared the sorrows of orphanage or widowhood. Where for these was death's sting?" . . . "We have not to ask 'Were these men of Martinique sinners above the rest?' but rather, 'What were these husbands and wives, parents and children, lovers and beloved of Martinique, that God blessed them thus above the rest, robbing death of its sting, the grave of its victory?'"

If the author himself were asked, which would he prefer—to die peacefully of old age, *i.e.*, normally ; or be burnt up by a fiery hot blast as the victims were in that volcanic outburst, what would be his reply? I am not surprised that this statement met with rather severe criticism in the second number of the *Hibbert Journal*. But he admits "they are only pleas in mitigation of judgment ; and the arraignment still lies against an Almighty God that He might have arranged things otherwise than He has".

"One consideration indeed there is for the special comfort of him whose trouble lies in the contemplation of catastrophes. It is of their very essence that, in human history, they are exceptional." So are railway accidents and falling towers, as of Siloam and others ; still such catastrophes *do* occur.

In conclusion, he leaves the concrete physical side of the question and observes : "But the main trust of Theism must for ever be in the spiritual experience of the individual man. . . . If the witness of the Spirit be with him, if he has known God working in him in his sorrow, in his temptation, in his remorse, in the blessed experience of reconciliation, the fires of all the volcanoes will not burn nor the waters of all the floods avail to quench his faith."

The third writer is Rev. Dr. R. F. Horton, who observes that men do not seem to remember that catastrophes are part of natural law. "On every occasion of sudden disaster the mind feels bound to discuss the question again *ab initio*." He agrees with the previous writer in saying : "It is surely illogical and childishly inconsistent, accepting the fact that some 30,000,000 of people perish by old age, disease, accident or their own fault every year in the ordinary way, to see in that nothing to shake one's faith in Providence."

“ But the value of such a catastrophe, from an intellectual and spiritual point of view, may be, that it calls our attention to the catastrophic nature of human life, and requires us to settle our accounts with the fact, which is forgotten because it is not regular but intermittent.”

This, of course, is in accordance with our Lord's remark : “ Unless ye repent, ye shall all likewise [spiritually] perish ”.

He alludes to the power of the will to mitigate pain ; as seen in the calmness of the martyrs at the stake, justified by the consciousness of righteousness, and in Jesus Christ on the cross ; but his critic rightly observes that there is the element of free will present, whereas at Martinique and St. Vincent the deaths were involuntary.

Lastly, he refers to the belief in a future life as the key to the problem : “ The Stoic saw half the truth when he knew that the just and resolute man cannot be shaken by the ruins of a falling world. The Christian sees it all when he says, ‘ Nevertheless we, according to His promise, look for new heavens and a new earth wherein dwelleth righteousness ’.”

Mr. C. Cohen criticises the last two writers in the *Hibbert Journal* (vol. i., p. 360). He observes generally, if man did the things which catastrophes do, he would be regarded as guilty : why then is not God ?

“ The *Apologia* of Messrs. Horton and Armstrong does not touch the really vital issue . . . which is, Why should they occur at all ? . . . “ It is the duty of the Theist to justify in God a method of working or of instruction that would be condemned in man.”

“ The argument *does* show that the Martinique disaster is in line with the general course of Nature ; but this only amounts to saying that if ‘ Providence ’ is at fault here, it is at fault everywhere else.”

I will now add some remarks and begin by criticising the critic. Mr. Cohen says that if such a slaughter were cruel in a man, it must be so in God.

But he overlooks the fact that ten times greater slaughter by man has never been regarded as cruel, but the right thing to do!

If there is any one thing that man has gloried in from the remotest times to the present day, and from the lowest savage to the highly civilised Englishman, it is WAR.

Is not there, therefore, a ring of disingenuousness about the whole argument? Men cry aloud against the holocausts on those West Indian islands; but as long as men persist in inventing the most horrible engines of warfare and try to sink or set on fire ships, laden with hundreds of human beings, do their best to mutilate their fellow-creatures with cordite, lyddite, and I do not know how many more inventions, surely it is scarcely apposite to complain of catastrophes as executed by God, when they do their very utmost to surpass Him in destruction!

But what is the true situation? Death is a law of Nature. No one complains of that. At eighty years of age, all of us will be pretty ready to go, being tired of this world, finding ourselves isolated—nay, we shall probably *long* to go!

The Rationalist's complaints, therefore, seem to rest on two grounds. One is that the young and middle-aged do not wish to go yet. The other is that no one likes to feel bodily pain, nor, I will add, give a cause of grief to others.

If any be Atheists, they can quit the world painlessly at any time. It is curious how pessimistic they are. Haeckel writes a long passage, and the author of *Mr.*

Balfour's Apologetics, pages—repeating himself—in describing the physical evils of the world.

With regard to pain, we must remember that man could not have pleasure without the possibility of pain. Death by catastrophe is not of longer duration than by disease or old age; it is generally exceedingly short if not instantaneous.

I take it, that pessimism about catastrophes arises from a want of Faith and a belief in a future life.

If Christ's teaching be true, and the promise that "he who *willeth* to do of the teaching *shall know* if it be of God," has over and over again been verified by experience; then His *conduct* bears witness to another truth—that He showed Himself to be superior to all "evils," throughout the whole period of His ministry. He not only taught His disciples to care nought for them, even if they should be scourged and *killed*, but gave Himself up as an example to a torturing death, in full faith of an Eternity.

It is worth while observing that there is a perfect analogy between external Nature and the internal nature of man. Within the latter are joy and grief, enthusiasm and pessimism, pleasure and pain. So too, is it externally: Nature surrounds us all with untold blessings and sunshine, for the greater part of mankind and the greater part of their lives.

But, on the other hand, we are from time to time reminded that there *are* and may recur at any time, volcanic eruptions, storms at sea and floods.

But man *risks* them. He builds towns on the flanks or foot of volcanoes. He sends his ships all over the oceans, etc. So, too, he travels by rail, knowing all the while that there is always a chance of an accident. But he does not care about it in the least. Nothing of these things deters him.

Do we not thus begin to see a certain natural law in us and about us? I call it "The Law of Inideality," meaning that *nothing* in this world ever reaches the *Ideal* which man can conceive of what he would like.

I quote the following from a paper I wrote upwards of thirty years ago.¹

"One of the Arguments of Design was supplied by *The Adaptation of External Nature to the Physical Condition of Man*. This was the title of the volume of the Bridgewater Treatises, by Dr. J. Kidd, F.R.S.

"I cannot but think that many adaptations of man and animals and plants, as well to their sphere of existence, have been much overrated; for, in fact, they are greatly limited. The conclusion arrived at from a study of such adaptations has been expressed by science somewhat as follows: Animals and plants, and we may include man, do not necessarily live where conditions may be best suited to them, but where other animals and plants, as well as inorganic or physical conditions, will let them live, when they cannot migrate or get away from them.

"This is the result of the intense struggle for existence and survival of the strongest which obtains everywhere. This is a universal fact, and covers the sphere of man's existence as well as that of all other organisms. It requires but a slight observation, provided the mind be free from preconceived ideas, to see that no animal or plant is absolutely or perfectly adjusted to its sphere of existence for every day of its life. These adjustments are ever varying round a mean condition of a fair state of comfort and happiness. Averages in this world must be looked for only. A vast amount of very imperfect

¹ "Natural Theology considered with reference to Modern Philosophy," *Journal of Transactions of the Victoria Institute*, 1872.

adaptations must be taken into account in considering the conditions of life upon this planet.

“I will confine my remarks here to the relative condition of man, in his adaptation to his environment; for this element of adaptation in the Argument of Design seems to have been too much depended upon. Moreover Dr. Kidd’s remarks will afford a good illustration of the faulty *a priori* or deductive reasoning of the teleologists of the old school.

“Starting with the truism that man can now exist upon this world—a possibility which, perhaps, did not exist during the greater part of the world’s history—we have to consider the degree of perfection to which this adaptability has arrived; and a careful scrutiny will not bring out more than a relatively perfect view. Consider his wants. Food stands foremost. Now his calculations on the produce of his fields can never be absolute. He may be in no way to blame; but after all his care and striving, his harvest may be ruined. Again: one of the most essential elements which furnishes to sustain our immense manufactures is coal. We may regard coal as ‘providentially’ stored up for man’s use; but we can conceive—if it be there by God’s providence—that it might have been far more accessible and less dangerous to procure; for even with the most careful processes being adopted for its extraction, an enormous loss of life has occurred. So, too, with regard to calamities by fires, earthquakes and storms. Who can foretell the fate of man, who is ever liable to destruction from natural causes which he cannot always avoid, and has no power to control? Not to mention diseases, hundreds of instances show an absence of a conceivably perfect adaptation between himself and his environment. In Dr. Kidd’s contribution to the *Bridgewater Treatises*, he alludes to the beneficial effect of wind

in dissipating intense heat, and as a preventive against the evils of a stagnant atmosphere, 'those currents of air which administer in various modes as well to the luxury and comfort of man, as to his most important wants'. But in his description he alludes as much to the destructive effects of wind as to its benefit, and to the existence of 'stagnant air producing [?] horrible effects, as goitre in Switzerland';¹ while of hurricanes he can only say, 'but on some occasions we have immediate demonstration of their remedying a greater evil [than the destruction of life and property which hurricanes cause]; *viz.*, dissipating swarms of ants in the island of Grenada!' It may be questioned whether the latter is really a greater evil than the destruction of hundreds of human beings! Again, of Swiss valleys, all he can say is, 'We may well be thankful that our lot has not been cast in certain regions of the earth, in those Alpine valleys, for instance, whose scarcely human inhabitants attest the dreadful consequences of a confined atmosphere'. He seems to forget that if God be the Author of Nature, He must have arranged the 'stagnant air as much as the hurricane'.

"But what do we infer from all this—and much more might be added as to the atmosphere being charged with pathogenic microbes, etc.—but that the physical adjustment of man to the atmosphere is anything but absolutely satisfactory?"

Now, an Atheist or modern Rationalist might easily appeal to Dr. Kidd's descriptions, and tauntingly ask: "Is this the work of your beneficent God?"

Moreover, if we consider man's adjustments to external conditions, everything else besides the atmosphere furnishes similar, so-called "evils".

¹ So common is this complaint among women, that a girl who had not one used to be ridiculed by her companions!

In other words, there are the same, only “relatively perfect,” *i.e.*, imperfect conditions, those, than which he can always conceive far better, wishes for far better, and hopes for far better hereafter.

The philosopher is thought to have said a clever thing when he remarked on the structure of the eye that had a manufacturer brought it to him, he would be ashamed to show so imperfect an instrument. This may be somewhat of an exaggeration, but the truth underlying it is that nothing *is* absolutely perfect but everything may be nevertheless “very good,” and good enough for this world.

Imperfect adaptations are the invariable law of this world. Now, many may feel disposed to ask: “Is not all this very derogatory to the Deity, who is a God of love and mercy?” I, at once and unhesitatingly, say “No!” It is not for man to pronounce what may or may not be derogatory to God, if he believe in His existence. The finite mind cannot estimate the wisdom of the Infinite. It is this unphilosophical way of weighing God’s actions in our own mental balance, which has brought so much contempt upon the methods and assertions of the teleologists.

I would maintain that Natural Theology, as a science, must be studied “objectively,” that is *inductively* and not “subjectively”; that is arguing *deductively* on an assumed datum. Theologians must not shirk a full and thoroughly impartial observation of the phenomena of the world. We can only discover His laws by a close examination of His works, their interactions, and their actions upon ourselves, and the universal presence of law—applicable to all cases of what was called design, including the adaptation of man and animals to their sphere of existence, I include under the *Law of Inideality*;

by which, I repeat, I would signify that nothing in Nature ever reaches that *ideal* state of perfection which is conceivable. It expresses what I have called *a relative state of perfection*. I call it a natural law, because law is expressive of an order of facts, and this law admits of universal application, applies to everything thought to be "designed" though now known to be "evolved," and is, therefore, like other natural laws, a universal witness to the will of God.

Under this same head of Adaptation, I would allude to a statement of Mr. Herbert Spencer, who in his usually powerful reasoning in support of Evolution, has made a slip (as it seems to me) in dealing with this subject in his article on the special creative hypothesis.¹

In speaking of the parasites to which man is subjected, he asks: "Shall we say that man, 'the head and crown of things,' was provided as a habitat for these parasites? or shall we say that these degraded creatures, incapable of thought and enjoyment, were created that they might cause unhappiness to man? One or other of these alternatives must be chosen by those who contend that every kind of organism was separately devised by the Creator. Which do they prefer? *With the conception of two antagonistic powers, which severally work good and evil in the world, the facts are congruous enough.*"

I italicise the last sentence as seeming to me to be bordering on absurdity, under any hypothesis. For, if parasites be an "evil" and man the "good," the *argument cannot stop with man*; and we shall soon become utterly perplexed to know which animals are "good" and which are "evil". If those which prey on others, such as

¹ *Principles of Biology*, 1st ed., vol. i., p. 344.

parasites on man, be (as is evidently intended by Mr. Spencer) evil; then *a fortiori*, all carnivorous animals must be "evil" and we must presume all herbivorous animals "good," and man himself must therefore be "evil" too. But we have started with the idea that *he* was "good" and his parasites "evil". Of what character then are those animals, besides man, that partake of a mixed diet, as the rat and pig?

Let us recognise this world as never furnishing more than a relative condition of things; while the "purpose" of that, too, is not difficult to see, now that we have the light of Christ's revelation as to the meaning of the world thrown upon it; namely, as a state of probation for man to fit him for a higher destiny than any which this world can furnish. If we accept *this* as a universal *truth*, we shall not discolour our view of creation by erroneous views of God's goodness, much less by rationalistic, monistic or atheistic ideas.

CHAPTER XI

ETHER AS THE VEHICLE OF DIVINE POWER AND THE HUMAN SOUL

I HAVE had something to say upon the origin of matter out of vortex-rings of ether. I now wish to show that the theory is feasible which supposes God to be wherever ether is supposed to be. That is, they are both infinite in space.

Ether penetrates all matter, inorganic and organic alike; and as it is the vehicle for all kinds of physical forces, so it may be the instrument of the soul of man when parted from the body. It, therefore, may be the universal inter-communicating medium of all conscious beings in the universe.

I do not think, therefore, that we can conceive of anything in Nature better than the ether, capable of "imaging," so to say, an Infinite Spiritual Power.

If ether be a fact, then it must be practically infinite and eternal, and is *not* matter, as we understand matter. The evidence of its existence depends upon induction based on the transmission of light and other vibratory forces. We do not think of those which cause light in our brains as self-conscious; but that own self-consciousness may be dependent, not so much on the *matter* of our bodies, as upon the ether which inter-penetrates the substance of our brains; hence, we can begin to imagine

the Infinite Ether as the Vehicle of an Infinite Conscious Being.

The idea of "God residing with the humble and contrite heart," and our Lord's expression: "We will make our abode with him who loves," etc., may have a physical as well as spiritual interpretation. We all do practically assume it, by *praying in silence*, fully believing that there is a sympathetic Spirit which can help our mental aspirations. Our souls must "vibrate in unison with God," and response comes as truly as when a note struck on a violin causes the same to sound in a distant piano.

Our own vibrations are constantly changing. God's are permanent and uniform. "With Him there is no variableness nor turning of the shadow," *i.e.*, on the dial; for God is, so to say, always on the meridian.

It is for us to put ourselves in unison with Him; that is "at one" with Him, not for *Him* to be reconciled to *us*.

Again, it is well known that two waves may meet, whether air-waves giving sound or ether-waves giving us light, and if they do not coincide, silence and darkness may be the result, respectively; so that we seem to see an analogy with St. Paul's expression, "Quench not the Spirit".

A pure and loving heart vibrates in unison with God. A lustful and rebellious thought produces discord with, it may be, direful consequences.

It may be suggested that this "ethereal" notion may be all fanciful, and only a picturesque if not grotesque analogy; but there would seem to be some basis for believing that our "soul" or the *Ego* is not so much dependent on the body made of flesh, as one of ether permeating it.

To supply some, perhaps only a slight ground for this supposition, I will describe briefly the result of careful observations on experiments made by a gentleman who possesses the powers of *revealing* (not *reading* any thought), whatever was within the brain of any person in the form of a mental picture. It may, perhaps, in a way, lend some countenance to the ethereal theory of soul-vibrations occurring in an ethereal counterpart of the body.

The gentleman in question admitted that he had no power to read any abstract thought passing through the mind, so styled his entertainment—"Thought Revealing". From a careful study of all his successes as well as failures, which were just as instructive, it became perfectly clear to me that whatever formed a *mental picture* in the mind of the "Transmitter," as he called the person operating with him, he, the "Revealer," could see and describe it; so that if you thought of a particular photograph among a group of portraits lying on the table, he would at once select it from any number.

His method of operation consisted first, in being blindfolded; for he said, though not necessary, it helped him not to see. Then he would hold with his left hand the right hand of the transmitter. He usually first pressed his own palm strongly upon that of the transmitter, often with a sliding motion. They then grasped hands firmly. This was not, however, necessary, for after pressing the palm he would sometimes withdraw his hand to a distance of about twelve or fourteen inches, so that the outstretched palms of both men faced each other. They were then kept in this position. Under this condition, without actual contact, he could "reveal" just as readily. He told me that it produced a sensation of taut cords, as it were, extending from palm to palm,

but that if he removed his hand further away the "cords" on the circumference began to "snap".

His failures were as interesting as his successes ; because they were always the fault of the transmitter in consequence of his not following the direction, which was that the transmitter should *always imagine himself doing whatever he wished the revealer to do* ; so that he thereby formed a mental picture of the act in his own mind which the revealer then reproduced by doing it. A few examples will illustrate some failures.

A scarf-pin was placed in the breast-pocket of a gentleman's coat, the pocket being in the *inside* of the coat, which was buttoned up. The revealer felt *over* the spot, but *outside* the coat. His failure in extracting the pin arose from the fact, elicited by questioning the transmitter, that the latter forgot that he would have in *imagination* to unbutton his coat and feel in the *inside* pocket to get it, so that the revealer, of course, omitted this part of the performance.

As another example : A gentleman having arranged to think of something, stared at the wall. The transmitter (being always blindfolded) at once began *stroking* the wall at the spot. The experiment was abandoned, as the transmitter said the action was incorrect. On subsequently asking him what it was he wished the revealer to do, he replied that it was to stroke the head of a little dog which was in the arms of a lady standing by. The transmitter had, therefore, failed to comply with the revealer's primary condition, which was that he should *imagine himself looking at and stroking* the dog's head. Instead of that, by gazing hard at the wall instead of at the dog, he introduced a disturbing element into his own mind. The result was a combination of transmissions, for the revealer *stroked the wall*.

Another example may be added. The gentleman in question said he could tell the name of my watch, or number of a bank-note, or anything else which *I knew* myself; provided I imagined myself writing it in the air, as it were. Standing before a wall, and holding my hand, he wrote in large letters with his finger, as I myself *thought* of it, the name TUPMAN, on the wall. He could not have guessed it, as the watch was made in the early part of last century by a watchmaker of that name living in Great Russell Street, and long since dead; and no watchmaker of that name exists in London.¹

On telling the revealer that I once transmitted a wish upon a revealer in a hypnotic or somnabulistic condition, with the aid of a copper wire some two yards long, one end being bound round the hand of the revealer, the other being in my own, he assured me that he had done the same thing, but with a fine wire used for electrical purposes, about twenty feet in length, between himself and the transmitter; and he named Mr. Carlisle, the manager of the *Irish Times*, as the transmitter, and a person with whom he could instantly and clearly reveal anything.

There were, therefore, three distinctly different means of communication from the transmitter to the revealer.

- (1) By contact, by holding hands.
- (2) Without contact, after previous contact of hands.
- (3) With the connection by wire between them.

It is difficult to suppose that the *body* (*i.e.*, a *material communication*) is the instrument; since experiments (2) and (3) show that the body is unnecessary.

It would seem, therefore, that the body is, as it were, a necessary "outer case" as long as we are alive in this

¹An account of this and other experiments is given in *Borderland*, No. iii., p. 260, 1894.

world ; but that the *Ego* is really dependent upon an "ethereal" structure permeating and perhaps exceeding the material body in dimensions.

The authors of *The Unseen Universe*, take this view, as the following quotation proves: "Let us begin by supposing that we possess a frame, or the rudiments of a frame, connecting us with the invisible universe, which we may call the spiritual body".¹

Again they write: "Thought conceived to affect the matter of another universe with this may explain a future state". That is, by our having an ethereal body in connection with the surrounding ethereal world.²

Mr. H. S. Olcott, in his paper entitled "Psychometry and Thought Transference," arranges experiments of the latter phenomenon under five heads: "The transference of Directions; the transference of Visual Impressions; the transference of Sensation; the transference of Words, Names, Sentences, Tunes, Concrete Ideas, such as Historical Scenes, Apparitions; and lastly Abstract Thoughts and Ideas.

With regard to the last, however, all he can say is: "It not infrequently happens that when two persons are thinking out the same problem, the solution seems to come to both simultaneously, so that both begin to utter it at once. Or that if one is thinking on some philosophical subject, the other begins to discuss the same subject. However, this branch of thought-transference does not very readily lend itself to experimentation."

The phenomenon called Psychometry appears to afford another illustration of the probability that mental phenomena are expressible as vibrations. The following is a case: I sent a portion of a letter from a gentleman abroad to an unknown lady in the north of England who

¹ *The Unseen Universe*, p. 299.

² P. 200.

possessed the psychometric powers. Nothing in the writing could afford the least clue as to the writer or to his whereabouts. All that she had to do was to hold the latter, when his "aura," as it is called, influenced her in some mysterious way that not only did she perceive that the writer was in a village in India, but located it as some forty miles from Madras ; which was correct.

If the writer had derived pleasure or sorrow from certain events, the corresponding sensations are felt by the psychometrist.

If such are referable to vibrations in ether "clinging" to the object held in the hand, then we seem to have an analogy with light ; that as the letter, so to say, was charged with vibrations by the writer, these were reproduced as conscious sensations by the receiver ; just as ether-vibrations are translated into light by the brain.

A passage which seems to bear on this subject is by the authors of *The Unseen Universe* who observe :¹ "We may go even further than luminiferous vibrations which take their rise chiefly at the surfaces of bodies, and extend our speculations into the interior of substances, since the law of gravitation assures us that any displacement which takes place in the very heart of the earth will be felt throughout the universe, and we may even imagine that the same thing will hold true of those molecular motions which accompany thought. For every thought we think is accompanied by a displacement and motion of the particles of the brain, and we may imagine that somehow—in all probability by means of the medium—these motions are propagated through the universe." Views of this nature were long ago entertained by Babbage, and they have since commended themselves to several men of science, and amongst others to Jevons. "Mr. Babbage,"

¹ P. 198.

says this author,¹ "has pointed out that if we had power to follow and detect the minutest effects of any disturbance, each particle of existing matter must be a register of all that has happened."²

Mr. Frederic W. H. Myers writes as follows on his experience of thought transference:—

"We find that it is occasionally possible for an experimenter to produce by effort of will a hallucinatory image of himself in the perception of a friend at a distance, without any previous suggestion or anticipation that such an image would appear. This fact, of which we have several instances attested by trustworthy persons at each end of the chain, forms a transition between ordinary experiments in thought-transference and those spontaneous hallucinatory images which occur so frequently at or about the moment of death, and represent the dying person to a distant friend who is often not even aware of the illness."³

The late Rev. H. R. Haweis was on one occasion too unwell with a severe cold to be in his place in the pulpit of St. James's Church, Westmoreland Street; so a friend preached instead. *More than one* of his congregation told him the next day that they saw him in the pulpit by the side of the preacher, and asked why he did not preach and why he was there. Haweis, as he informed me himself, was sitting all the morning over the fire bemoaning his absence from the pulpit!

Mr. Myers' interpretation seems to be the most likely one; not that Haweis unconsciously projected an appearance of himself into the pulpit, but two of his congregation were *en rapport* with him, received the ethereal waves,

¹ *Principles of Science*, vol. ii., p. 455.

² *Ninth Bridgewater Treatise*.

³ *Science and a Future Life*, p. 26.

and their brains translated them into a vision of Haws where they were accustomed to see him. If this hypothesis be true, it would be, of course, exactly parallel to any visual object ; as only waves reach the eye, but are translated by the brain into the object which transmits them. It will also interpret the appearance of wraiths of friends on the point of death.

CHAPTER XII

RATIONALISTIC CRITICISMS UPON THE THEOLOGICAL ASPECT OF GOD

THERE is a tolerable uniformity in writers of the Monistic, Rationalistic and other kindred schools as to the non-acceptance in the belief of God ; because it is wanting in such proof as they will only accept.

Some, as Huxley, content themselves with the word "Agnostic" ; Haeckel goes further and denies the existence of a conscious God altogether.

The question, therefore, arises : What sort of proof do they require to satisfy them ?

I will select the author of *Mr. Balfour's Apologetics*, and quote some paragraphs as representative of a typical Rationalist's views.

(1) "To describe Theology as a department of knowledge is to beg the whole question at issue between Rationalism and Religion."¹

(2) "Knowledge courts the most rigorous investigation. . . . What single fact or statement is there in the realm of Theology which can be successfully submitted to these conditions and may, therefore, be entitled to rank as knowledge?"²

(3) "Science remains firmly planted on the impregnable ground of experience. . . . Theology consists of

¹ *Op. cit.*, p. 24.

² P. 24.

doctrines and speculations which are based on imagination and vain desire.”¹

(7) “If by religious truth be meant the doctrines of the existence of God and of human immortality, we think it would be difficult to show that there is any general ‘need’ to believe in these things.”²

(8) “All faith which is not an inference from knowledge should be regarded with suspicion and distrust.”³

No doubt many doctrines or dogmas propounded by the Church in past centuries were based on erroneous interpretations of the Scriptures. These are gradually being eliminated whenever modern scientific investigations into the true meaning of the documents reveal their unsoundness. But there are some which the more they are investigated the sounder appears to be their tenability. The two alluded to above, *viz.*, the existence of *God*, and human *immortality*; and we may add man’s *Will* are based on inductive evidence of the highest order; for the first two are outside the sphere of “observation and experiment”.

I would, however, maintain that these *do* come within the range of human *knowledge* as much as the *Rotation of the Earth*; which cannot be proved to be true by either observation or experiment. According to Rationalists Ptolemy must have been right, and Copernicus wrong.

As the opinions of a Monist, Haeckel speaks as follows with regard to the Deity of Christians:—

(1) “He is always conceived in a more or less human form, as an organism which thinks and acts like a man—only on a much higher scale.”⁴

“The ‘Trinity’ is not an original element in Chris-

¹ P. 27.

² P. 28.

³ Pp. 33, 34.

⁴ *The Riddle of the Universe*, p. 283.

tianity. Like most of the other Christian dogmas, it has been borrowed from earlier religions.”¹

“‘God the Father,’ the omnipotent creator of heaven and earth—this untenable myth was refuted long ago by scientific cosmogony, astronomy and geology.”²

“In the higher and more abstract forms of religion [than anthropomorphic ideas], this idea of bodily appearances [as in the old Egyptian cult, in animals] is entirely abandoned, and God is adored as a ‘pure spirit’ without a body. ‘God is a spirit, and they who worship him must worship him in spirit and in truth.’ Nevertheless, the psychic activity of this ‘pure spirit’ remains just the same as that of the anthropomorphic God. In reality, even this immaterial spirit is not conceived to be incorporeal, but merely invisible, gaseous. We thus arrive at the paradoxical conception of God as a *gaseous vertebrate*.”³

In reply to the sentiments expressed in these quotations, I would observe that the various conceptions of God or of gods, seem always to have been in accordance with the intellectual stages of man. It is man, in fact, who conceives of his God in his own image. Thus the immoralities of the deities of ancient Greece reflected those of the Greeks themselves.

Man cannot possibly conceive of the nature of a Spiritual Being not appreciable by the senses. He *must* be anthropomorphically expressed; but as man rises in the scale of knowledge and of ideas of morality, so does his idea of God become more and more refined. But through many stages, morality, as we understand it, was not necessarily associated with a divine nature at all. Religion consisted solely of ceremony.

¹ *The Riddle of the Universe*, p. 285.

² *Ibid.*, p. 284.

³ *Ibid.*, p. 295.

Hence in the Old Testament, we find the conception of God passing through various grades, so to speak, till we come to the psalmists and prophets, who speak of Him as loving and sympathetic towards man, the widow and the orphan, as well as having righteous and merciful traits of character taken from the improved condition of man's mind and heart.

The important question which concerns us now is: Are all these anthropomorphic conceptions of the Deity purely *Subjective* creations of man's brain, or is there any *Objective* reality corresponding to them?

The Christian says "Yes"; but the Monist and Rationalist say "No".

I maintain that the *probabilities* of a Conscious Mind in Nature are as great as those in other matters which men accept as undeniable truths; but cannot prove by experimental evidence.

It is worth while considering a few of them, to show that the belief in God being based on parallel lines of inductive evidence is quite as reasonable as many which scientists hold.

It is advisable to select these from scientific conclusions, because Monists and Rationalists assert that science is *par excellence* the one thing to be trusted; and whatever cannot be brought within the pale of her region, need not be accepted as infallible truth.

I have already alluded to the fact that the rotation of the earth cannot be proved by observation and experiment; for it is only believed because it is infinitely more probable that the earth revolves on its axis in twenty-four hours, than that the sun and stars should do so, considering their distances are so great or incalculable.

As another instance of Inductive Evidence let us

turn to geology. Geologists tell us that the crust of the earth is composed of "aqueous strata" and "igneous rocks," etc. How do they know that these descriptive adjectives are applicable and correct? Solely by analogy with existing processes going on in the world. As geology represents past history, it cannot be recalled and tested experimentally. And so we remain perfectly satisfied with inductive evidence. The same reasoning applies to the fossils upon which palæontological evolution is based, and Huxley's interesting genealogy of the horse from a small animal with five toes on each foot to our own one-toed useful animal is entirely based on inductive reasoning.

The establishment of Evolution generally is as largely founded on inductive evidence as that of man is, by embryology and anatomy; but this great doctrine is equally well based on experimental evidences of cultivation and domestication, and so when we have to draw conclusions about prehistoric remains, we conclude that flint weapons were made artificially by the flat facets or planes all over them, even on the rudest palæolithic ones, showing *longitudinal surfaces*; which cannot be accounted for by the action of running water or other physical forces in Nature.

We can imitate them closely, as the celebrated "Flint Jack" did, who used to impose upon the unwary, but still the conviction that they were artificially made by man outweighs any improbability that might rise in some people's minds in consequence of their vast antiquity—as seen in their being associated with the sub-glacial mammoth and woolly rhinoceros, etc., etc.

I hardly think the author of *Mr. Balfour's Apologetics* will deny that these conclusions of science are as perfectly sound and acceptable as if they were the "evidences of

the senses," which they are not, or "proved by experiment," which they cannot be.

This being the case, neither he nor any Rationalist can claim the right to refuse similar lines of evidence for the belief in God and immortality of man if they can be forthcoming.

Many theologians have written upon the Being of God, and brought forward reasons which appeared to them conclusive. Thus, Mr. S. Charnock, B.D., in the middle of the seventeenth century, wrote a long treatise entitled, *Discourses on the Divine Providence and the Existence and Attributes of God*, from which I have already had occasion to quote freely. Many of his arguments are, as might be expected with the progress of science and biblical study, out of date; but some are, and always will be, permanent, as long as the mind of man remains as it is; such as the production of "Order" out of "Chaos," now called "cosmic vapour"; the "origin of living beings" in the world; the argument of "Adaptations" and the presence of "Directivity"; the existence of Volition and Self-consciousness and the "Moral Nature of Man," generally, etc.

Charnock quotes from several writers of early date—and we might go as far back, not only as Socrates, but to the earliest dates known in history—to show the generally believed existence of a Deity of some sort.

David declares that the heavens and the firmament witness to a Creator.¹ So does Isaiah² and St. Paul, but modern Rationalists can also see the heavens and the fruitful seasons; but they carry no weight as evidencing a Mind. They demand "scientific proof". If they want "experimental" proof, it is not to be had; but inductive evidence there is in ample abundance.

¹ Ps. xix.

² Is. xl. 12, 13, 18.

The writer of the Epistle to the Hebrews says: "By faith we understand that the worlds have been framed by the word of God, so that what is seen hath not been made out of things which do appear;"¹ and by *faith* he means what we now call "inductive evidence". It is not mere *belief* on slight grounds or probabilities, much less *credulity* on a mere statement without any sort of proof or evidence, but only in some fallible authority.

"How could this great heap be brought into being unless a God had framed it?" asks Charnock. "Every plant, every atom, as well as every star, at the first meeting whispers this in our ears, 'I have a Creator, I am witness to a Deity'. Who ever saw statues or pictures, but presently thinks of a statuary and limner? Who beholds garments, ships or houses, but understands there was a weaver, a carpenter, an architect?"²

In a previous chapter I have carried this argument further down, wherein we saw that every part and atom of structure in living beings betrays *Directivity*; which cannot be accounted for by any known actions of purely physical and chemical forces: and if a chemist can make in the laboratory any organic substances, then he *himself* is assuming the place of that *Directivity* which universally pervades the organic world.

If any one refuses to recognise the Power in Nature, he violates the laws of his own mental constitution.

It is foreign from my province in this book, to combat atheistic views, apart from the method I have followed in proving the *positive* position by inductive evidence; nor do I touch upon Mr. Robertson's revival of the mythical

¹ Heb. xi. 3.

² Philo, ex Petav. Theol. Dog., tom. i., lib. 1. cap. 1, p. 4. [Ref. in Charnock. vol. i., pp. 143, 144.]

idea of Christ ; nor to substantiate the Christian's belief in a Personal God of Love.

Consequently I shall not do more than call attention to the late Mr. Grant Allen's works. He is no doubt right or most probably so in thinking that the primitive idea of a God was an ancestral spirit ;¹ but this does not *prove* that there is no God in reality.

His formidable work on *The Evolution of the Idea of God* has for its object "the proof that in its origin the concept of a God is nothing more than that of a dead man, regarded as a still surviving ghost or spirit, and endowed with increased or supernatural powers and qualities."²

That *one*, if not *the*, most primitive idea was ancestral is obvious. It explains the meaning of sacrificial offerings of roast flesh, vegetables and incense ; but if it be implied that there is no God at all, then I would reply the universal consensus of *opinion*, collected by Mr. Grant Allen, though it *per se* may be no *proof* yet it shows the universal "feeling after God" through all time and space since man has peopled this earth. It has been a groping in the dark, till men gained a clearer light by philosophy and science, apart from anything supposed to have been revealed.

Having "proved" by inductive evidence the overwhelming probability of the existence of a conscious Mind or God in Nature, then all attempts to discover Him are but progressive efforts and strivings to establish what man has all along been intuitively convinced to have existed, but could not prove, only realising Him in his mind, anthropomorphically, according to his light, in time and space.

¹ So too Col. Garnier in his *Worship of the Dead*.

² P. 19.

CHAPTER XIII

INDUCTIVE EVIDENCE THE BASIS OF BELIEF OF THE THEIST IN HUMAN IMMORTALITY

THE Soul as well as Life is not material, though intimately bound up with it ; therefore it must be of the nature of energy of some sort, perhaps a bundle of vibrations of ether.

If a vibration be set up in a medium, that vibration must go on for ever, if no other force intervene to stop it.

The same medium may be in motion with several vibrations at the same time ; as we are all familiar with the effects of an orchestra, the same air which enters our ears carries many notes at once. Similarly the ether carries many colours at the same moment into our pupils when looking upon a picture or scenery.

Hence if our souls have an ethereal basis (perhaps identical with St. Paul's "spiritual body") there is nothing inconceivable in the portion of ether constituting our soul-frame being agitated by numerous and separate vibrations, recognisable as emotions, intellect, conscience, etc.

As our whole soul is bound up with the whole body, so each individual element of the former would seem to be specially correlated with localised portions of the brain, so that mental inequalities are due to unequal developments of their respective sites.

We know from the sizes of the brain cavities of the

mammalia from the Eocene period to man that as their evolution proceeded so did the development of the brain as far as size is concerned ; but intelligence is correlated not only with size but also with structure, such as an increase in convolutions and grey matter, etc.

As Evolution proceeds in accordance with use, and the structure of their limbs, peculiar to each kind of animal, are formed in direct response to the animals' *physical* activities, according to the "principle of Least Action," so brains develop in response to *mental use* ; and the brains of animals were presumably evolved in accordance with an increasing intelligence simultaneously ; and not much exceeding their requirements for efficiency.

With man, not only has all this been equally true ; but having acquired the power of realising abstract, mental ideals, he can bring about an alteration in the brain by volitional thought alone ; and secondly, in the shape of his skull in adaptation to the increasing size of the brain within it.

I know a man who as a boy had a remarkably retreating forehead. His former schoolmaster met him when he was fifty-five. He said in my presence, "Let me look at your profile, for it was a remarkable one when you were at school". He found, however, that there was nothing to remark about it. The boy had grown into a great reader and student. His brain had developed in response to use, and something like a hemisphere had grown where a retreating forehead had been.

Darwin somewhere alludes to the same phenomenon.

Here, then, the Soul acted as a power over the material structure of the brain and skull ; just as muscular exercise develops the muscles and bones of the limbs ; but while actual *movements* of these bring

about an enlargement of the muscles ; so *thought* causes the brain to respond and develop itself accordingly.

Conversely, disuse will cause atrophy of both the body and brain.

Materialists base their disbelief in the possibility of immortality of the soul on its intimate connection with the physical nature of the brain ; but they have nothing to say about the possible existence of a "spiritual" or more accurately "ethereal" body ; to which I have alluded in speaking upon "Thought Revealing". If the living soul consist of ethereal vibrations, there is nothing to disprove the possibility or probability of thought being transmitted to a distance as ethereal waves of a peculiar length, and thus establish telepathic communications, somewhat like wireless telegraphy in physics.¹

If the preceding be any approximation to the truth, then the essential thing is that the soul and its ethereal counterpart may be separated from the grosser material one which it is obliged to have in this world in order to hold ordinary intercourse with other souls and apprehend all terrestrial phenomena.

Rationalists and Monists would limit all possibilities of acquiring knowledge to the senses ; and what they cannot take in, they say, need not be believed in as true ; but our senses are greatly limited. In sight we only see a fragment of the spectrum ; a cat is better off than we are. A dog's perception of smell is far keener than ours.²

But there are higher perceptions than mere response to sight, sound, smelling, etc.

¹ The reader will find this discussed by Dr. Minot Judson Savage in his *Life beyond Death*, who "knows beyond question a case of telepathy between the Indian Ocean and New York," p. 263.

² As the authors of *The Unseen Universe* have replied to ten objections to an immaterial existence, I will content myself by referring the reader to their refutation (pp. 202-210).

One man *hears* music, but it is but little more than noise to him. In another it excites a rapturous emotion, though both hear precisely the same notes. So is it with painting. Again, one man has the emotion of philanthropy, which would embrace the whole world if possible ; another feels nothing of the sort, and only cares for his family ; or it may be even for himself alone.

Are these emotions to be limited to the senses, or are they ethereal, psychical vibrations, though they may have been set in motion through the material agency of the senses?

If it be said a man would not have had them at all without a brain ; the answer is, Could they have come out of a material chaos? It is more probable that they are part and parcel of Life. They are in accordance with natural laws in the ethereal world, and are echoes in man's spirit of the Universal Spirit of God.

“ Harmonies,” whether in colours or sounds as compared by men, are but revelations of possibilities of natural laws framed by God.

If Evolution has been necessary to develop Man from a Monad, why should it stop? That it should cease as far as the body goes is reasonable ; because man can make *tools* and so there is no need to convert his limbs, mouth and teeth into instruments ; but he has passed the boundary line, not only in corporeal manufacture, but in acquiring self-consciousness based on the power of realising abstract ideas. This has opened out a new science—Human Psychology—and as physiology is the science dealing with the evolution of bodily life, so human psychology is the science of the evolution of the human soul ; and the great question is, if man's body has reached the terrestrial goal, may not man's soul be just beginning a corresponding career to be pursued hereafter?

As in the history of animals and plants there are gradations in the phenomena of life; so do we see numerous stages of psychical progress in man in this world. Some men have been and are highly intellectual giants, others are religious saints. From them are all stages downwards, whether as individuals or races. Some are "survivals" with only "rudimentary ideas," just as there are still living lowly organised plants and animals.

When is psychical evolution to end? If it has taken millions of years to evolve the body of man, may it not take millions of years to perfect the human soul? It is very far from perfection now? We must live in Faith and Hope and not *only* by Sight.

Now let us turn to Monists and Rationalists and hear what they have got to say. I will take Haeckel's views first.

He calls the conception of the immortality of the soul the "highest point of superstition, which is regarded as the impregnable citadel of all mystical and dualistic notions". He attributes the belief to "the selfish interest of the human personality, who is determined to have a guarantee of his existence beyond the grave at any price".¹

"Thanatism," as he calls the mortality of the soul, "is the opinion which holds that at a man's death not only all the other physiological functions are arrested, but his "soul" also disappears—that is, that sum of cerebral functions which psychic dualism regards as a peculiar entity, independent of the other vital processes in the living body". . . . "Personal psychic activity is extinguished like every other physical function."²

¹ *Op. cit.*, p. 192.

² I am not concerned here with Weismann's theory that unicellular organisms, multiplying by division, are immortal. Haeckel repudiates it altogether (*op. cit.*, pp. 193, 194, 195).

The Materialist who builds his argument against immortality solely on the destructibility of the body at physical death, cannot refute the suggestion of the ethereal body, the evidence for the existence of which has been already given ; and if we ask, if man should rise again, why should not all animals as well, it may be replied that, although, as Butler argued, that for all we know, animals may do so, yet a reasonable objection to this hypothesis is that they are not mentally fitted for it. Since their minds are limited to the appreciation of concrete terrestrial matters only, or to objects which merely appeal to their senses, any mental conception of "Life," abstractedly considered is, *per se*, either here or hereafter precluded.

They would all be like "fish out of water" in a spiritual world, where bodily organisations are non-existent.

Conversely, the very fact that Evolution has brought about the power of conceiving abstractions, places man completely above the animals ; and so, in a way, fits him for a spiritual environment, beyond any which this earth can supply.

If he were solely adapted for a terrestrial life, he is no better off, but rather worse than the animals ; as they are unable mentally to realise their own existence and position here. Consequently a future existence is inconceivable, and, as far as can be seen or conjectured, useless to them.

Now, are there any conditions requisite for man to enjoy a future life ?

The following words of St. John seem to throw some light upon this important question, from a psychological point of view : "He that hath the Son hath the Life ; and he that hath not the Son of God hath not the Life".

These words are a paraphrase of what St. John

reports our Lord to have Himself said : " This is the will of My Father, that every one that beholdeth the Son, and believeth in Him, should have eternal life ; and I will raise him up at the last day ".¹

Man may resemble the animals, and live a purely automatic existence, their *consciousness of volition* being arrested, dormant, or in the worst cases, practically extinct. They are what St. Paul calls " natural " as opposed to the " spiritual ". They allow themselves to become automata like all animals ; namely, swayed by the stronger motive at the time of temptation or other occasion, without allowing themselves to reflect upon their actions.

The germ or spark of the higher life may be there—that potentiality of holiness—which requires to be fanned into a flame of enthusiasm for righteousness.

This possibility of Regeneration is in every one, or the living the higher life in Christ.

Every one who lives up to his light is on the high road to " have the Son," whether he ever heard of Him or not, like the Good Samaritan.

St. Peter's vision revealed this truth to Him.

On the other hand, every one who *refuses* to live up to his light, and persistently follows the ways of darkness, repudiates the Son, " quenches the Spirit " within him, and so he *will not* have Life or the Son.

Hence, and all the New Testament supports this view, that *it is the cultivation of the Spiritual Life which ensures Immortality* for man and man alone.

It may be said that many men are forced into evil lives, by their environments ; that infants and children have died, never having had the opportunity of a moral education. But may not this be an argument for a future

¹ John vi. 40.

life, that the opportunity will then be provided? The "germ" had no chance of growing here. It is said that *all* will rise again, but while *some* rise to eternal life, others do so to judgment; and a "second death" is alluded to.

If the latter is to be the punishment for evil lives spent on earth, we may ask why does it not coincide with physical death?

On the other hand, may not this intermediate period—the length of which is not stated—be just what is wanted to give *all* men another chance of redeeming their characters and accepting the Son?

If they *do* perish—be annihilated—such an end would be due to their own fault.

It would be unwise for me to lay any stress on the so-called "proofs" of the continuous existence after death, in the "spiritualistic" phenomena exhibited by mediums. I would refer the reader to Dr. Savage's *Life Beyond Death* for the opinions of one who has studied the subject as scientifically as it seems possible.¹

There is, however, one curious phenomenon with which I am familiar, though I cannot do it myself—I allude to automatic writing; and the question arises: Is it due to the automatic action of the "sub-conscious" part of the brain; or is it due to intelligences which are independent of the "operator," as I will call the writer?

The first noticeable fact is, that the writers are *Intelligences* of some sort. The operator is quite ignorant as to what his or her fingers are going to write. Moreover, they will write of themselves, while the operator's mind is occupied on other matters—as when holding a conversation with any one present.

¹ Mr. William James in *The Will to Believe*, has also something to say about it.

The question is, how is it to be tested as to which source it must be referred?

In the case of the person (a lady) to whom I refer, the hand-writing is not at all like hers. The formation of the letters is quite different, often very quaint, as in making little spirals or helices at the bottom of capital letters; or by beginning the circle of round letters as *a*, *o*, *g*, etc., from left to right and then reversing it suddenly.

Sometimes a word is spelt wrongly, a few letters only being made; the hand stops, pauses as if for reflection, then begins again to spell the word rightly. A sentence may be half written when the writer stops, dashes a line to a distance and writes no more.¹

Sometimes it shows humour. It wrote a sentence very minutely; the lady said: "Why do you write so small?" It immediately went on in a large childish round hand. Such replies as "Don't be so inquisitive," "Be patient," etc., come after questions, etc., etc.

The subject-matter of the sentences often differs *toto cælo* from the lady's ordinary mental characteristics. Thus, for example, when her second daughter was married her hand wrote: "My word, you have put your foot into it this time!" I need hardly say there was nothing whatever to justify this rude remark; and it is difficult to reconcile it with her own brain's automatic action!

On another occasion the lady asked some question and the reply came, "Oh! go to blazes!" Could that have been her own subliminal consciousness; or the subsequent communication in another hand-writing, "We apologise for that rude remark"?

The writers² almost invariably say, "We"; *e.g.*,

¹ Other "writers" have experienced this same peculiarity.

² There are several distinguishable by the various kinds of expressions, etc.

“We think”—so and so, is a common commencement to some trivial remark.

It does not hesitate to tell falsehoods about people : and when asked “if it is true,” adds “No we were only funning”.

Like the experience of other automatic writers, the Intelligences always say they are not allowed to say anything about themselves or their condition either now or formerly, one observing, “It’s against the rules”.

On one occasion the “Intelligence” said she was the lady’s mother, and to prove her identity, told the lady (her daughter) to remember a gentleman whom she knew as a little child in Brussels. The question her mother put was : “Do you remember Dr.— and what he used to say about his violin?” For the first time since she was ten years old, the lady recalled the fact that he said he believed his violin had a “soul”.

The “Intelligences” sometimes have names ; and one failed for some time to write ; so the lady asked what had become of him ? The reply was : “He is gone to be an inspector of spirits !” One of the lady’s married daughters is named Marion, but from a child she has never been addressed by it, but has always been called Maggie ; yet one of the writers persists in speaking of her as “Mrs. Marion”.

These are but a few samples of what comes spontaneously from the lady’s fingers. It is all trivial enough, if not false ; but it is *intelligent*.

The following cases were communicated to me by friends who vouched for their accuracy. The late Rev. H. R. Haweis informed me that a relative of his used to amuse himself by seeing what his hand would write. On one occasion he asked what the carriage builder was doing to his carriage, sent to be repaired, at that particular

moment—"Mending the hood," came the reply. He had the curiosity to ask the carriage-builder if that was true. It proved to be quite wrong. On the next occasion he asked why the writer had told him wrong. The reply came very deliberately—"F-O-O-L!" The gentleman asked no more questions.

Another gentleman well-known in the horticultural world told me that a "spirit" said on one occasion—"X is dead, you will hear by the next mail from America". He had no idea that his relative (X) was even ill. He dated the paper and showed it to the late Dr. Hogg, who corroborated the fact to me. On the day when the mail was due, a black-edged envelope arrived at breakfast time. He told me: "I handed it to my wife saying, 'you need not open that; X is dead. I knew it some time ago.'" It proved to be true.

Another curious instance was the following: A party of young people were amusing themselves one evening with planchette. The pencil wrote, "Jack will be here to-night". This caused great amusement because Jack was in India, or thought to be. But within half an hour "Jack" walked into the room!

The following account of a "communication" by automatic handwriting is given by Sir Horace Rumbold, Bart., in his work *Recollections of a Diplomatist*.¹ It occurred at the house of the American minister "Governor" Curtin, as told by himself to Sir Horace: "At the very eve of the great war, he was hard at work one day in the government offices at Philadelphia, when he was told that a person wished to speak to him on important business. Although very busy, he consented to see the applicant for a few minutes. The man ushered in was unknown to him, apparently in poor circumstances,

¹ Vol. ii., page 286.

while he evidently hailed from some Western State. 'Mr. Curtin,' he said, 'I have a very urgent message for you which I must put in writing.' He forthwith sat down and began to scribble, Curtin watching him with feelings that turned to utter amazement when he recognised, in what flowed from the pen of this entire stranger, the unmistakable handwriting of the mother he had lost not long before, and to whom he was devotedly attached. The message was not lengthy, but of an extraordinary character. The man repeated that he had simply been impelled to deliver the message in this form.

"What he had written was a rough forecast of the chief events of the great contest which then had not yet broken out. Curtin was so struck by the circumstances that he imparted them in confidence at the time to friends in Philadelphia; who, with him, afterwards watched with intense interest the developments predicted in the message. That Mr. Curtin told me this singular story in perfect faith I cannot for a moment doubt."

These are a few "inexplicable" cases where no fraud was possible; as no knowledge of the events was possessed by any one in England or America.

The question, then, remains, which is more probable—that it is merely the automatic action of the brain, as in dreams; but, unlike dreams, the writing is always intelligent, and without any of the incongruities that are associated with dreams—or is it really the work of spiritual intelligences acting through the brain and fingers of the operator?

Regarding the writing alone—*i.e.*, if it were not known whose fingers wrote it—the conclusion would certainly be that it could not be that of the lady in question, as it is always so completely different to her characteristic features both in handwriting and subject-matter.

If it be the sub-conscious or automatic brain, then there are at least *two* if not more and totally different intelligences within one and the same head.

I leave the reader, now, to draw his own conclusions, only guaranteeing for the genuineness of the phenomena above described which I have myself witnessed.

Mr. Frederic W. H. Myers, who has studied this subject, attributes it as theoretically referable to "(1) automatist's own mind, *i.e.*, things known and forgotten ; (2) telepathic—facts unknown to the automatist, but known to some living person in his company or connected with him ; (3) messages which contain facts apparently not known to the automatist nor to any living friend of his, but known to some deceased person, perhaps a total stranger to the living man whose hand is writing. I cannot avoid the conviction that in some way—however dreamlike and indirect—it is the departed personality which originates such messages as these." ¹

Conclusion.—This brings me to the end of my task, *viz.*, to meet the objections of Rationalists raised against the Belief in God, Free Will and Immortality, and to emphasise the method of inductive evidence as supplying ample "proof" to substantiate all these ; inasmuch as the demand for "observation and experiment" is irrelevant ; since that method of verification is obviously out of the question.

¹ *Op. cit.*, p. 33 (see *Proceedings of the Society for Psychical Research*, pt. xvi., etc.)

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