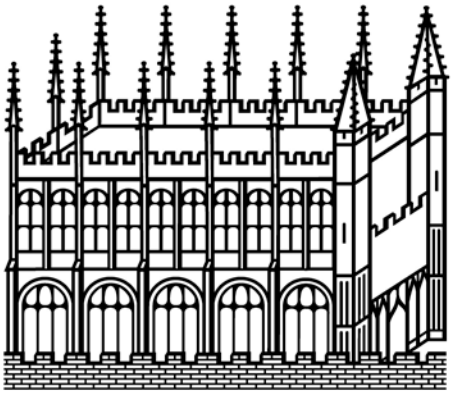

TWO ESSAYS ON HAECKEL

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BY

RUDOLF STEINER, PH.D.

Authorised translation from the German

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INTRODUCTION

This translation of two of Dr. Steiner's works on Haeckel was originally published by the Theosophical Society in one volume with an essay on the Working of Karma. By the courtesy of the Theosophical Society and with the kind consent of the translator, Dr. Bertram Keightley, LL.D., M.A., the parts referring to Haeckel are now reprinted in this volume.

In the original German the two parts were published separately:

I. Haeckel und seine Gegner.

Haeckel and his opponents: a brochure, 1900, page 1.

II. Haeckel, die Welträtsel und die Theosophie.

Haeckel, "the Riddle of the Universe" and Theosophy: a lecture given at Berlin, 5th October, 1905.

I

HAECKEL AND HIS OPPONENTS

Authorised Translation from the German by
BERTRAM KEIGHTLEY, M.A. (Cantab)

PREFACE

I AM convinced that my work, *The Philosophy of Freedom*,[1] published some five years ago, gives the outline of a world-conception which is in complete harmony with the stupendous results of the natural science of our time. I am also conscious that I did not intentionally bring about this harmony. My road was quite independent of that which natural science follows.

From this independence of my own way of looking at things in regard to the province of knowledge that is dominant in our day, and

[1] Now published at the author's request as *The Philosophy of Spiritual Activity*. Cloth. Crown 8vo. Third Edition. pp. 241. 7s. 6d. net.

from its simultaneous, complete agreement therewith, I believe myself entitled to draw my justification for presenting the position of that monumental representative of the scientific mode of thought, Ernst Haeckel, in the intellectual battle of our time.

Doubtless there are to-day many who feel the need for clearing up matters with regard to natural science. This need can best be satisfied by penetrating deeply into the ideas of that seeker into Nature who has most unreservedly drawn the full conclusions of scientific premises. I desire to address myself in this little book, to those who share with me a like need in this respect.

RUDOLF STEINER

BERLIN, *January*, 1900.

I

Goethe has given glorious expression, in his book upon Winkelmann, to the feeling which a man has when he contemplates his position within the world: "When the healthy nature of man works as a whole, when he feels himself in the world as in a great, beautiful, worthy, and valuable whole, when harmonious contentment yields him pure, free rapture, *then would the universe, could it but feel itself, burst forth into rejoicing at having attained its goal, and admire the summit of its own becoming and being.*"

From out of this feeling there arises the most important question that man can ask himself: how is his own becoming and being linked with that of the whole world? Schiller, in a letter to Goethe of 23rd August, 1794, admirably characterises the road by which Goethe sought to come to a knowledge of human nature. "From the simple organism you ascend step by step to the more complex,

in order finally to build up the most complex of all, man, *genetically* from the materials of the entire structure of nature." Now this road of Goethe's is also that which natural science has been following for the last forty years, in order to solve "the question of questions for humanity." Huxley sees the problem to be the determination of the position which "man occupies in nature, and his relation to the totality of things." It is the great merit of Charles Darwin to have created a new scientific basis for reflection upon this question. The facts which he brought forward in 1859 in his work, *The Origin of Species*, and the principles which he there developed, gave to natural research the possibility of showing, in its own way, how well founded was Goethe's conviction that Nature, "after a thousand animal types, forms a being that contains them all—man."

To-day we look back upon forty years of scientific development, which stand under the influence of Charles Darwin's line of thought. Rightly could Ernst Haeckel say in his book, *On our Present Knowledge of Man's Origin*, which reproduces an address delivered by him at the Fourth International Congress of

Zoologists in Cambridge on 26th August, 1898: "Forty years of Darwinism! What a huge progress in our knowledge of Nature! And what a revolution in our weightiest views, not only in the more closely affected departments, but also in that of anthropology, and equally in all the so-called psychological sciences."

Goethe, from his profound insight into Nature, foresaw to its full extent this revolution and its significance for the progress of man's intellectual culture. We see this particularly clearly from a conversation which he had with Soret on 2nd August, 1830. At that time the news of the beginning of the Revolution of July reached Weimar and caused general excitement. When Soret visited Goethe, he was received with the words: "Now, what do you think of this great event? The volcano has burst into eruption; all is in flames, and it is no longer a conference behind closed doors!" Soret naturally could only believe that Goethe was speaking of the July Revolution, and replied that under the known conditions nothing else could be expected than that it would end with the expulsion of the Royal family. But Goethe had something quite different in his

mind. " I am not talking of those people at all ; I am concerned with quite other things. I am speaking of the conflict, so momentous for science, between Cuvier and Geoffroy de Saint-Hilaire that has come to a public outbreak in the Academy." The conflict concerned the question whether each species in which organic nature finds expression possesses a distinct architectural plan of its own, or whether there is one plan common to them all. Goethe had already settled this question for himself forty years earlier. His eager study of the plant and animal worlds had made him an opponent of the Linnæan view, that we " count as many species as different forms were created in the beginning (*in principio*)." Anyone holding such an opinion can only strive to discover what are the plans upon which the separate species are organised. He will seek above all carefully to distinguish these separate forms.

Goethe followed another road. " That which Linnæus strove forcibly to hold apart was bound, according to the innermost need of my being, to strive after reunion." Thus there grew up in him the view which, in 1796, in the Lectures upon the three first chapters

of *A General Introduction to Comparative Anatomy*, he summed up in the sentence: "This, then, we have gained, that we can unhesitatingly maintain that all complete organic natures—among which we see fishes, amphibia, birds, mammals, and, as the head of the last, man—have *all been shaped according to one original type*, which only inclines more or less to this side or the other in its constant parts, and yet daily develops and transforms itself by reproduction." The basic type, to which all the manifold plant-forms may be traced back, had already been described by Goethe in 1790 in his *Attempt to Explain the Metamorphosis of Plants*. This way of regarding things, by which Goethe endeavoured to recognise the laws of living nature, is exactly similar to that which he demands for the inorganic world in his essay, written in 1793, *Experiment as Mediator between Object and Subject*: "Nothing happens in Nature which is not in some connection with the whole, and if experiences only *appear* to us as isolated, if we can only regard experiments as isolated facts, that does not imply that they actually *are* isolated; it is only the question: How shall we find the connection

of these phenomena, these occurrences?" Species also *appear* to us only in isolation. Goethe seeks for their connection. Hence it clearly appears that Goethe's effort was directed *to apply the same mode of explanation to the study of living beings as has led to the goal in that of inorganic nature.*[1]

[1] *Goethe and Kant.* I have characterised the contrast that exists between Goethe's and Kant's world-conceptions, in the Introductions to my edition of *Goethe's Scientific Writings* (in Kürschner, *Deutsche National-Litteratur*) and in my book, *Goethe's Conception of the World* (p. 37 *et seq.*). It shows itself also in the attitude of the two personalities towards the explanation of organic nature. Goethe seeks for this explanation along the road which modern science has also trodden. Kant holds such an explanation to be impossible. Only one who penetrates deeply into the nature of Goethe's view of the world can acquire a correct judgment as to its position in regard to the Kantian philosophy. Goethe's own testimony is not conclusive, because he never devoted himself to a closer study of Kant. "The portal (of the *Critique of Pure Reason*) it was that pleased me, into the labyrinth itself I could not adventure: now it was my poetic gift that hindered me, now my commonsense, and I nowhere found myself any the better." Single passages in Kant's *Critique of Judgment* pleased him, because he so interpreted their meaning that they

How far he had run ahead of his time with such conceptions becomes apparent when one reflects that at the same time when Goethe published his *Metamorphosis*, Kant sought to

agreed with his own view of the world. It is, therefore, only too easily understood why his conversations with followers of Kant appear somewhat peculiar. " They certainly listened to me, but could give me no answer, nor in any way help me on. More than once it happened to me, that one or the other confessed with smiling admiration: it may be something analogous to the Kantian mode of conception, but a rather strange one." Karl Vorländer, in his essay *Goethe's Verhältnis zu Kant in seiner historischen Entwickelung* (*Kant-studien*, i., ii.), has judged this relationship according to the actual words of Goethe's own testimony, and has reproached me with the fact that my conception thereof is " in contradiction with the clear testimony of Goethe himself," and, at the very least, " strongly one-sided." I would have left this objection unanswered, because I saw from the explanations of Herr Karl Vorländer that they proceed from a man who finds it quite impossible to understand a mode of thinking which is strange to him; however, it still seemed to me needful not to leave without answer a remark which he couples thereto. Herr Vorländer belongs to those men who regard their own opinion as absolutely right, and therefore as proceeding from the highest possible insight, and who therefore stamp every other view as a product of ignorance. Because

prove scientifically, in his *Critique of Judgment*, the impossibility of an explanation of the living according to the same principles as hold for the lifeless. He maintained: " It is

I think otherwise about Kant than he does, he gives me the sage advice to study certain portions of Kant's works. Such a mode of criticising other people's opinions cannot be too strongly repudiated. Who gives anyone the right, not to criticise me for an opinion differing from his own, but to schoolmaster me? I have therefore told Herr Karl Vorländer my opinion as to his schoolmastering in the fourth volume of my edition of *Goethe's Scientific Writings*. Thereupon, in the third volume of *Kantstudien*, he has discussed my book, *Goethe's Conception of the World*, in a fashion which not only far surpasses in point of form what he had previously said against me, but which is also full of *objective untruths*. Thus he speaks of an " isolated and embittered opposition " in which I find myself against the whole of modern philosophy (naturally exclusive of Nietzsche) and science. There at once one has three objective untruths. Anyone who reads my writings—and whoever, like Herr Vorländer, pronounces judgment upon me, should at the least read them—will perceive that I do indeed criticise technically particular views of modern science and endeavour to deepen others philosophically; but that to talk of an embittered opposition is simply absurd. In my *Philosophie der Freiheit* I have expressed my conviction to the effect that in my views is given the philosophical

quite certain that we cannot even adequately learn to know, far less explain to ourselves, the organised beings and their inner possibility according to purely mechanical principles of nature; and, indeed, it is so certain that we can boldly say it is senseless for man even to conceive such a purpose, or to hope that sometime perhaps a Newton may arise who will make comprehensible the production

completion of the structure which " Darwin and Haeckel have erected for Natural Science " (p. 186). That I am the one who has sharply emphasised the fundamental deficiency in the world of Nietzsche's ideas is indeed known to the Frenchman Henri Lichtenberger, who observes in his book *La Philosophie de Nietzsche:* " R. Steiner is the author of *Truth and Science* and *The Philosophy of Freedom.* In the latter work he completes Nietzsche's theory on an important point." He emphasises the point which I have shown that Nietzsche's *Superman* is not that which he ought to be. The German philosopher, Karl Vorländer, has either not read my writings, and none the less passes judgment upon me; or else he has done so, and still writes the above and other similar objective untruths. I leave it to the judgment of the competent public to decide whether his contribution, which was found worthy of acceptance in a serious philosophical review, is a proof of his complete lack of judgment or a dubious contribution to the morality of German scholarship.

of a blade of grass according to natural laws which no purpose has ordered; rather one must simply and flatly deny any such insight to man." Haeckel repudiates this thought with the words: "Now, however, this impossible Newton really appeared seventy years later in Darwin, and, as a matter of fact, solved the problem whose solution Kant had declared to be absolutely unthinkable!"

That the revolution in scientific views brought about by Darwinism must take place, Goethe knew full well, for it corresponds with his own way of conceiving things. In the view which Geoffroy de Saint-Hilaire defended against Cuvier, that all organic forms carry in them a "general plan modified only here and there," he recognised his own again. Therefore he could say to Soret: "Now, however, Geoffroy de Saint-Hilaire is decidedly on our side, and with him all his important disciples and followers in France. This event is for me of quite extraordinary value, and I rejoice rightly over the general victory gained at length by a cause to which I have devoted my life, and which is most especially my very own." Of still greater value for Goethe's view of Nature are, however, the discoveries

of Darwin. Goethe's view of Nature is related to Darwinism in a way similar to that in which the insights of Copernicus and Kepler into the structure and movements of the planetary system are related to the discovery by Newton of the law of the universal attraction of all heavenly bodies. This law reveals the scientific causes, why the planets move in the manner which Copernicus and Kepler had described. And Darwin found the natural causes, why the common original type of all organic beings, which Goethe assumed, makes its appearance in the various species.

The doubt as to the view that there underlies each distinct organic species a special plan of organisation, unchangeable for all time, took firm hold upon Darwin upon a journey which he undertook to South America and Australia in the summer of 1831 as naturalist on the ship *Beagle*. As to how his thought ripened, we get an idea in reaching such communications from him as the following: "When, during the voyage of the *Beagle*, I visited the Galapagos Archipelago, which lies in the Pacific Ocean some five hundred English miles from the South American coast, I saw myself surrounded by peculiar kinds of birds,

reptiles, and snakes, which exist nowhere else in the world. Yet they almost all bore upon them an American character. In the song of the mocking thrush, in the sharp cry of the carrion hawk, in the great chandelier-like Opuntico, I clearly perceived the neighbourhood of America ; and yet these islands were separated from the mainland by so many miles, and differed widely from it in their geological constitution and their climate. Yet more surprising was the fact that most of the inhabitants of each separate island of this small archipelago were specifically different, although closely related to one another. I often asked myself, then, how these peculiar animals and men had originated. The simplest answer seemed to be that the inhabitants of the different islands descend from one another, and in the course of their descent had undergone modifications, and that all the inhabitants of the archipelago had descended from those of the nearest mainland, viz., America, from which naturally the colonisation would proceed. But it long remained for me an unintelligible problem : *how* the necessary degree of modification could have been attained."

As to this "how," it was the numerous breeding experiments which he tried, after his return home, with pigeons, fowls, dogs, rabbits, and garden plants that enlightened Darwin. He saw from them in how high a degree there lies in organic forms the possibility of continually modifying themselves in the course of their reproduction. It is possible, by creating artificial conditions, to obtain from a given form after a few generations new kinds, which differ much more from each other than do those in Nature, whose difference is regarded as so great that one inclines to ascribe to each a special underlying plan of organisation. As is well known, the breeder utilises this variability of kinds to bring about the development of such forms of domesticated organisms as correspond with his intentions. He endeavours to create the conditions which guide the variation in a direction answering his purpose. If he seeks to breed a kind of sheep with specially fine wool, he seeks out among his flock those individuals which have the finest wool. These he allows to breed. From among their descendants he again selects for further breeding those which have the finest wool. If this is carried on

through a series of generations, a species of sheep is obtained which differs materially from its ancestors in the formation of its wool. The same thing can be done with other characteristics of living creatures. From these facts two things become obvious: that organic forms have a tendency to vary, and that they pass on the acquired modifications to their descendants. Owing to this first property of living creatures, the breeder is able to develop in his species certain characteristics that answer his purposes; owing to the second, these new characteristics are handed on from one generation to the next.

The thought now lies close at hand, that in Nature also, left to itself, the forms continually vary. And the great power of variation of domesticated organisms does not force us to assume that this property of organic forms is confined within certain limits. We may rather presuppose that in the lapse of vast time-periods a certain form transforms itself into a totally different one, which in its formation diverges from the former to the utmost extent imaginable. The most natural inference then, is this, that the organic species have not arisen independently, each according

to a special plan of structure, alongside each other ; but that in course of time they have evolved the one from the other. This idea gains support from the views at which Lyell arrived in the history of the earth's development, and which he first published in 1830 in his *Principles of Geology*. The older geological views, according to which the formation of the earth was supposed to have been accomplished in a series of violent catastrophes, were thereby superseded. Through this doctrine of catastrophes it was sought to explain the results to which the investigation of the earth's solid crust had led. The different strata of the earth's crust, and the fossilised organic creatures contained in them, are of course the vestiges of what once took place on the earth's surface.

The followers of the doctrine of violent transformations believed that the development of the earth had been accomplished in successive periods, definitely distinguished from one another. At the end of such a period there occurred a catastrophe. Everything living was destroyed, and its remains preserved in an earth-stratum. On the top of what had been destroyed there arose a

completely new world, which must be created afresh. In the place of this doctrine of catastrophes, Lyell set up the view that the crust of the earth has been gradually moulded in the course of very long periods of time, by the same processes which still in our time are going on every day on the earth's surface. It has been the action of the rivers carrying mud away from one spot and depositing it on another ; the work of the glaciers, which grind away rocks and stones, forward blocks of stone, and analogous processes, which, in their steady, slow working have given to the earth's surface its present configuration. This view necessarily draws after it the further conclusion that the present-day forms of plants and animals also have gradually developed themselves out of those whose remains are preserved for us in fossils. Now, it results from the processes of artificial breeding that one form can really transform itself into another. There remains only the question, by what means are those conditions for this transformation, which the breeder brings about by artificial means, created in Nature itself ?

In artificial breeding human intelligence

chooses the conditions so that the new forms coming into existence answer to the *purposes* which the breeder is following out. Now, the organic forms living in Nature are in general purposefully adapted to the conditions under which they live. A mere glance into Nature will teach one the truth of this fact. Plant and animal species are so constructed that they can maintain and reproduce themselves in the conditions under which they live.

It is just this purposeful arrangement which has given rise to the supposition that organic forms cannot be explained in the same way as the facts of inorganic Nature. Kant observes in his *Critique of Judgment*: "The analogy of the forms, in so far as they seem to be produced in accordance with a common basic plan, despite all differences, strengthens the presumption of a *real relationship* between them in their generation from a common mother through an approach, step by step, of one animal species to another. . . . Here, therefore, it is open to the archæologist of Nature to cause to arise that great family of creatures (for one would be forced to conceive them thus if the thoroughgoing connected relationship spoken of is to hold good) from

the traces left over of her older revolutions, according to all their known and supposed mechanisms. But he must equally for that purpose ascribe to this common mother an organisation purposely fitted to all these creatures, for otherwise the purposive form of the products of the plant and animal kingdoms is unthinkable as to its possibility."

If we would explain organic forms after the same manner in which natural science deals with inorganic phenomena, we must demonstrate that the particular arrangement of the organisms—devoid of a purposeful object—comes into being by reason of what is practically natural necessity, even as one elastic ball after having been struck by another is fulfilling a law as it rolls along. This requirement has its fulfilment in Darwin's teachings regarding natural selection. Even in Nature organic forms must, in accordance with their capacity for assimilating modifications which have been brought about by artificial breeding, become transformed. Should there be nothing available for directly bringing about the change, so that none but the forms aimed at should come into existence, there will be, regardless of choice, useless, or less useful,

forms called into being. Now, Nature is extremely wasteful in the bringing forth of her germs. So many germs are, indeed, produced upon our earth, that were they all to attain to development we should soon be able to fill several worlds with them.

This great number of germs is confronted with but a comparatively small amount of food and space, the result of this being a universal struggle for existence among organic beings. Only the fit survive and fructify; the unfit have to go under. The fittest, however, will be those who have adapted themselves in the best possible way to the surrounding conditions of life. The absolutely unintentional, and yet—from natural causes—necessary, struggle for existence brings in its train the same results as are attained by the intelligence of the breeder with his cultivated organisms: he creates *purposeful* (*useful*) *organic* forms. This, broadly sketched, is the meaning of Darwin's theory of natural selection in the struggle for existence; or, otherwise, the "selective theory." By this theory, that which Kant held to be impossible is reached: the thinking out in all its possibilities of a predetermined

form in the animal and vegetable kingdom, without assuming the Universal Mother to be dowered with an organism directly productive of all these creatures.

As Newton by pointing out the general attraction of the heavenly bodies showed why they moved in the set courses determined by Copernicus and Kepler, so did it now become possible to explain with the help of the theory of selection how in Nature the evolution of the living thing takes place, the course of which Goethe, in his *Metamorphosis of Planets*, has observed : " We can, however, say this, namely, that proceeding from a relationship that is hardly distinguishable between animal and plant, creatures do little by little evolve, carrying on their development in opposite directions—the plant finally reaching its maturity in the form of the tree, and the animal finding its culminating glory in man's freedom and activity."

Goethe has said of his ancestors : " I shall not rest until I have found a pregnant point from which many deductions may be made ; or, rather, one that will forcibly bestow upon me the overflow of its own abundance." The theory of selection became for Ernst Haeckel

the point from which he was able to deduce a conception of the universe entirely in accordance with natural science.

At the beginning of the last century Jean Lamarck also maintained the view that, at a certain moment in the earth's development, a most simple organic something developed itself, by spontaneous generation, out of the mechanical, physical, and chemical processes. These simplest organisms then produced more perfect ones, and these again others more highly organised, right up to man. " One might therefore quite rightly name this part of the theory of evolution, which asserts the common origin of all plant and animal species from the simplest common root-forms, in honour of its most deserving founder, Lamarckianism " (Haeckel, *Natural History of Creation*). Haeckel has given in grandiose style an explanation of Lamarckianism by means of Darwinism.

The key to this explanation Haeckel found by seeking out the evidences in the individual development of the higher organisms—in their ontogeny—showing that they really originated from lower forms of life. When one follows out the form-development of one

of the higher organisms from the earliest germ up to its fully developed condition, the different stages are found to present configurations corresponding to the forms of lower organisms.[1] At the outset of his individual existence man and every other animal is a simple cell. This cell divides itself, and from it arises a germinal vesicle consisting of many cells. From that develops the so-called " cup-germ," the two-layered gastrula, which has the shape of a cup- or jug-like body. Now, the lower plant-animals (sponges, polyps, and so on) remain throughout their entire existence on a level of development which is equivalent to

[1] *Fundamental Biogenetic Law.* Haeckel has proved in a series of works the general validity and far-reaching significance of the fundamental biogenetic law. The most important explanations and proofs will be found in his *Biology of the Corals* (1872) and in his *Studies in the Gastrula Theory* (1873-84). Since then other zoologists have extended and confirmed this doctrine. In his latest work, *Die Welträtsel* (1899), Haeckel is able to say of it (p. 72) : " Although this doctrine was at the outset almost generally rejected, and for some ten years fiercely combated by numerous authorities, yet, at the present time (for about fifteen years past), it has been accepted by all well-informed specialists in the subject."

this cup-germ. Haeckel remarks thereupon : " This fact is of extraordinary importance. For we see that man, and generally every vertebrate, runs rapidly, in passing, through a two-leaved stage of formation, which in these lowest plant-animals is maintained throughout life " (*Anthropogenesis*). Such a parallelism between the developmental stages of the higher organisms and the developed lower forms may be followed out through the entire evolutionary history. Haeckel clothes this fact in the words : " The brief ontogenesis or development of the individual is a rapid and abbreviated repetition, a condensed recapitulation of the prolonged phylogenesis or development of the species." This sentence gives expression to the so-called fundamental biogenetic law. Why then do the higher organisms in the course of their development come to forms which resemble lower ones ? The natural explanation is that the former have developed themselves out of the latter ; that therefore every organism in its individual development shows us one after another the forms which have clung to it as heirlooms from its lower ancestors.

The simplest organism that once upon a

time formed itself on earth, transforms itself in the course of reproduction into new forms. Of these, the best adapted in the struggle for existence survive, and transmit their peculiarities to their descendants. All the formations and qualities which an organism exhibits at the present time have arisen in the lapse of enormous time-periods by adaptation and inheritance. Heredity and adaptation are thus the causes of the world of organic forms.

Thus, by investigating the relationship of individual developmental history (ontogeny) to the history of the race (phylogeny), Haeckel has given the scientific explanation of the manifold organic forms.[1] As a natural philosopher he has satisfied the human demand for knowledge, which Schiller had derived from observation of Goethe's mind; he ascended from the simple organisations

[1] *Haeckel's latest book.* In his recently published book, *Die Welträtsel, Gemeinverständliche Studien über Monistische Philosophie* (Bonn, Emil Strauss, 1899), Haeckel has given without reserve the "further development, proof, and completion of the convictions" which throughout a full generation he has represented. To anyone who has absorbed the

step by step to the more complicated, to finally build up genetically the most complex of all, man, from the materials of the whole structure of Nature. He has set forth his view in several grandly designed works—in his *General Morphology* (1866), in his *Natural History of Creation* (1868), in his *Anthropogenesis* (1874)—in which he " undertook the first and hitherto the only attempt to establish critically in detail the zoological family-tree of man, and to discuss at length the entire animal ancestry of our race." To these works there has been further added in recent years his three-volumed *Systematic Phylogeny*.

It is characteristic of Haeckel's deeply philosophical nature that, after the appearance of Darwin's *Origin of Species*, he at once recognised the full significance for man's entire conception of the Universe, of the principles therein established ; and it speaks

scientific knowledge of our time, this work must appear as one of the most important manifestos of the end of the nineteenth century. It contains in ripened form a complete analytical discussion of the relations of modern science with philosophical thinking from the mind of the most original, far-sighted investigator of our time.

much for his philosophical enthusiasm that he boldly and tirelessly combated all the prejudices which arose against the acceptance of the new truth by the creed of modern thought. The necessity that all modern scientific thinking should reckon with Darwinism was expounded by Haeckel at the fiftieth meeting of German scientists and doctors on the 22nd September, 1877, in his address, *The Present Theory of Evolution in relation to Science as a whole.* He delivered a widely-embracing *Confession of Faith of a Man of Science* on the 9th October, 1892, in Altenburg at the seventy-fifth anniversary of the Society for Natural Science of the Osterland. (This address was printed under the title, *Monism as a link between Religion and Science,* Bonn, 1892.) What has been yielded by the remodelled doctrine of evolution and our present scientific knowledge towards the answering of the " question of questions," he has recently expounded in its broad lines in the address mentioned above, *On our Present Knowledge as to the Origin of Man.* Herein Haeckel handles afresh the conclusion, which follows as a matter of course from Darwinism for every logical thinker, that man has deve-

loped out of the lower vertebrates, and further, more immediately from true apes.

It has been, however, this necessary conclusion which has summoned to battle all the old prejudices of theologians, philosophers, and all who are under their spell. Doubtless, people would have accepted the emergence of the single animal and plant forms from one another if only this assumption had not carried with it at once the recognition of the animal descent of man. "It remains," as Haeckel emphasised in his *Natural History of Creation*, "an instructive fact that this recognition—after the appearance of the first Darwinian work—was in no sense general, that on the contrary numerous critics of the first Darwinian book (and among them very famous names) declared themselves in complete agreement with Darwinism, but entirely rejected its application to man." With a certain appearance of justice, people relied in so doing on Darwin's book itself, in which no word is said of this application. Because he drew this conclusion unreservedly, Haeckel was reproached with being "more Darwinian than Darwin." True, that held good only till the year 1871, in which appeared Darwin's work,

The Descent of Man and Sexual Selection, in which Darwin himself maintained that inference with great boldness and clearness.

It was rightly recognised that with this conclusion must fall a conception belonging to the most treasured among the collection of older human prejudices: the conception that the "soul of man" is a special being all to itself, having quite another, a different, "higher origin" from all other things in Nature. The doctrine of descent must naturally lead to the view that man's soul-activities are only a special form of those physiological functions which are found in his vertebrate ancestors, and that these activities have evolved themselves with the same necessity from the mental activities of the animals, as the brain of man, which is the material condition of his intellect, has evolved out of the vertebrate brain.

It was not only the men with old conceptions of faith nurtured in the various ecclesiastical religions who rebelled against the new confession, but also all those who had indeed apparently freed themselves from these conceptions of faith, but whose minds nevertheless still thought in the sense of these concep-

tions. In what follows the proof will be given that to this latter class of minds belong a series of philosophers and scientific scholars of high standing who have combated Haeckel, and who still remain opponents of the views he advocated. To these ally themselves also those who are entirely lacking in the power of drawing the necessary logical conclusions from a series of facts lying before them. I wish here to describe the objections which Haeckel had to combat.

A bright light is thrown upon the relationship of man to the higher vertebrates, by the truth which Huxley, in 1863, expressed in his volume on *Man's Place in Nature, and other Anthropological Essays:* "Thus whatever system of organs be studied, the comparison of their modifications in the ape series leads to one and the same result—that the structural differences which separate man from the gorilla and the chimpanzee are not so great as those which separate the gorilla from the lower apes" (see *Man and the Lower Animals*, p. 144). With the help of this fact it is

possible to establish man's animal line of ancestry in the sense of the Darwinian doctrine of descent. Man has common ancestors with the apes in some species of apes that have died out. By a corresponding utilisation of the knowledge which comparative anatomy and physiology, individual developmental history, and palæontology supply, Haeckel has followed the animal ancestors of man lying still more remotely in the past, through the semi-apes, the marsupials, the earliest fishes, right up to the very earliest animals consisting only of a single cell. He is fully entitled to ask : " Are the phenomena of the individual development of man in any way less wonderful than the palæontological development from lower organisms ? Why should not man have evolved in the course of enormous periods of time from unicellular original forms, since every individual runs through this same development from the cell to the fully developed organism ? "

But it is also by no means easy for the human mind to construct for itself conceptions in accordance with Nature as regards the unfoldment of the single organism from the germ up to the developed condition. We can

see this from the ideas which a scientist like Albrecht von Haller (1708-1777) and a philosopher like Leibnitz (1646-1716) formed about this development. Haller maintained the view that the germ of an organism already contains in miniature, but fully and completely formed in advance, all the parts which make their appearance during its development. Thus, development is taken to be not the formation of something new in what is already present, but the unfolding of something that was already there but invisible to the eye because of its minuteness. But if this view were correct, then in the first germ of an animal or vegetable form all following generations must be already contained like boxes one inside the other. And Haller actually drew this conclusion. He assumed that in the first human germ of our root-mother, Eve, the entire human race was already present in miniature. And even Leibnitz also can only imagine the development of men as an unfoldment of what already exists: "So I should opine that the souls, which some day will be human souls, were already there in germ, like those of other species, that they existed in man's ancestors

up to Adam, therefore from the beginning of things, always in the form of organised bodies."

The human understanding has a tendency to imagine to itself that anything coming into existence was somehow already there, in some form or other, before its manifestation. The entire organism is supposed to be already hidden in the germ; the distinct organic classes, orders, families, species, and kinds are supposed to have existed as the thoughts of a creator before they actually came into existence. Now, however, the idea of evolution demands that we should conceive the arising of something new, of something later, from out of something already present, of something earlier. We are called upon to understand that which has become, out of the becoming. That we cannot do, if we regard all that has become as something which has always been there.

How great the prejudices are that the idea of evolution had to face was clearly shown by the reception which Caspar Friedrich Wolff's *Theoria Generationis*, which appeared in 1759, met with among the men of science who accepted Haller's views. It was demon-

strated in this book that in the human ovum not even a trace of the form of the developed organism is present, but that its development consists in a series of *new* formations. Wolff defended the idea of a real evolution, an epigenesis, a becoming from what is not present, as against the view of seeming evolution. Haeckel says of Wolff's book that it " belongs, in spite of its small size and awkward language, to the most valuable writings in the whole field of biological literature. . . ." Nevertheless, this remarkable book had at first no success whatever. Although scientific studies, as a result of the stimulus imparted by Linnæus, flourished mightily at that time, although botanists and zoologists were soon counted no longer by dozens but by hundreds, yet no one troubled himself about Wolff's *Theory of Generation.* The few, however, who had read it, held it to be fundamentally wrong, and especially Haller. Although Wolff proved by the most accurate observations the truth of epigenesis, and disproved the current hypotheses of the preformation doctrine, nevertheless the " exact " physiologist Haller remained the most zealous follower of the latter and rejected the correct teaching

of Wolff with his dictatorial edict : " There is no becoming " (*Nulla est epigenesis !*). With so much power did human thinking set itself against a view, of which Haeckel (in his *Anthropogenesis*) remarks : " To-day we can hardly any longer call this theory of epigenesis a *theory*, because we have fully convinced ourselves of the correctness of the *fact*, and can demonstrate it at any moment with the help of the microscope."

How deep-rooted is the prejudice against the idea of evolution can be seen at any moment by the objections which our philosophical contemporaries make against it. Otto Liebmann, who, in his *Analysis of Reality* and his *Thoughts and Facts*, has subjected the fundamental views of science to criticism, expresses himself in a remarkable manner about the conception of evolution. In face of the facts, he cannot deny the justice of the conception that higher organisms proceed from lower. He therefore endeavours to represent the range and importance of this conception for the higher need of explanation as being as small as possible. " Accepted, the theory of descent . . . granted that it be complete, that the great genealogical

register of Nature's organic beings lies open before us ; and that, not as an hypothesis, but as historically proven fact, what should we then have ? A gallery of ancestors, such as one finds also in princely castles ; only not as a fragment, but as a completed whole." This means that nothing of any consequence has been accomplished towards the real explanation, when one has shown how what appears later proceeds as a new formation from what preceded.

Now it is interesting to see how Liebmann's presuppositions lead him yet again to the assumption that what arises on the road of evolution was there already before its appearance. In the recently published second part of his *Thoughts and Facts* he maintains : " It is true that for us, to whom the world appears in the form of perception known as time, the seed is there before the plant ; begetting and conception come before the animal that arises from them, and the development of the embryo into a full-grown creature is a process of time and drawn out in time to a certain length. In the timeless world-being, on the contrary, which neither becomes nor passes away, but *is* once and for all, maintaining

itself unchangeably amid the stream of happenings, and for which no future, no past, but only an eternal present exists, this before and after, this earlier and later, falls away entirely. . . . That which unrolls itself for us in the course of time as the slower or more rapidly passing succession of a series of phases of development, is in the omnipresent, permanent world-being a fixed law, neither coming into existence nor passing away."

The connection of such philosophical conceptions with the ideas of the various religious doctrines as to the creation may be easily seen. That purposefully devised beings arise in Nature, without there being some fundamental activity or power which infuses that purposefulness into the beings in question, is something that neither these religious doctrines nor such philosophical thinkers as Liebmann will admit. The view that accords with Nature follows out the course of what happens, and sees beings arise which have the quality of purposefulness, without this same purpose having been a co-determinant in their production. The purposefulness came about along with them; but the purpose did not

co-operate in their becoming.[1] The religious mode of conception has recourse to the Creator, who has created the creatures purposefully according to his preconceived plan ; Liebmann turns to a timeless world-being, but

[1] *Purposefulness and Purpose.* Those who would willingly cling in faith to the existence of purposes in Nature, are constantly emphasising the fact that Darwin's views do not by any means exclude the idea of purpose, but rather make full use thereof, inasmuch as they show how the linking of causes and effects of necessity by themselves lead to the arising of the purposeful. The important point, however, is not whether or no one admits the existence of purposeful formations in Nature, but whether one assumes or rejects the idea that the purpose, the goal, co-operates as a *cause* in the development of these formations. Anyone who makes this assumption defends teleology, or the doctrine of purpose. Whoever says, on the contrary, purpose is in no way whatever operative in the production of the organic world ; living creatures come into existence according to necessary laws just as do inorganic phenomena, and purposefulness is only there because that which is not purposeful cannot maintain itself ; it is not the cause of what happens, but its consequence : he makes confession of Darwinism. No heed is paid to this by anyone who asserts, like Otto Liebmann, " Charles Darwin is one of the greatest teleologists of the present day " (*Thoughts and*

he still makes that which is purposeful be brought forth by the purpose. "The goal or the purpose is here not later, and also not earlier than the means; but the purpose helps it on in virtue of a timeless necessity." (*Thoughts and Facts*, pt. ii, p. 268.) Liebmann is a good example of those philosophers who have apparently freed themselves from the conceptions of faith, but who still think altogether on the lines of such conceptions. They profess that their thoughts are determined purely by reasonable considerations, but none the less it is an innate theological prejudice which gives the direction to their thoughts.

Reasoned reflection must therefore agree with Haeckel when he says: "*Either* organisms have naturally *developed* themselves, and in that case they must all originate from the simplest common ancestral forms—*or* that is not the case, the various species of organisms have arisen independently of one another, and

Facts, pt. i, p. 113). No, he is the greatest anti-teleologist, because he would show to such minds as Liebmann, if they understood him, that the purposeful can be explained without assuming the action of operative purposes.

in that case they can only have been *created* in a supernatural manner, by a miracle. Natural evolution or supernatural creation of species —we must choose between these two possibilities, for there is no third!" (*Free Science and Free Teaching*, p. 9.) What has been proffered by philosophers or scientists as such a third alternative against the doctrine of natural evolution shows itself, on closer examination, to be only a belief in creation which more or less veils or denies its origin.

When we raise the question as to the origin of species in its most important form, in that which concerns the origin of man, there are only two answers possible. Either a consciousness endowed with reason is not present prior to its actual appearance in the world, but *evolves* as the outcome of the nervous system concentrated in the brain; or else an all-dominating world-reason exists before all other beings, and so shapes matter that in man its own image comes into being. Haeckel (in *Monism as the Link between Religion and Science*, p. 21) describes the becoming of the human mind as follows: "As our human body has slowly and step by step built itself up from a long series of vertebrate ancestors,

so the same thing holds good of our soul : as a function of our brain it has developed itself step by step in interaction with that organ. What we term for short the ' human soul ' is indeed only the sum-total of our feeling, willing, and thinking—the sum-total of physiological functions whose elementary organs consist of the microscopic ganglionic cells of our brain. Comparative anatomy and ontogeny show us how the marvellous structure of the latter, of our human soul-organ, has built itself upwards gradually in the course of millions of years out of the brain-forms of the higher and lower vertebrates ; while comparative psychology shows us how, hand in hand therewith, the very soul itself—as a function of the brain—has evolved itself. The latter shows us also how a lower form of soul activity is already present in the lowest animals, in the unicellular protozoa, infusoria, and rhizopods. Every scientist who, like myself, has observed through long years the life-activity of these unicellular protista, is positively convinced that they also possess a soul ; this ' cell-soul,' too, consists of a sum of feelings, representations, and volitions ; the feeling, thinking, and willing of our

human soul is only different therefrom in degree."

The totality of human soul-activities, which find their highest expression in *unitary self-consciousness*, corresponds to the complex structure of the human brain,[1] just as simple feeling and willing do to the organisation of the protozoa. The progress of physiology, which we owe to investigators like Goltz, Munk, Wernicke, Edinger, Paul Flechsig, and others, enables us to-day to assign particular soul-manifestations to definite parts of the brain as their special functions. We recognise in four tracts of the grey matter of the cortex the mediators of four kinds of feeling: the sphere of bodily organic feeling in the meso-cranum lobule, that of smell in the frontal lobule, that of vision in the chief basal lobule, that of hearing in the temple lobule. The thinking which connects and orders the sensations has its apparatus between these four

[1] *Organs of Thought.* Quite recently Paul Flechsig has succeeded in proving that in one portion of the human organs of thought, complicated structures are found which are not present in other mammalia. These obviously are the organs of those mental activities by which man is distinguished from the animal.

" sense-foci." Haeckel links the following remark to the discussion of these latest physiological results: " The four thought-foci, distinguished by peculiar and highly complicated nerve-structure from the intervening sense-foci, are the true *organs of thought*, the only real tools of our mental life " (*On our Present Knowledge as to the Origin of Man*, p. 15).

Haeckel demands from the psychologists that they shall take such results as these into account in their explanations about the nature of the soul, and not build up a mere pseudo-science composed of a fantastic metaphysic, of one-sided, so-called inner observation of soul-events, uncritical comparison, misunderstood perceptions, incomplete experiences, speculative aberrations and religious dogmas. As against the reproach that is cast by this view at the old-fashioned psychology, we find in some philosophers and also in individual scientists the assertion that there cannot in any case be contained in the material processes of the brain that which we class together as mind and spirit ; for the material processes in the areas of sense and thought are in no case representations, feelings, and thoughts, but

only material phenomena. We cannot learn to know the real nature of thoughts and feelings through external observation, but only through *inner* experience, through purely mental self-observation. Gustav Bunge, for instance, in his address *Vitalism and Mechanism*, p. 12, explains: "In activity—therein lies the riddle of life. But we have not acquired the conception of activity from observation through the senses, but from self-observation, from the observation of willing as it comes into our consciousness, as it reveals itself to our inner sense." Many thinkers see the mark of a philosophical mind in the ability to rise to the insight that it is a turning upside down of the right relation of things, to endeavour to understand mental processes from material ones.

Such objections point to a misunderstanding of the view of the world which Haeckel represents. Anyone who has really been saturated with the spirit of this view will never seek to explore the laws of mental life by any other road than by inner experience, by self-observation. The opponents of the scientific mode of thought talk exactly as if its supporters sought to discover the truths of logic,

ethics, æsthetics, and so forth, not by means of observing mental phenomena as such, but from the results of brain-anatomy. The caricature of the scientific world-conception thus created by such opponents for themselves is then termed materialism, and they are untiring in ever repeating afresh that this view must be unproductive, because it ignores the mental side of existence, or at least gives it a lower place at the expense of the material. Otto Liebmann, whom we may here cite once more, because his anti-scientific conceptions are typical of the mode of thought of certain philosophers and laymen, observes: "But granting, however, that natural science had attained its goal, it would then be in a position to show me accurately the *physico-organic* reasons why I hold that the assertion 'twice two are four' is true and assert it, and the other assertion 'twice two are five' is false and combat it, or why I *must*, just at this moment, write these very lines on paper the while I am entangled in the subjective belief that this happens because I *will* to write them down on account of their truth as assumed by me" (*Thoughts and Facts*, pt. ii, p. 294 *et seq.*). No scientific thinker will ever be of opinion

that bodily-organic reasons can throw any light upon what, in the logical sense, is true or false. Mental connections can only be recognised from the side of the mental life. What is logically justified, must always be decided by logic ; what is artistically perfect, by the æsthetic judgment. But it is an altogether different question to inquire : How does logical thinking, or the æsthetic judgment arise as a function of the brain ? It is on this question only that comparative physiology and brain-anatomy have anything to say. And these show that the reasoning consciousness does not exist in isolation for itself, only utilising the human brain in order to express itself through it, as the piano-player plays on the piano ; but that our mental powers are just as much functions of the form-elements of our brain, as " every force is a function of a material body " (Haeckel, *Anthropogenesis*, pt. ii., p. 853).

The essence of *Monism* consists in the assumption that all occurrences in the world, from the simplest mechanical ones upwards to the highest human intellectual creations, evolve themselves naturally in the same sense, and that everything which is called in for the

explanation of appearances, must be sought *within* that same world. Opposed to this view stands *Dualism*, which regards the pure operation of natural law as insufficient to explain appearances, and takes refuge in a reasoning being ruling over the appearances from above. Natural science, as has been shown, must reject this dualism.

Now, however, it is urged from the side of philosophy that the means at the disposal of science are insufficient to establish a world-conception. From its own standpoint science was entirely right in explaining the whole world-process as a chain of causes and effects, in the sense of a purely mechanical conformity to law ; but behind these laws, nevertheless, there is hidden the real cause, the universal world-reason, which only avails itself of mechanical means in order to realise higher, purposeful relations. Thus, for instance, Arthur Drews, who follows in the path of Eduard von Hartmann, observes : " Human works of art, too, are produced in a mechanical manner, that is when one looks only at the outward succession of single moments, without reflecting on the fact that after all there is hidden behind all this only the artist's

thought ; nevertheless one would rightly take that man for a fool who would perchance contend that the work was produced purely mechanically . . . that which presents itself as the inevitable effect of a cause, on that lower standpoint which contents itself with merely gazing at the effects and thus contemplates the entire process as it were *from behind*, that very same thing reveals itself, when seen from the front, in every case as the intended goal of the means employed" (*German Speculation since Kant*, vol. ii, p. 287 *et seq.*). And Eduard von Hartmann himself remarks about the struggle for existence which renders it possible to explain living creatures naturally : " The struggle for existence, and therewith the whole of natural selection, is only the servant of the *Idea*, who is obliged to perform the *lower* services in its realisation, namely, the rough hewing and fitting of the stones that the master-builder has measured out and typically determined in advance according to their place in the great building. To proclaim this selection in the struggle for existence as the essentially adequate principle of explanation of the evolution of the organic kingdom, would be

on a par with a day-labourer, who had worked with others in preparing the stones in the building of Cologne Cathedral, declaring himself to be the architect of that work of art" (*Philosophy of the Unconscious*, 10th ed., vol. iii, p. 403).

If these conceptions were justified, it would be the task of philosophy to seek the artist behind the work of art. In fact, philosophers have tried the most various and diverse dualistic explanations to account for Cosmic processes. They have constructed in thought certain entities, supposed to hover behind the phenomena as the spirit of the artist rules behind the work of art.

No scientific consideration would be able to rob man of the conviction that perceptible phenomena are guided by beings outside the world, if he could find within his own consciousness anything that pointed to such beings. What could anatomy and physiology accomplish with their declaration that soul-activities are functions of the brain, if observation of these activities yielded anything which could be regarded as a higher ground for an explanation? If the philosopher were able to show that a universal world-reason mani-

fests itself in human reason, then all scientific results would be powerless to refute such knowledge.

Now, however, the dualistic world-conception is disproved by nothing more effectively than by the consideration of the human mind. When I want to explain an external occurrence—for instance, the motion of an elastic ball which has been struck by another, I cannot stop short at the mere observation, but must seek the law which determines the direction of motion and velocity of the one ball from the direction and velocity of the other. Mere observation cannot furnish me with such a law, but only the linking together in thought of what happens. Man, therefore, draws from his mind the means of explaining that which presents itself to him through observation. He must pass beyond the mere observation, if he wants to comprehend it. Observation and thought are the two sources of our knowledge about things; and that holds good for all things and happenings, except only for the thinking consciousness itself. To that we cannot add by any explanation anything that does not lie already in the observation itself. It yields us the

laws for all other things ; it yields us at the same time its own laws also. If we want to demonstrate the correctness of a natural law, we accomplish this by distinguishing, arranging observations and perceptions, and drawing conclusions—that is, we form conceptions and ideas about the experiences in question with the help of thinking. As to the correctness of the thinking, thought itself alone decides. It is thus thought which, in regard to all that happens in the world, carries us beyond mere observation, though it does not carry us beyond itself.

This fact is incompatible with the dualistic world-conception. The point which the supporters of this conception so often emphasise, namely, that the manifestations of the thinking consciousness are accessible to us through the inner sense of introspection, while we only comprehend physical and chemical happenings when we bring into the appropriate connections the facts of observation through logical, mathematical combination, and so on ; in other words, through the results of the psychological domain : *this fact is the very thing which they should never admit.* For let us for once draw the right conclusion

from the knowledge that observation transforms itself into self-observation when we ascend from the scientific into the psychological domain.

If a universal world-reason underlay the phenomena of nature, or some other spiritual primordial being (for instance, Schopenhauer's *will* or von Hartmann's *unconscious spirit*), then it follows that the human thinking spirit must also be created by this world-being. An agreement of the conceptions and ideas which the mind of man forms from phenomena, with the actual laws proper to these occurrences, would only be possible if the ideal world-artist called forth in the human soul the laws according to which he had previously created the entire world. But then man could only know his own mental activity through observation of the root-being by whom he is shaped, and not through self-observation. Indeed, there could be no self-observation, but only observation of the intentions and purposes of the primordial being. Mathematics and logic, for example, ought not to be developed by means of man's investigating the inner, proper nature of mental connections, but by his deducing these psychological truths from the

intentions and purposes of the eternal world-reason. If human understanding were only the reflection of an eternal mind, then it could never possibly ascertain its own laws through self-observation, but must needs explain them from out of the eternal reason. But whenever such an explanation has been attempted, it is simply human reason which has been transferred to the world outside. When the mystic believes that he rises to the contemplation of God by sinking down into his own inner being, in reality he merely sees his own spirit, which he makes into God ; and when Eduard von Hartmann speaks of ideas which utilise the laws of Nature as their hodmen-helpers in order to shape the building of the world, these ideas are only his own, by means of which he explains the world. Because observation of the manifestations of mind is *self-observation*, therefore it follows that it is man's own spirit which expresses itself in the mind, and not any external reason.

The monistic doctrine of evolution, however, is in complete agreement with the fact of self-observation. If the human soul has evolved itself slowly and step by step along with the organs of the soul out of lower conditions,

then it is self-evident that we can explain its development from below scientifically, though we can discover the inner nature of that which emerges from the complex structure of the human brain only from the contemplation of this very nature itself. Had spirit been always present in a form resembling the human, and had it at last created its likeness in man alone, then we ought to be able to deduce the human spirit from the All-spirit ; but if man's spirit has arisen as a *new formation* in the course of natural evolution, then we can understand its origin by following out its line of ancestry ; we learn to know the stage at which it has at last arrived when we contemplate that spirit itself.

A philosophy that understands itself, and turns its attention to an unprejudiced contemplation of the human spirit, thus yields a further proof of the correctness of the monistic world-conception. It is, however, quite incompatible with a dualistic natural science. (The further development and detailed proof of a *monistic philosophy*, the basic ideas of which I can only indicate here, I have given in my *Philosophy of Freedom*, Berlin, 1894, Verlag Emil Felber.)

For one who understands aright the monistic world-conception, all the objections urged against it from the side of ethics lose all significance. Haeckel has repeatedly pointed out the injustice of such objections, and also called attention to the fact that the assertion that scientific monism must needs lead to ethical materialism, either rests upon a complete misunderstanding of the former, or else aims at nothing more than casting suspicion upon it.

Naturally monism regards human conduct only as a part of the general happenings of the world.[1] It makes that conduct just as little dependent upon a so-called higher moral world-order, as it makes the happenings in Nature dependent upon a supernatural order.

[1] *Human and Animal Psychology.* The merit of having proved that there is no real contrast between the soul of man and that of animals, but that the mental activities of man are linked to those of animals as a higher form thereof in a perfectly natural chain of development, belongs to George Romanes, who, in a comprehensive work, *Mental Evolution in Animals* (vol. i) and *Mental Evolution in Man and the Origin of Human Faculties* (vol. ii), has shown, " that the psychological barrier between animal and man has been surmounted."

"The mechanical or monistic philosophy maintains that, everywhere in the phenomena of human life, as in those of the rest of nature, fixed and unalterable laws rule, that everywhere there exists a necessary causal connection, a causal nexus of appearances, and that in accordance therewith the entire world knowable to us constitutes a uniform whole, a 'monon.' It maintains further that all phenomena are produced by *mechanical* causes, not by preconceived *purposive* causes. There is no such thing as a 'free will' *in the ordinary sense*. On the contrary, those very phenomena which we have accustomed ourselves to view as the freest and most independent, the manifestations of the human will, appear in the light of the monistic world-conception as subordinated to just as rigid laws as any other phenomenon of nature" (Haeckel, *Anthropogenesis*, p. 851 *et seq.*). It is the monistic philosophy which first shows the phenomenon of free will in the right light. As a bit cut out of the general happening of the world, the human will stands under the same laws as all other natural things and processes. It is conditioned according to natural law. But inasmuch as the monistic view denies the

presence of higher, purposeful causes in the course of Nature, it at the same time also declares the will independent of such a higher world-order.

The natural course of evolution leads the processes of Nature upwards to human self-consciousness. On that level it leaves man to himself; henceforward he can draw the impulses of his action from his own spirit. If a universal world-reason were ruling, then man also could not draw his goals from within himself, but only from this eternal reason. In the monistic sense man's action is hereafter determined by causal moments; in the ethical sense it is not determined, because Nature as a whole is determined not ethically but in accordance with natural law. The preliminary stages of ethical conduct are already to be found among the lower organisms. "Even though later the moral foundations have in man developed themselves much more highly, nevertheless their most ancient, prehistoric source lies, as Darwin has shown, in the *social instincts* of the animals" (Haeckel, *Monism*, p. 29).

Man's moral conduct is a product of evolution. The moral instinct of animals perfects

itself, like everything else in Nature, by inheritance and adaptation, until man sets before himself moral purposes and goals from out of his own spirit. Moral goals appear not as predetermined by a supernatural world-order, but as a new formation within the natural process. Regarded ethically, " that only has purpose which man has first endowed therewith, for only through the realisation of an idea does anything purposeful arise. But only in man does the idea become effective in a realistic sense. To the question, What is man's task in life ? Monism can only answer, that which he sets himself. My mission in the world is no (ethically) predetermined one ; on the contrary, it is, at every moment, that which I elect for myself. I do not enter on life's journey with a fixed, settled line of march " (*cp.* my *Philosophy of Freedom*, p. 172 *et seq.*). Dualism demands submission to ethical commands derived from somewhere or other. Monism throws man wholly upon himself. Man receives ethical standards from no external world-being, but only from the depths of his own being. The capacity for creating for oneself ethical purposes may be called *moral phantasy*. Thereby man elevates the

ethical instincts of his lower ancestors into moral action, as through his artistic phantasy he reflects on a higher level in his works of art the forms and occurrences of Nature.

The philosophical considerations which result from the fact of self-observation thus constitute no refutation, but rather an important complement of the means of proof in favour of the monistic world-conception, derived from comparative anatomy and physiology.

The famous pathologist, Rudolf Virchow,[1] has taken up a quite peculiar position towards the monistic world-conception. After

[1] *Virchow and Darwin.* On 3rd October, 1898, Virchow delivered the second of the *Huxley Lectures* in the Charing Cross Hospital Medical School, in London, wherein he said: "I venture to assume that such a duty would not have been assigned to me if those who did so had not known how deep the feeling of veneration for Huxley is in my soul, if they had not seen how I have recognised his achievements from the first pioneer publications of the deceased master, and how greatly I have valued the friendship which he bestowed upon me personally." Now, these pioneer

Haeckel had delivered his address on *The Present Theory of Evolution in Relation to Science as a Whole* at the fiftieth congress of German scientists and doctors, in which he ably expounded the significance of the monistic world-conception for our intellectual culture and also for the whole system of public instruction, Virchow came forward four days later as his opponent with the speech: *The Freedom of Science in the Modern State.* At first it seemed as if Virchow wanted monism excluded from the schools only, because, according to his view, the new doctrine was only an hypothesis and did not represent a fact established by definite proofs. It certainly seems remarkable that a modern scientist wants to exclude the doctrine of evolution

publications of Huxley's mean precisely the first great step towards the building up of the theory of man's descent from the ape, which Virchow combats, and about which, moreover, in his Huxley address, *The more recent Advances of Science,* he has nothing more to say than a few words, which are wholly meaningless in face of the present position of this question: "*One may think as one chooses about the origin of man,* the conviction as to the fundamental coincidence of the human and the animal organisation is at present generally accepted . . ." etc.

from school-teaching on the ostensible ground of lack of unassailable proofs while at the same time speaking in favour of Church dogma. Does not Virchow even say (on p. 29 of the speech mentioned): "Every attempt to transform our *problems* into set *formulæ*, to introduce our suppositions as the *basis of instruction*, especially the attempt simply to dispossess the Church and replace its dogmas without more ado by a 'descent-religion'; yes, gentlemen, this attempt must fail entirely, and in its frustration this attempt will also bring with it the greatest dangers for the whole position of science!" One must needs, however, here raise the question—meaningless for every reasonable thinker—Have we more certain proofs for the Church's dogmas than for the "descent-religion"? But it results from the whole tone and style in which Virchow spoke that he was much less concerned about warding off the dangers which monism might cause to the teaching of the young than about his opposition on principle to Haeckel's world-conception as a whole. This he has proved by his whole subsequent attitude. He has seized upon every opportunity that seemed to him suitable to combat

the natural history of evolution and to repeat his favourite phrase, " It is quite certain that man does *not* descend from the ape." At the twenty-fifth anniversary of the German Anthropological Society, on 24th August, 1894, he even went so far as to clothe this dictum in the somewhat tactless words : " On the road of speculation people have come to the ape theory ; one might just as well have arrived at an elephant theory or a sheep theory." Of course, this utterance has not the smallest sense in view of the results of comparative zoology. " *No zoologist,*" remarks Haeckel, " would consider it *possible* that man could have descended from the elephant or the sheep. For precisely these two mammals happen to belong to the most specialised branches of hoofed animals, an order of mammalia which stands in no sort of direct connection with that of the apes or primates (excepting their common descent from an ancestral form common to the entire class)." Hard as it may be towards a meritorious scientist, one can only characterise such utterances as Virchow's as empty verbalism.

In combating the theory of descent, Virchow follows quite peculiar tactics. He

demands unassailable proofs for this theory. But as soon as natural science discovers anything which is capable of enriching the chain of proofs with a fresh link, he seeks to weaken its probatory force in every way. The theory of descent sees in the famous skulls of Neanderthal, Spy, etc., isolated palæontological remains of extinct races of lower men, which form a transition-link between the ape-like ancestor of man (Pithecanthropus) and the lower human races of the present day. Virchow declares these skulls to be abnormal, diseased formations, pathological productions. He even developed this contention in the direction of maintaining that all deviations from the fixed organic root-forms must be regarded as pathological formations. If, then, by artificial breeding we produce table-fruit from wild fruit, we have only produced a diseased object in Nature. One cannot prove more effectively the thesis of Virchow (hostile to any theory of evolution), " The plan of organisation is unalterable within the species, kind does not depart from kind," than by declaring that what shows plainly how kind departs from kind, is not a healthy, natural product of evolution, but a *diseased* formation.

Quite in accord with this attitude of Virchow's to the theory of descent were, further, his assertions in regard to the skeleton remains of the man-ape (*Pithecanthropus erectus*), which Eugen Dubois found in Java in 1894.

It is true that these remains—the top of the skull, a thigh-bone, and some teeth—were incomplete; and a debate that was most interesting arose about them in the Zoological Congress at Leyden. Out of twelve zoologists, three were of opinion that the remains were those of an ape, three that they were those of a human being, while six defended the view that they belonged to an extinct *transition form* between man and ape. Dubois set out in a most lucid manner the relation of this intermediate link between man and ape, on the one hand to the lower races of humanity, on the other to the known anthropoid apes. Virchow declared that the skull and the thigh-bone did not belong together; but that the former came from an ape, the latter from a human being. This assertion was refuted by well-informed palæontologists, who, on the basis of the conscientious report of the find, expressed themselves as of opinion

that not the smallest doubt could exist as to the origin of the bony remains from one and the same individual. Virchow tried to prove that the thigh-bone could only have come from a man, from the presence of a bony outgrowth which could only proceed from an illness that had been cured through careful human nursing. As against that, the palæontologist Marsh showed that similar bony outgrowths occur also in wild apes. A third assertion of Virchow's, that the deep groove between the upper edge of the eye sockets and the low roof of the skull in Pithecanthropus bore witness to its simian nature, was refuted by the palæontologist Nehring's showing that the same formation existed in a human skull from Santos in Brazil.

Virchow's fight against the evolution doctrine appears indeed somewhat of a riddle when one reflects that this investigator, at the beginning of his career, *before* the publication of Darwin's *Origin of Species*, defended the doctrine of the mechanical basis of all vital activity. In Würzburg, where Virchow taught from 1848 to 1856, Haeckel sat " reverentially at his feet and first heard with enthusiasm from him that clear and simple

doctrine." But Virchow fights against the doctrine of transformation created by Darwin, which furnishes an all-embracing principle of explanation of that doctrine. When, in the face of the facts of palæontology, of comparative anatomy and physiology, he constantly emphasises that "definite proof" is lacking, one can only point out, on the other side, that knowledge of the facts alone does indeed not suffice for the recognition of the doctrine of evolution, but there is needed in addition—as Haeckel remarks—a "*philosophical understanding*" as well. "The unshakable structure of true monistic science arises only through the most intimate interaction and mutual penetration of philosophy and experience" (Haeckel, *Natürliche Schöpfungsgeschichte*, 34, Vortrag). In any case, the campaign which Virchow has carried on for many years past against the doctrine of descent, with the applause of theological and other reactionaries, is more dangerous than all the mischief which a "descent-religion" can cause in unripe heads. A technical discussion on the point with Virchow is made difficult by the fact that, fundamentally, he remains standing on a bare negation, and in

general does not bring forward any specific technical objections against the doctrine of evolution.

Other scientific opponents of Haeckel's make it easier for us to attain clearness in regard to them because they give the reasons for their opposition, and we can thus recognise the mistakes in their inferences. Among these are to be reckoned Wilhelm His and Alexander Goette.

His made his appearance in the year 1868 with his *Researches as to the First Beginnings of the Vertebrate Body*. His attack was primarily directed against the doctrine that the form-development of a higher organism from the first germ to the fully-developed condition can be explained from the evolution of the type. We ought not, according to him, to explain this development by regarding it as the outcome of the generations from which the single organism descends through inheritance and adaptation, but we should seek in the individual organism itself the mechanical causes of its becoming, without regard to comparative anatomy and ancestral history. His starts from the view that the germ, conceived as a uniform surface, grows unequally

at different spots, and he asserts that in consequence of this unequal growth the complex structure of the organism results in the course of development. He says: "Take a simple layer and imagine that it possesses at different places a different impulse to enlargement. One will then be able to develop from purely mathematical and mechanical laws the condition in which the formation must find itself after a certain time. Its successive forms will accurately correspond to the stages of development which the individual organism runs through from the germ to the perfected condition. Thus we do not need to go beyond the consideration of the individual organism in order to understand its development, but can deduce this from the mechanical law of growth.

"All formation, whether consisting in cleavage, in the formation of folds, or in complete separation, follows as a consequence from this fundamental law." The law of growth brings into existence the two pairs of limbs as follows: "Their disposition is determined, like the four corners of a letter, by the crossing of four folds which limit and bound the body." His rejects any help drawn from the history of the

species, with the following justification: "When the history of development for any given form has thoroughly fulfilled the task of its physiological deduction, then it may rightly say of itself that it has explained this form as an individual form" (*cp.* His, *Unsere Körperform und das physiologische Problem ihrer Entstehung*). In reality, however, nothing whatever has been accomplished by such an explanation. For the question still remains: *Why* do different forces of growth work at different spots in the germ? They are simply assumed by His to exist. The explanation can only be seen in the fact that the relations of growth of the individual parts of the germ have been transmitted by inheritance from the ancestral animals, that therefore the individual organism runs through the successive stages of its development because the changes which its forefathers have undergone through long ages continue to operate as the cause of its individual becoming.

To what consequences the view of His leads may best be seen from his theory as to the orbital lobule, by which the so-called "rudimentary organs" of the organism were to be explained. These are parts which are

present in the organism without possessing any sort of significance for its life. Thus man has a fold of skin at the inner corner of his eye which is without any purpose for the functions of the organ of sight. He possesses also muscles corresponding to those by which certain animals can move their ears at will. Yet most people cannot move their ears. Some animals possess eyes which are covered over with a skin and thus cannot serve for seeing. His explains these organs as being such, to which " up to the present it has not been possible to assign any physiological rôle, analogous to the snippets, which, in cutting out a dress, cannot be avoided even with the most economical use of the stuff." The evolution theory gives the only possible explanation of them. They are inherited from remote ancestors, in whom they subserved a useful purpose. Animals which to-day live underground and have no seeing eyes, descend from such ancestors as once lived in the light and needed eyes. In the course of many generations the conditions of life of such an organic stock have changed. The organisms have adapted themselves to the new conditions in which they can dispense

with organs of sight. But these organs remain as heirlooms from an earlier stage of evolution; only in the course of time they have become atrophied, because they have not been used. These rudimentary organs[1] form one of the strongest means of proof for the natural theory of evolution. If any deliberate intentions whatever had ruled in the building up of an organic form, whence came these purposeless parts? There is no other possible explanation of them, except that in the course of many generations they have gradually fallen into disuse.

Alexander Goette, also, is of opinion that

[1] *Purposeless organs.* As to these organs Haeckel observes in his book *Die Welträthsel*, p. 306: "All higher animals and plants, indeed all those organisms whose bodies are not quite simply built, but are composed of several organs working purposefully together, reveal on attentive examination a number of useless or ineffective, yes, even of dangerous and harmful, arrangements. . . . The explanation of these purposeless arrangements is quite simply given by the theory of descent. It shows that these rudimentary organs are *atrophied*, and that by want of use. . . . The blind struggle for existence between the organs conditions just as much their historical destruction, as it originally caused their arising and development."

it is unnecessary to explain the developmental stages of the individual organism by the roundabout road through the history of the species. He deduces the shaping of the organism from a " law of form " which must superadd itself to the physical and chemical processes of matter in order to form the living creature. He endeavoured to defend this standpoint exhaustively in his *Entwickelungsgeschichte der Unke* (1875). " The essence of development consists in the complete but gradual introduction into the existence of certain natural bodies of a new moment, determined from without, viz., that of the law of form." Since the law of form is supposed to superadd itself from without to the mechanical and physical properties of matter, and not to develop itself from these properties, it can be nothing else but an immaterial idea, and we have nothing given us therein which is substantially different from the creative thoughts, which, according to the dualistic world-conception, underlie organic forms. It is supposed to be a motive-power existing outside of organised matter and causing its development. That means, it employs the laws of matter as " helpers," just

like Eduard von Hartmann's idea. Goette is forced to call in the help of this " law of form," because he believes that " the individual developmental history of organisms " alone explains and lies at the basis of their whole shaping. Whoever denies that the true causes of the development of the individual being are an historical result of its ancestral development, will be driven of necessity to have recourse to such ideal causes lying outside of matter.

Weighty evidence against such attempts to introduce ideal formative forces into the developmental history of the individual, is afforded by the achievements of those investigators who have really explained the forms of higher living creatures on the assumption that these forms are the hereditary repetition of innumerable historical changes in the history of the species, which have occurred during long ages. A striking example in this respect is the " vertebral theory of the skull-bones," already dimly anticipated by Goethe and Oken, but first set in the right light by Carl Gegenbauer on the basis of the theory of descent. He demonstrated that the skull of the higher vertebrates, and also that of man,

has arisen from the gradual transformation of a " root-skull " whose form is still preserved by the " root-fishes," or primordial gastrea, in the formation of the head. Supported by such results, Gegenbauer therefore remarks rightly : " The descent theory will likewise find a touch-stone in comparative anatomy. Hitherto there existed no observation in comparative anatomy which contradicts it ; all observations rather lead us towards it. Thus that theory will receive back from comparative anatomy what it gave to its method : clearness and certainty " (*cp.* the Introdutcion to Gegenbauer's *Vergleichende Anatomie*). The descent theory has directed science to seek for the real causes of the individual development of each organism in its ancestry ; and natural science on this road replaces the ideal laws of development which might be supposed to superpose themselves on organic matter, by the actual facts of the ancestral history, which continue to operate in the individual creature as formative forces.

Under the influence of the theory of descent, science is ever drawing nearer to that great goal which one of the greatest scientists of the century, Karl Ernst von Baer, has depicted

in the words: "It is one fundamental thought which runs through all forms and stages of animal evolution and dominates all particular conditions. It is the same fundamental thought which gathered together the scattered masses of the spheres in universal space and formed them into solar systems; the same thought caused the disintegrated dust on the surface of the planet to sprout forth into living forms. But this thought is nothing else but Life itself, and the words and syllables wherein it expresses itself are the various forms of that which lives." Another utterance of Baer's gives the same conception in another form: "To many another will a prize fall. But the palm will be won by the fortunate man for whom it is reserved to trace back the formative energies of the animal body to the general forces and vital functions of the universe as a whole."

It is these same general forces of Nature which cause the stone lying on an inclined plane to roll downwards, which also, through evolution, cause one organic form to arise from another. The characteristics which a given form acquires through many generations by adaptation, it hands on by heredity to its

descendants. That which an organism unfolds to-day, from within outwards, from its germinal dispositions, had developed itself outwardly in its ancestors in mechanical struggle with the rest of the forces of Nature. In order to hold this view firmly it is doubtless necessary to assume that the formations acquired in this external struggle should be actually transmitted by heredity. Hence the whole doctrine of evolution is called in question by the view, defended especially by August Weismann, that acquired characteristics are not inherited. He is of opinion that no external change which has occurred in an organism can be transmitted to its offspring, but that only can be inherited which is predetermined by some original disposition in the germ. In the germ-cells of organisms innumerable possibilities of development are held to lie. Accordingly, organic forms can vary in the course of reproduction. A new form arises when among the descendants possibilities of development come to unfoldment other than in the ancestors.

From among the ever new forms arising in this way, those will survive which can best maintain the struggle for existence. Forms

unequal to the struggle will perish. When out of a possibility of evolution a form develops itself which is specially effective in the battle of competition, then this form will reproduce itself ; when that is not the case, it must perish. One sees that here causes operating on the organism from without are entirely eliminated. The reasons why the forms change lie in the germ. And the struggle for existence selects from among the forms coming into existence from the most diverse germ-dispositions those which are the fittest. The special characteristic of an organism does not lead us up to a change which has occurred in its ancestors as its cause, but to a disposition in the germ of that ancestor. Since, therefore, nothing can be effected from outside in the upbuilding of organic forms, it follows that already in the germ of the root-form, from which a race began its development, there must have lain the dispositions for the succeeding generations.

We find ourselves once more in face of a doctrine of Chinese boxes one within another. Weismann conceives of the progressive process through which the germs bring about evolution, as a material process. When an organ-

ism develops, one portion of the germ-mass out of which it evolves is solely employed in forming a fresh germ for the sake of further reproduction. In the germ-mass of a descendant, therefore, a part of that of the parents is present, in the germ-mass of the parents a portion of that of the grandparents, and so on backwards to the root-form. Hence through all organisms developing one from another there is maintained an originally present germ-substance. This is Weismann's theory of the continuity and immortality of the germ-plasm. He believes himself to be forced to this view, because numerous facts appear to him to contradict the assumption of the inheritance of acquired characteristics. As one specially noteworthy fact he cites the presence of the workers, who are incapable of reproduction, among the communal insects —bees, ants, and termites. These workers are not developed from special eggs, but from the same as those from which spring the fruitful individuals. If the female larvæ of these animals are very richly and nourishingly fed, they then lay eggs from which queens or males proceed. If the feeding is less generous, the result is the production of sterile workers.

Now, it is very easy and obvious to seek the cause of this unfruitfulness simply in the less effective nourishment.

This view is represented among others by Herbert Spencer, the English thinker, who has constructed a philosophical world-conception on the basis of natural evolution. Weismann holds this view to be mistaken. For in the worker-bee the reproductive organs do not merely remain behindhand in their development, but they actually become rudimentary; they do not possess a large proportion of the parts necessary for reproduction. But now, he contends, one can demonstrate in the case of other insects that defective nourishment in no way entails such a degeneration of organs. Flies are insects related to bees. Weismann reared the eggs laid by a female bluebottle in two separate batches, and fed the one plentifully, the other meagrely. The latter grew slowly and remained strikingly small. But they reproduced themselves. Hence it appears that in flies insufficient nourishment does not produce sterility. But then it follows also that in the root-insect, the common ancestral form, which in line with the evolution doctrine must be assumed for the

allied species of bees and flies, this peculiarity of being rendered unfruitful by insufficient nourishment cannot have existed. On the contrary, this unfruitfulness must be an *acquired characteristic* of the bees. But at the same time there can be no question of any inheritance of this peculiarity, for the workers which have acquired it do not reproduce themselves, and accordingly, therefore, can pass on nothing by heredity. Hence the cause must be sought for in the bee-germ itself, why at one time queens and at another workers are developed. The external influence of insufficient nourishment can accomplish nothing, because it is not inherited. It can only act as a *stimulus*, which brings to development the preformed disposition in the germ.

Through the generalisation of these and similar results, Weismann comes to the conclusion : " The external influence is never the real cause of the difference, but plays the part of the stimulus, which decides which of the available dispositions shall come to development. The real cause, however, always lies in preformed changes of the body itself, and these—since they are constantly purposeful—can be referred in their development only to

processes of selection," to the selection of the fittest in the struggle for existence. The struggle for existence (selection) " alone is the guiding and leading principle in the development of the world of organisms " (*Aüssere Einflüsse der Entwickelungsreize*, p. 49). The English investigators Francis Galton and Alfred Russel Wallace hold the same view as Weismann as to the non-inheritance of acquired characteristics and the omnipotence of selection.

The facts which these investigators advance are certainly in need of explanation. But they cannot receive such an explanation in the direction indicated by Weismann without abandoning the entire monistic doctrine of evolution. But the objections urged against the inheritance of acquired characteristics are the least capable of driving us to such a step. For one only needs to consider the development of the instincts in the higher animals to convince oneself of the fact that such inheritance does occur. Look, for instance, at the development of our domestic animals. Some of them, as a consequence of living together with men, have developed mental capacities which cannot even be mentioned in connection

with their wild ancestors. Yet these capacities can certainly not proceed from an inner disposition. For human influence, human training, comes to these animals as something wholly external. How could an inner disposition possibly come to meet exactly an arbitrarily determined action of man? And yet training becomes instinct, and this is inherited by the descendants. Such an example cannot be refuted. And countless others of the same kind can be found. Thus the fact of the inheritance of acquired characteristics remains such; and we must hope that further investigations will bring the apparently contradictory observations of Weismann and his followers into harmony with monism.

Fundamentally, Weismann has only stopped half-way to dualism. His inner causes of evolution only have a meaning when they are *ideally* conceived. For, if they were *material* processes in the germ-plasm, it would be unintelligible why *these* material processes and not those of external happenings should continue to operate in the process of heredity. Another investigator of the present day is more logical than Weismann—namely, J.

Reinke, who, in his recently published book, *Die Welt als That ; Umrisse einer Weltansicht auf naturwissenschaftlicher Grundlage*, has taken unreservedly the leap into the dualistic camp. He declares that a living creature can never build itself up from out of the physical and chemical forces of organic substances. " Life does not consist in the chemical properties of a combination, or a number of combinations. Just as from the properties of brass and glass there does not yet emerge the possibility of the production of the microscope, so little does the origination of the cell follow from the properties of albumen, carbohydrates, fats, lecithin, cholesterin, etc." (p. 178 of the above-named work). There must be present besides the material forces also spiritual forces, or at least forces of another order, which give the former their direction, and so regulate their combined action that the organism results therefrom. These forces of another order Reinke calls " dominants." " In the union of the dominants with the energies—the operations of the physical and chemical forces—there unveils itself to us a spiritualisation of Nature ; in this mode of conceiving things culminates my scientific

confession of faith " (p. 455). It is now only logical that Reinke also assumes a universal world-reason, which originally brought the purely physical and chemical forces into the relation in which they are operative in organic beings.

Reinke endeavours to escape from the charge that through such a reason working from outside upon the material forces, the laws which hold good in the inorganic kingdom are rendered powerless for the organic world, by saying: " The universal reason, as also the dominants, make use of the mechanical forces; they actualise their creations only by the help of these forces. The attitude of the world-reason coincides with that of a mechanician, who also lets the natural forces do their work after he has imparted to them their direction." But with this statement the kind of conformity to law which expresses itself in mechanical facts is once more declared to be the helper of a higher kind of law, in the sense of Eduard von Hartmann.

Goette's law of form, Weismann's inner causes of development, Reinke's dominants are fundamentally just nothing else but derivatives of the thoughts of the world-creator who

builds according to plan. As soon as one forsakes the clear and simple mode of explanation of the monistic world-conception, one inevitably falls a victim to mystical-religious conceptions, and of such Haeckel's saying holds good, that " then it is better to assume the mysterious creation of the individual species " (*Uber unsere gegenwärtige Kenntniss vom Ursprung des Menschen*, p. 30).

Besides those opponents of monism who are of opinion that the contemplation of the phenomena of the world leads up to spiritual beings, who are independent of material phenomena, there are still others[1] who seek

[1] *Other opponents of Haeckel.* Here we can only speak of such objections to Haeckel's doctrines as are, to a certain extent, typical and have their origin in antiquated, although still always influential, circles of thought. The numerous " refutations " of Haeckel, which present themselves merely as variants of the main objections cited, have to be left unnoticed equally with those which Haeckel himself has disposed of in his book on *Die Welträthsel*, by saying to these valiant warriors, " Acquire by a diligent five years' study of *natural science*, and in particular of anthropology (especially the anatomy and the physiology of the brain !), that indispensable *empirical prior knowledge* of the *facts*, which you still lack entirely."

to save the domain of a supernatural order hovering over the natural one, by denying entirely to man's power of knowing the capacity to understand the ultimate grounds of the world-happenings.[1] The ideas of these opponents have found their most eloquent spokesman in Du Bois-Reymond. His famous "Ignorabimus" speech, delivered at the Forty-fifth Congress of German Scientists and Doctors (1872), is the expression of their confession of faith. In this address Du Bois-Reymond describes as the highest goal of the scientist the explanation of all world-happenings, therefore also of human thinking and feeling, by mechanical processes. If some day we shall succeed in saying how the parts of our brain lie and move when we have a definite thought or feeling, then the goal of natural explanation will have been reached. We can get no further. But, in Du Bois-Reymond's view, we have not therewith understood in what the nature of our spirit consists. "It seems, indeed, on superficial examination, as though, through the knowledge of the material

[1] *Limits of knowledge.* In my *Philosophie der Freiheit* I have shown the misunderstanding upon which is based the assumption of limits of knowledge.

processes in the brain, certain mental processes and dispositions might become intelligible. Among such I reckon memory, the flow and association of ideas, the consequences of practice, the specific talents, and so on. A minimum of reflection, however, shows that this is a delusion. Only with regard to certain inner conditions of the mental life, which are somehow of like significance with the outer ones through sense impressions, shall we thus be instructed, not with regard to the coming about of the mental life through these conditions.

" What thinkable connection exists between the definite movements of definite atoms in my brain on the one hand ; and, on the other, those for me primary, not further definable, not to be denied facts : ' I feel pain, I feel pleasure, I taste something sweet, smell the odour of roses, hear the sound of an organ, see red,' and the equally immediate certainty flowing therefrom, ' therefore I am ! ' ? It is just entirely and for ever incomprehensible that it should not be indifferent to a number of carbon, oxygen, nitrogen, hydrogen, etc., atoms, how they lie and move, how they lay and moved, how they will lie and move."

But who asked Du Bois-Reymond first to expel mind from matter, in order then to be able to observe that mind is not in matter? The simple attraction and repulsion of the tiniest particle of matter is force, therefore a spiritual cause proceeding from the substance. From the simplest forces we see the complicated human mind building itself up in a series of developments; and we understand it from this its becoming. "The problem of the origin and nature of consciousness is only a special case of the general problem in chief: that of the connection of matter and force" (Haeckel, *Freie Wissenschaft and freie Lehre*, p. 80). As a matter of fact, the problem is not at all, How does mind arise out of mindless matter? but, How does the more complex mind develop itself out of the simplest mental (or spiritual) actions of matter—out of attraction and repulsion? In the preface which Du Bois-Reymond has written to the reprint of his "Ignorabimus" speech, he recommends to those who are not contented with his declaration of the unknowableness of the ultimate grounds of being, that they should try to get along with the faith-conceptions of the supernatural view of the

world. " Let them, then, make a trial of the only other way of escape, that of supernaturalism. Only that where supernaturalism begins, science ceases." But such a confession as that of Du Bois-Reymond will always open the doors wide to supernaturalism. For whenever one sets a limit to the knowledge of the human mind, there it will surely start the beginning of its belief in the " no longer knowable."

There is only one salvation from the belief in a supernatural world-order, and that is the monistic insight that all grounds of explanation for the phenomena of the world lie also within the domain of these phenomena. This insight can only be given by a philosophy which stands in the most intimate harmony with the modern doctrine of evolution.

II

HAECKEL, " THE RIDDLE OF THE " UNIVERSE," AND THEOSOPHY[1]

In selecting such a theme as the one I propose for to-day, " Haeckel, *The Riddle of the Universe*, and Theosophy," I am aware that to a student of spiritual life it is fraught with difficulties, and that the statements I am about to make may possibly give offence to so-called materialists and theosophists alike. And yet there seems to me a necessity that this matter should, once in a while, be approached from the theosophical point of view, since from one standpoint the " gospel " derived from Haeckel's researches has been made accessible to thousands upon thousands of mankind by means of his book, *The Riddle of the Universe*. Ten thousand copies of this work were sold within a very short time of its appearance, and it has been translated into

[1] Delivered as a lecture, Berlin, 5th October, 1905. Authorised translation from the third German edition.

many languages. Seldom, indeed, has a book of serious purpose found so wide a circulation.

Now, if theosophy is to make clear its aims, it is but right that it should take into account so important a publication—one that concerns itself with the most profound questions of existence. Theosophy should deal with it comprehensively, and seek to express its attitude with regard to it. For after all, the theosophical conception of life is not combative but rather conciliatory, desirous of harmonising opposing views.

Furthermore, I myself am in a very peculiar position with respect to Ernst Haeckel's conception of the universe, for I know well those feelings and perceptions which, partly by reason of a scientific consciousness, and partly from the general conditions of the world and the usual conceptions thereof, draw men as though by the power of some fascination towards such great and simple paths of thought as those from which Haeckel has constructed his conception of the universe. And here I may say that I should hardly have dared to speak my mind thus openly were I in any sense an opponent of Haeckel, or were it

not that I am intimately acquainted with all that can be experienced in the process of adapting oneself to the wonderful edifice of his ideas.

The very first thing that anyone bringing his attention frankly to bear upon the development of spiritual life is bound to recognise, is the moral power displayed in Haeckel's labours. For years past this man, imbued with an enormous amount of courage, has fought for the acceptance and the recognition of his conception of the universe—fought strenuously, having again and again to defend himself against the manifold obstacles that impeded his progress. On the other hand, we must not be unmindful of the fact that Haeckel's great powers of comprehensive expression are balanced by equally comprehensive powers of thought : the very qualities in which many scientists are deficient happen to be those with which he is very highly endowed.

In gathering together the results of his researches and investigations under the one comprehensive title of a conception of the universe, he has boldly departed from those tendencies of scientific thought which have

for several decades opposed any such undertaking; and this very departure must be recognised as an act of special significance.

Another fact to be noted is, that I am placed in a singular position with regard to the theosophical conception of the universe when I speak about Haeckel; for anyone acquainted with the process of development through which the theosophical movement has passed will be aware of what sharp words and what opposition, not only on the part of theosophists in general, but on the part of the founder of the theosophical movement, Madame H. P. Blavatsky, were directed against the deductions which Ernst Haeckel draws from his work of investigation. Few publications touching cosmogony have been so violently opposed in the *Secret Doctrine* as that of Haeckel.

You will understand that I speak here without prejudice, for I think that in parts of my book, *Haeckel and his Opponents*, as well as in my other work on *Cosmogonies of the Nineteenth Centnry*, I have to the fullest extent done justice to what I take to be the real truths contained in Haeckel's conception of the universe. I believe that I have sifted

from his labours that which is fruitful, and that which is enduring. Consider the general attitude towards the conception of the world in so far as it is based upon scientific reasons. During the first half of the nineteenth century a totally different spiritual attitude prevailed from that known in the second half. Haeckel's appearance on the scene coincided with a time in which it was an easy thing for the new growth of so-called Darwinism to be subjected to materialistic interpretations. If, therefore, we realise how insistent was this tendency, at the very time when Haeckel was a young and enthusiastic student entering upon the pursuit of natural science, to reduce all discoveries in that domain of learning to a materialistic issue, the consequent bent towards materialism may well be understood, and may therefore lead us into a path of peace rather than of conflict.

If you will consider those men who, about the middle of the nineteenth century, set themselves to confront the great riddle of humanity with calm, unprejudiced eyes, you will find two things : on the one hand, a state of absolute resignation in relation to the highest questions concerning a divine ordering

of the world, such as immortality, freedom of will, origin of life—a resignation, in short, with regard to all the actual riddles of the universe. On the other hand you will discover, co-existing with this attitude of resignation, remnants of an ancient religious tradition, and this even among students of natural science. Bold adventuring towards investigation of such questions from the scientific point of view was, during the first half of the nineteenth century, to be met with only among German philosophers, such as Schelling and Fichte, as well as Oken, who, by the way, was a pioneer of freedom without equal, not alone upon this subject, but in many paths of life.

All attempts made by men in the present day towards the fundamentalising of world-theories are to be found in still bolder outline among the works of Oken. And yet all this was animated by a certain subtleness—a breath, as it were, of that old spiritualism which is clearly conscious that, behind and beyond all that our senses can perceive, all that can be investigated by means of instruments, there still lurks something spiritual to be sought for. Haeckel has again and

again told us how distinctly the mind of his great teacher—that deep student of natural science, Johannes Müller, of imperishable memory—was tinged with this subtle breath. You can read in Haeckel's own writings how he had been struck (it was at the time when he was busy at the Berlin University and studying the anatomy of men and animals under Johannes Müller) by the great resemblance apparent not alone in outward form, but also by that similarity which compels attention in the evolution of form. He tells us how he had remarked to his master that such resemblance as this must hint at some mysterious kinship between man and beast, and that the answer made by Johannes Müller, who had searched so deeply into Nature, had been : " Ah ! he who lays bare the secret of species will indeed have reached the highest summit."

What we have to do is to attune ourselves to the spirit, the motive, of such a seeker ; of one who assuredly would never have halted had he beheld a prospect of entering into possession of that secret. On one other occasion, when teacher and pupil were travelling together on some journey of investigation, Haeckel again referred to the close

relationship existing between animals; and Johannes Müller once more replied very much to the same effect. In alluding to this I only wish to draw your attention to a certain attitude of mind.

If you will look back among the writings of any well-known naturalist belonging to the first half of the nineteenth century—for instance, to those of Burdach—you will find that, in spite of all the careful and elaborate minutiæ appertaining to natural science, whenever the kingdom of life comes to be considered, the suggestion is ever present that here no mere physical and chemical powers are in operation, but that something higher has to be taken into account.

When, however, improvements in microscopes made it possible for man to observe, to a far greater extent than heretofore, all those curious formations which serve to distinguish living creatures, showing that we have to do with a fine web of the minutest animalcules, and that this actually composes the physical body—when, as I have said, so much was made visible, the attitude of the scientific mind underwent a change. This physical body, which serves plants and animals as

their garment, now resolved itself, so far as the scientist was concerned, into a tissue of cells. This discovery as to the life of these cells was made by naturalists about the end of the third decade of the nineteenth century, and, seeing that it was possible to ascertain so much about the lives of such animalcules by the exercise of the senses, assisted by the aid of the microscope, it required but a step further for that which acts as the organising principle in these living creatures to be lost sight of, because no physical sense, nothing external, proclaimed its presence.

At that time there was no Darwinism, yet it was owing to the impression made by this great advance in the domain of practical research that we find a natural science grounded in materialism coming into vogue during the 'forties and 'fifties. It was then thought that what could be perceived by the senses, and thus explained, could be understood by the whole world. Things that now seem puerile created then the most intense sensation, and became, so to speak, a gospel for humanity. Such words as " energy " and " matter " became popular by-words, while men like Büchner and Moleschott were

recognised authorities. It was considered an evidence of childish fancy, belonging to earlier epochs of the human race, to suppose that anything that could be minutely examined with the eye was possessed of aught beyond what was actually visible.

Now, you must bear in mind that, side by side with all discovery, feelings and sensations play a great part in the development of mental life. Anyone who may be inclined to think that cosmogonies are the result of bold calculations of reason makes a mistake: in all such matters the heart is active, and the secret sources of education also contribute their share. Humanity has, during its latest phase of development, been passing through a materialistic stage of education. The actual beginning of this stage is traceable far back, it is true; nevertheless, it reached its apex in the time of which we are speaking. We call this epoch of materialistic education the age of enlightenment.

Man had now—and this was the final result of the Christian conception of the universe—to find his foothold upon the firm ground of reality: the God whom he had so long sought beyond the clouds he was now bidden to seek

within his inner consciousness. This had a far-reaching effect upon the entire development of the nineteenth century, and anyone interested in psychological changes and caring to study the development of humanity at that time will be enabled to understand how all the events and occurrences which then followed upon each other, such as the struggle for freedom in the 'thirties and 'forties, can but be classed as separate storms and convulsions of the feelings which were the result of that newly developed sense of physical reality, and which were bound to run their appointed course. We have to deal with a tendency in human education that sought in the first place forcibly to eradicate from the human heart every aspiration towards a spiritual life.

It is not from natural science that those deductions, pronouncing the world to consist of naught but what can be perceived by the senses, have been drawn ; they are a consequence of the educational teaching obtaining at that time. Materialism had become interwoven with explanations relating to the facts of natural science. Anyone who will take the trouble to study these things as they really are, bringing to bear upon the subject a mind

free from prejudice, will be in a position to see for himself that the case is as I am about to set forth, but it is impossible for me in the space of one short hour to deal with the matter exhaustively.

The whole of the stupendous advance made in the realms of natural science, of astronomy, of physics and chemistry, due to spectrum analysis, to a greater theoretical knowledge of heat, and to that teaching concerning the development of living organisms known to us as the Darwinian theory—all these come within this period of materialism. Had these discoveries been made at a time when people still thought as they did about the end of the eighteenth and beginning of the nineteenth centuries, a time when a greater spiritual sensitiveness prevailed, then these discoveries would have been so construed as to furnish proofs positive of the working of the spirit in Nature—indeed, by very reason of the wonderful discoveries in natural science the supremacy of spirit would have been deemed incontestably established.

It is clear, then, that scientific investigations with regard to Nature need not necessarily and under all circumstances lead to

materialism. It was merely because so many leaders of civilisation at that time were materialistically inclined that these discoveries became interpreted in a materialistic way. Materialism was imported into natural science, and naturalists, such as Ernst Haeckel, accepted it unconsciously. Darwin's discovery *per se* need not have tended to materialism.

Materialism points to Darwin's book, *The Origin of Species*, as its chief support. Now, it is clear that if a thinker inclining to materialism approached these discoveries, he would be sure to invest Darwinism with a materialistic colouring, and it was due to Haeckel's boldly materialistic attitude of thought that Darwinism has received its present materialistic interpretation. It was an event of great moment when Haeckel, in the year 1864, announced the connection between man and the higher animals (apes). At that time this could but mean that man was descended from the higher animals. But since that day scientific thought has undergone a curious process of development. Haeckel has adhered to his opinion that man is the descendant of those higher animals, they being in their turn

the developments of still lower types, reaching back finally to the very simplest forms of life. It is thus that Haeckel constructs man's entire genealogical tree—in fact, the lineal descent of all humanity. By this means everything of a spiritual nature became for him excluded from the world, except as a reflection of already-existing material things.

And yet Haeckel, having in the depths of his being a peculiar spiritual consciousness working side by side with his materialistic " thinking mind," casts about for some means of help, since these two parts of his being have never been able to " come into line " ; he has not succeeded in bringing about a working partnership between them. For this reason he comes to the conclusion that even the smallest living creature may be accredited with a sort of consciousness, but he does not explain to us how the complex human consciousness is developed out of that which is latent in the smallest living creature.

In the course of a conversation Haeckel once said : " People are always objecting to my materialism, but I don't deny the Spirit, nor do I deny Life : I only want people to observe that when you place matter in a retort

everything in it soon begins to work and effervesce—to ferment." That remark shows plainly enough that Haeckel possesses a spiritual as well as a scientific mind.

Among those who, at the time of Darwin's supremacy, proclaimed their adherence to the theory of man's descent from the higher animals was the English scientist Huxley. He asserted the close similarity in external structure between man and the higher animals to be even greater than that existing between the higher and lower species of apes, and that we could but come to the conclusion that a line of descent existed leading from the higher animals to man. In more recent times scientists have discovered new facts, but even then those feelings which for centuries past have educated the human heart and soul were undergoing a change, a transformation. Hence it was that Huxley in the 'nineties, not long before his death, gave utterance to the following view—a strange one, coming from him:

"We see therefore," he observed, "that in Nature life is conditioned by a series of steps, proceeding from the simplest and most incomplete up to the complicated and perfected. We cannot follow this continuity, yet why

should not this continuous line proceed onwards in a region which we are unable to survey ? "

In these words the way is indicated by which man may, by the pursuit of natural science, rise to the idea of a Divine being, standing high above man—a being farther removed from man than man himself is from the one-celled organism. Huxley had once said :

" I would rather have descended from such ancestors, ancestors similar to the brute, than from such as deny the human intelligence."[1]

[1] Readers who are unacquainted with Huxley's famous reply may be glad to have it *in extenso*, as given by Edward Clodd in *Thomas Henry Huxley*, published by William Blackwood & Sons :

" At the meeting of the British Association at Oxford, on 28th June, 1860, Owen emphasised the statement that ' the brain of the gorilla presented more differences, as compared with the brain of man, than it did when compared with the brains of the very lowest and most problematical of the Quadrumana.' To this Huxley, in polite English, gave the lie direct, and pledged himself to ' justify that unusual procedure elsewhere.' Two days after, by mere chance, he was present at the reading of a paper by Dr. Draper ' On the Intellectual Development of Europe considered with reference to the

Thus do precepts and concepts, all the soul thinks and feels, alter in the course of time. Haeckel has continued his work of research along the lines he first adopted. In the year 1867 he had already published his popular work, *The Natural History of Creation*, and from this book much may be learnt. It teaches the laws by which the living kingdoms in Nature are linked one to the other. We can see through the veil shrouding the grey past and bring what is existent into relation with what is extinct, of which only the last remains may now be found upon the earth.

views of Mr. Darwin.' In the discussion which followed, Bishop Wilberforce, throwing a glance at Huxley, ended a suave and superficial speech by asking him ' as to his belief in being descended from an ape. Is it on his grandfather's or his grandmother's side that the ape ancestry comes in ? ' Huxley did not rise till the meeting called for him. Then he let himself go. ' The Lord hath delivered him into mine hands,' he said in an undertone to Sir Benjamin Brodie. After showing how ill-equipped was the Bishop for controversy upon the general question of organic evolution, although it was an open secret that Owen had primed him for the contest, Huxley said : ' You say that development drives out the Creator, but you assert that God made you ; and yet you know that you yourself were

Haeckel has recognised this accurately. That world-history, here in a wider sense playing its part, I can only elucidate by making use of an illustration. You may find it no more accurate than are most comparative illustrations, yet it fairly bears out my meaning.

Let us suppose that a writer on art appeared upon the scene and produced a book in which he treated with consummate skill the whole period stretching from the days of Leonardo da Vinci to modern times. He presents to our minds all that has been achieved in the pursuit of art during that period, and we

originally a piece of matter no bigger than the end of this gold pencil-case ? ' Then followed the famous retort :

" ' I asserted, and I repeat, that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel shame in recalling it would rather be a *man*—a man of restless and versatile intellect—who, not content with success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by an aimless rhetoric, and distract the attention of his hearers from the real point at issue by eloquent digressions and skilled appeals to religious prejudice.' "

believe ourselves enabled to look within at the development of man's creative powers. Let us, then, go further, and imagine that another person came along and criticised the descriptive work, saying : " But, look here ! Everything this art historian has put on record never happened at all ! These are all descriptions of pictures that don't exist ! What use have I for such imaginings ? One has to investigate reality in order to arrive at the true method of adequately presenting art in its historical bearings. I will therefore investigate the remains of Leonardo da Vinci himself, and try to reconstruct the body, and then judge by the contours of his skull what brain he is likely to have had and how it may probably have functioned." In the same way the events described by the art historian are depicted by the professor of anatomy. There may have been no mistake. All may have been correct. Well, then, in that case, says the anatomist, we must " fight to a finish " against this idealisation of our art historian ; we must combat his phantasy, his imagination, for it amounts to credulity and superstition to allow anyone to attempt to make us believe that besides the form of

Leonardo da Vinci there was some " gaseous vortex " to be apprehended as a soul.

Now, this illustration, in spite of its manifest absurdity, really hits the mark. This is the position in which everyone finds himself who chooses to assert his belief in the *Natural History of Creation* as the only accurate one. Nor can this illustration be negatived by merely indicating its weak points. They are there, perhaps, but that is beside the point. What is of importance is that the obvious should for once be presented according to its inner relationship ; and that is what Haeckel has done in a full and exhaustive way. It has been done in such a manner that anyone wishing to see, can see, how active is the Spirit in the moulding of the form, where, to all appearances, matter alone reigns supreme. Much may be learnt from that ; we may learn how to acquire spiritually knowledge as to the world's material combination, how to acquire it with earnestness, dignity, and perseverance. Anyone going through Haeckel's *Anthropogenesis* sees how form builds itself up, as it were, from the simplest living creature to the most complicated, from the simplest organism to man. He who under-

stands how to add the Spirit to what is already granted by the materialist may in this example of "Haeckelism" have the opportunity of studying the best elementary theosophy.

The results of Haeckel's research constitute, so to speak, the first chapter of theosophy. Far better than by any other method, we can arrive at a comprehension of the growth and transformation of organic forms by a study of his works. We have every reason to call attention to the great things which have been achieved through the progress of this profound study of Nature.

At the time when Haeckel had constructed this wonderful edifice, the world was facing the deeper riddles of humanity as problems without solution. In the year 1872 Du Bois-Reymond, in a speech memorable for its brilliant rhetoric, alluded to the limits placed to natural science and to our knowledge of Nature. During the past decade the utterances of few men have been so much discussed as has this lecture with the celebrated "Ignorabimus." It was a momentous event, and offered a complete contrast to Haeckel's own development and to his theory of the descent

of man. In another lecture Du Bois-Reymond has tabulated seven great questions as to existence, questions which the naturalist can only answer in part, if at all. These seven "riddles of the universe" are:

1. The origin of energy and matter.
2. How did the first movement arise in this quiescent matter?
3. How did life originate within this "matter set in motion"?
4. How is it that so many things in Nature bear the stamp of utility to a degree only met with in such human achievements as are the result of intelligent reasoning?
5. Assuming we were able to examine our brain, we should find it to be nothing but a jumble of little whirling spheres; how is it, then, that these same little balls, or spheres, enable me, let us say, to "see red," to hear the tones of the organ, to feel pain, etc.? Think of a mass of whirling atoms, and it will be plain to you that it is not from them that you derive the sensations expressing themselves in such words as "I see red," "I smell the scent of the rose," etc.
6. How do understanding, reason, and speech develop in the living being?

7. How can "free will" originate in a being so circumscribed that his every act is the product of the whirling of these atoms ?

It was in connection with these riddles of the universe put forward by Du Bois-Reymond that Haeckel gave his book the title of *The Riddle of the Universe*. His desire was to give the answer to the questions raised by Du Bois-Reymond. There is a specially important passage in the lecture Du Bois-Reymond delivered on the "Limits of Inquiry into Nature," which will enable us to step across into the field of theosophy.

At the time when Du Bois-Reymond was lecturing at Leipsic before an assembly of natural scientists and medical men, the spirit of natural science was seeking after a purer, higher, and freer atmosphere—such an atmosphere as might lead to the theosophical cosmogony. On that occasion Du Bois-Reymond spoke as follows :—

"If we study man from the point of view of natural science, he presents himself to us as a working compound of unconscious atoms. To explain man in accordance with natural science means to 'understand' this atomic motion to its uttermost degree."

He considered that if one were in a position to indicate the precise way in which the atoms moved at any given place in the brain, while saying, for instance, " I think," or " Give me an apple "—if this could be done, then the problem would, according to natural science, have been solved. Du Bois-Reymond calls this the " astronomic " understanding of man. Even as a miniature firmament of stars would be the appearance of these active groups of human atoms. But what has not here been taken into consideration is the question as to how sensations, feelings, and thoughts arise in the consciousness of the man of whom, let us say, I perfectly well know that his atoms move in such and such a manner. That natural science can as little determine as it can the manner in which consciousness arises. Du Bois-Reymond concluded with the following words :—

" In the sleeping man, who is not conscious of the sensation expressed in the words ' I see red,' we have before us the physical group of the active members of the body. With regard to this sleeping body, we need not say, ' We cannot know '—' Ignorabimus ! ' We are able to comprehend the sleeping man. Man

awake, on the contrary, is incomprehensible to the scientist. In the sleeping man something is absent which is nevertheless present in the man awake : I allude to the consciousness through which he appears before us as a spiritual being." At that time, owing to a lack of courage in matters concerning natural science, further progress was impossible ; there was no question as yet of theosophy, because natural science had, in concise terms, defined the boundary, had set a barrier at the precise spot up to which it wished to proceed in its own fashion. It was owing to this self-limitation of science that theosophical cosmogony had, about this time, its beginning. No one is going to maintain that man, when he goes to sleep " ceases to be," and on reawaking in the morning " resumes existence." And yet Du Bois-Reymond says that something which is present in him by day is absent during the night. It is here that the theosophical conception of the universe is enabled to assert itself. Sense-consciousness is in abeyance in the sleeping man. As, however, the man of science uses as a prop for his argument that which brings about this sense-consciousness, he is unable to say anything

concerning the spirituality that transcends it, because he lacks precisely the knowledge of that which makes of man a spiritual being.

By the use of such means as serve for natural science we are unable to investigate matters spiritual. Natural science depends upon what may be demonstrated to the senses. What can no longer be sensed when man falls asleep, cannot be the object of scientific investigation. It is in this something, no longer perceptible in the sleeping man, that we must seek for that entity by which man becomes a spiritual being. No mental representation can be made of what transcends the purely material and passes beyond the knowledge of the senses, until organs, of which the scientist can know nothing if he only depends on his sense-perceptions—spiritual eyes—are developed ; eyes which are able to see beyond the confines of the senses.

For this reason we have no right to say, " Here are the limits of cognition " ; but merely, " Here are the limits of sense-perception."

The scientist perceives by means of his senses, but he is no spiritual observer ; he must become one, become a " seer," in order

that he may see what is spiritual in man. This is the bourne towards which tends all profound wisdom in the world; not seeking the mere widening of its radius where actual material knowledge is concerned, but striving towards the raising of human faculty.

This also is the great difference between what is taught by present-day natural science and what is taught by theosophy. Natural science says: "Man has senses with which he perceives, and a mind whereby he is enabled to connect the evidences of his senses. What does not come within the scope of these lies beyond the ken of natural science."

Theosophy takes a different view of the case. It says: "You scientists are perfectly right, so long as you judge from your point of view, just as right as the blind man would be from his in saying that the world is devoid of light and colour. We make no objection to the standpoint of natural science, we would only place it in juxtaposition to the view taken by theosophy, which asserts that it is possible —nay, that it is certain—that man is not obliged to remain stationary at the point of view he occupies to-day; that it is possible for organs—spiritual eyes—to develop after a

similar fashion to that in which those physical sense-organs of the body, the eyes and ears, have been developed; and once these new organs are developed, higher faculties will make themselves apparent.

This must be taken on faith at first—nay, it need not even be believed; it may just be accepted as an assertion in an unprejudiced manner. Nevertheless, as true as it is that all believers in the *Natural History of Creation* have not beheld all that is therein presented to them as fact (how many of them have actually investigated these facts?), so true is it that these facts concerning a knowledge of the super-sensual can be explained to everyone.

The ordinary man, held in bondage by his senses, cannot possibly gain admittance to this realm. It is only by the aid of certain methods of investigation that the spiritual world opens to the seeker. Thus, man must transform himself into an instrument for those higher powers, one able to penetrate into worlds hidden from those still enthralled by their physical senses. To such as can accomplish this, visions of a quite distinctive nature will appear. The ordinary human being is not capable of seeing for himself, or of consciously recognising things about him, when

his senses are wrapped in slumber ; but when he applies occult methods of investigation this incapacity ceases, and he begins to receive quite consciously impressions of the astral world.

There is at first a state of transition, familiar to all, between that exterior life of sense cognisance and that life which even in the most profound state of slumber is not quite extinguished. This state of transition is the chaos of dreams. To most people these will appear as mere reflections of what they have been experiencing during the previous day. Indeed, you will ask, how should a man be able to receive any new experiences during sleep, since the inner self has as yet no organs of cognition ? But still, *something* is there—*life* is there. That which left the body when sleep wrapped it round has memory, and this remembrance rises before the sleeper in pictures more or less fantastic and confused. (Should anyone desire more information on this subject, it will be found in my books entitled *The Way of Initiation* and *Initiation and its Results*, Theosophical Publishing Society, 161, New Bond Street, W.)[1]

[1] Now published by the Rudolf Steiner Publishing Co., in one volume, ***The Knowledge of Higher Worlds and its Attainment.*** Cloth, Crown 8vo, pp. 221, 6s.

Now, in place of this chaos, order and harmony will, in the course of time, be brought about; an order and a harmony governing this region of dreams, and this will be a sign that the person in question is beginning to develop spiritually. Then he will cease to see the mere aftermath of reality, grotesquely portrayed; he will see things which have in ordinary life no existence.

Those who desire to remain within the boundary of the senses will, of course, say, "But they are only dreams!" Yet, if they, by such means, obtain an insight into the loftiest secrets of creation, it may surely be a matter of indifference to them whether they gain this through the medium of a dream or by means of the senses. Let us, for instance, suppose that Graham Bell had invented the telephone in a state of dream-consciousness. That would have been of no moment whatever to-day, for the telephone itself in any case is an important and useful invention. Clear and regular dreaming is therefore the beginning, and if in the stillness of the night hours you have come to "live in your dreams," if, after a time, you have habituated yourself to a cognisance of worlds quite other than this, then

will soon come a time when you will learn, by these new experiences, to step forth into actuality.

Then the whole world will assume a new aspect, and you will be as sensible of this change as you would be of threading your way through a row of solid chairs, through anything your senses may at this moment be aware of in their vicinity. Such is the condition of anyone who has acquired a new state of consciousness. Something new, a new kind of personality, has awakened within him. In the course of his further development a stage will at length be reached where not only the curious apparitions of the higher worlds pass before the spiritual eye as visions of light, but the tones also of those higher worlds become audible, telling their spiritual names, and able to convey to the seer a new meaning. In the language of the mysteries, this is expressed in the words, " Man sees the sun at midnight " ; which is to say, that for him there are no longer any obstacles in space to prevent him from seeing the sun when on the other side of the world. Then, too, is the work of the sun, acting within the universe, made plain to him, and he becomes aware of that harmony of the

spheres, that truth to which the Pythagoreans bore witness.

Tones and sounds, this music of the spheres, now become, for him, actual. Poets who were also seers have known of the existence of something approaching this music, and only those who can grasp Goethe's meaning from this point of view will be able to understand those passages, for instance, occurring in the "Prologue in Heaven" (see *Faust*, pt. I), which may be taken either as poetic phraseology or as a lofty truth. Where Faust is a second time introduced into the world of spirits, he speaks of these sounds:

> "Tönend wird für Geistes-Ohren,
> Schon der neue Tag geboren!"
>
> ("Sounding loud to spirit-hearing,
> See the new-born Day appearing!")
>
> *Faust, Part II.*

Here we have the connection between natural science and theosophy. Du Bois-Reymond has pointed to the fact that the sleeper only can be an object for the experiments of natural science. But if man should begin to open his inner senses, if he should come to see and hear that there is such a

thing as spiritual actuality, then indeed will the whole edifice of elementary theosophy, so wonderfully constructed by Haeckel—a structure none can admire more profoundly than I—then will this great work glow with a new glory, revealing, as it must, an entirely new meaning. According to this marvellous structure we see a simple living creature as the archetype, yet we may trace back that creature *spiritually* to an earlier condition of consciousness.

I will now explain what theosophy holds as the doctrine of the descent of man. It is obvious that in a single lecture like the present no " proofs " can be advanced, and it is also natural that to all who are only acquainted with the theories commonly advanced on this subject everything I say will appear fantastic and highly improbable. All theories thus advanced originated, however, in the leading circles of materialistic thought, and many who would probably resent the suggestion of materialism as utterly foreign to their nature, are nevertheless (and indeed quite comprehensibly so) caught in a net of self-delusion.

The true theosophical teaching concerning evolution is, in our day, hardly known ; and

when our opponents speak of it, he who *does know* is at once able to recognise by the objections raised that he is dealing with a caricature of this doctrine of evolution.

For all such as merely acknowledge a soul, or spirit, to which expression is given within the human, or animal organism, the theosophical mode of representation must be utterly incomprehensible, and every discussion touching that subject is, with such persons, quite fruitless. They must first free themselves from the state of materialistic suggestion in which they live, and must make themselves acquainted with the fundamental attitude of theosophical thought.

Just as the methods of research employed by physical science trace back the organism of the physical body into the dim distance of primeval times, so it is the mode of theosophical thought to delve into the past with regard to the soul and the spirit. Now, the latter method does not lead to any conclusions antagonistic or contradictory to the facts advanced by natural science; only with the materialistic interpretations of these facts it can have nothing to do.

Natural science traces the descent of the

physical living being backwards, arriving by this course at organisms of a less and less complicated kind. Natural science declares: "The perfect living being is a development of these simpler and less complicated ones"; and, as far as physical structure is concerned, this is true, although the hypothetical forms of primeval ages of which materialistic science speaks do not entirely conform with those known to theosophical research. This, however, need not concern us at the present moment.

From the physical standpoint theosophy also acknowledges the relationship of man with the higher mammals, with the man-like apes. But there can be no question of the descent of our humanity from a creature of the mind and soul calibre of the ape, as we know it. The facts are quite otherwise, and everything that materialism puts forward of this nature rests upon an error of thought. This error may be cleared up by means of a simple comparison sufficient for our purpose, though trite.

We will imagine two persons, one morally deficient and intellectually insignificant; the other endowed with a high standard of

morality and of considerable intellectuality. We will assume that some fact or other confirms the relationship of these two. Now, I ask you, will the inference be drawn that the one in every way more highly endowed is descended from one who was of the standard described? Never! We may think it a surprising fact that they are brothers. We may find, however, that they had a father who was not of exactly the same standard as either of the brothers, and in that case one will be found to have worked his way up, the other to have degenerated.

Materialistic science makes a similar mistake to that here indicated. Facts known to it induce the acceptance of a connection between ape and man, yet from this it should not draw the conclusion that man is descended from the ape-like animals. What should be accepted is a primeval creature, a common physical ancestor, from the stock of which the ape has degenerated, while man has been the ascending "brother."

Now, what was there in that primeval creature to cause this ascendance to the human on the one hand, the sinking into the ape kingdom on the other? Theosophy

answers, " The soul of man himself did this." Even then the soul of man was present, at a time when, on the face of this physical earth, the creatures possessing the highest sense of development were these common ancestors of man and ape. From amid the multitude of these ancestors the best types were capable of subjecting themselves to the soul's progress, the rest were not. Thus it happens that the present-day human soul has a " soul-ancestor" just as the body has its physical forebear.

It is true that, so far as the senses are concerned, those " soul-ancestors " could not, according to our present-day observations, have been perceptible within our bodies. They still belonged in a sense to " higher worlds," and they were also possessed of other capabilities and powers than those of the present human soul. They lacked the mental activity and the moral sense now evident. Such souls could conceive no way of fashioning instruments from the things in the outer world ; they could create no political states. The soul's activity still consisted to a great extent in transforming the archetype of those ancestral bodies themselves. It laboured at improving the incomplete brain, enabling it

at a later period to become the seat of thought activities. As the soul of to-day, directed towards external things, constructs machines, etc., so did that ancestral soul labour at constructing the body of the human ancestor. The following objection can, of course, be raised: "Why, then, does not the soul at the present day work at its body to the same extent?" The reason for its not doing so is that the energy used at a former time for the transforming of the organs has since been directing its whole effort upon external things in the mastery and regulation of the forces of Nature.

We may therefore ascribe a twofold descent to man in primeval times. His spiritual birth is not coeval with the perfecting of his organs of sense. On the contrary, the "soul" of man was already present at a time when those physical "ancestors" inhabited the earth. Figuratively speaking, we may say that the soul "selected" a certain number of such "ancestors" as seemed best fitted for receiving the external corporeal expression distinguishing the present-day man. Another branch of these ancestors deteriorated, and in its degenerate condition is now represented

by the anthropoid apes. These, then, form, in the true sense of the word, branch lines of the human ancestry. Those ancestors are the physical forebears of man, but this is due only to the capacity for reconstruction which they had primarily received from the human soul within. Thus is man physically descended from the " archetype," while spiritually he is the descendant of the " ancestral soul."

But we can go even further back with regard to the genealogical tree of living creatures, and we shall then arrive at a physically still more imperfect ancestor. Yet, at the time of this physical ancestor, too, the " soul-ancestor " of man was existent. It was this latter which raised the physical ancestor to the level of the ape, again outstripping its less adaptable brother in the race for development, and leaving him behind on a lower stage of creation. To such as these belong those present-day mammals of a lower grade than that of the apes. Thus we may go further and further back into primeval times, even to a time when upon this earth, then bearing so different an aspect, existed those most elementary of creatures from which Haeckel claims the development of all higher beings.

The soul-ancestor of man was also a contemporary of these primitive creatures; it was already living when the "archetype" transformed the serviceable types, leaving behind at different stages those incapable of further development.

In actual truth, therefore, the entire sum of earth's living creatures are the descendants of man, within whom that which in this day "thinks and acts" as soul originally brought about the development of living beings. When our earth came into existence, man was a purely spiritual being; he began his career by building for himself the simplest of bodies. The whole ladder of living creatures represents nothing but the outgrown stages through which he has developed his bodily structure to its present degree of perfection.

The creatures of the present day differ widely in appearance from that of their ancestors at those particular stages where they branched off from the human tree. Not that they have remained stationary, for they have deteriorated in accordance with an inevitable law, which, owing to the lengthy explanation it would involve, cannot be entered into here. But the greatest interest

attaches to the fact that through theosophy we arrive, so far as man's outward form is concerned, at a genealogical tree not altogether unlike Haeckel's. Haeckel, however, presupposes as the physical ancestor of man nothing but a hypothetical animal. Yet the truth is that at all those points where Haeckel uses the names of animals, the still undeveloped forebears of man should be installed; for those animals, down to the meanest living creatures, are but deteriorated and degenerate forms occupying those lower stages through which the human soul has passed on its upward journey.

Externally, therefore, the resemblance between Haeckel's genealogical tree and that of theosophy is sufficiently striking, though internal evidences show them to be as wide apart as the poles.

Hence the reasons why Haeckel's deductions are so eminently suited for the learning of sound elementary theosophy. One need do no more than master, from the theosophical point of view, the facts he has elucidated in so masterly a manner, and then raise his philosophy to a higher and nobler plane. If Haeckel seeks to criticise and belittle any

such " higher " philosophy, he shows himself to be simply puerile—after the fashion, for instance, of a person who, not having got beyond the multiplication table, yet presumed to assert : " What I know is true, and all higher mathematics are only imaginary nonsense." No theosophist desires to deny or contradict the elementary facts of natural science ; but the crux of the matter is that the scientist, deluded by materialistic suggestions, does not even know what theosophy is talking about.

It depends upon a man himself what kind of philosophy he adopts. Fichte has put this in so many words :

" The unperceiving eye cannot detect colours ;
The non-perceptive Soul cannot perceive Spirit."

The same thought has been voiced by Goethe in a well-known phrase :

" Were the eye not sun-like—how could we see the sun ?
Were God's own power not within us, the God-like vision—could it enrapture us ? "

and an expression of Feuerbach, if rightly conceived, proclaims that each one sees God's

image after his own likeness. The slave to his senses sees God in accordance with those senses; the spiritual observer sees the Spirit deified. "Were lions, bulls, and oxen able to set up gods, their gods would resemble lions, bulls, and oxen," was the remark of a Greek philosopher long ages ago.

The fetish-worshipper, too, has as his highest principle something we may call spiritual, but he has as yet not come to seek for this within himself, and this is why he has not got beyond beholding his god as anything more than a block of wood. The fetish-worshipper cannot raise his prayer above what he can inwardly feel, for he still regards himself as on the same level as the block of wood. And those who can see no more than a whirl of atoms, those to whom the highest resolves itself into tiny dots of matter, such as these, too, have missed recognition of the highest principle within themselves.

It is true that Haeckel places before us in all his works the information he has honestly acquired, so that to him must be accorded "les défauts de ses qualités." The sterling worth of his teaching will live, its negative qualities will vanish. Taken from the higher

point of view, one might say that the fetish-worshipper worships in his fetish a lifeless object, while the materialistic adherent of the theory of atoms worships not alone one "little god" but a whole host of them, which he calls atoms![1] The superstition of the one is about as great as that of the other; for the materialistic atom is no more than a fetish, and the wooden block is made up of atoms too. Haeckel says in one passage: "We see God in the stone, in the plant, in the brute, in man —God is everywhere," yet he only sees God as he can comprehend Him. How enlightening here are Goethe's words, when he says:

"Du gleichst dem Geist den du begreifst, nicht mir!"
("Thou'rt like the Spirit which thou comprehendest,
Not me!")
(BAYARD TAYLOR'S translation.)

Thus does the materialist mark the whirling atoms in stone, in plant, in animal, and in man, possibly, too, in every work of art, and

[1] The word "worship" is, of course, not to be taken literally, for the materialistic thinker, though he has not yet been weaned from "fetishism," has lost the habit of prayer.

claim for himself a knowledge of a monistic cosmogony that has overcome the ancient superstitions. Yet theosophists have a monistic cosmogony too; and we can say, in the same words as Haeckel uses, that we see God in the stone, in the plant, in the brute, and in the man; but what we see are no whirling atoms, but the living God, the spiritual God, whom we seek outside in Nature, because we can also seek Him within ourselves.

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