

which we have just been contemplating, forcibly reminds one of the words of the Mantuan bard when he describes the giant Polyphemus, whose solitary orb was burnt out by Hercules,

"Monstrum horrendum, informe, ingens, cui lumen ademptum."¹

But if Hæckel is the accomplished biologist he is reputed to be, if he is one of the leading representatives of contemporary science, and even his enemies will not deny that he is all this, how comes it, it will be asked, that he has fallen into so many errors and that he has so many enthusiastic followers?

¹ "A frightful, misshapen, huge monster deprived of sight."

In his latest work, "The Confession of Faith of a Man of Science," Hæckel gives expression to absurdities which are almost incredible. It would, indeed, seem impossible that any sane man, much less one who pretends to be a leader in science and philosophy, should be guilty of such utterances as the following:

"The Monistic idea . . . can never recognize in God a 'personal being,' or, in other words, an individual of limited extension in space, or even of human form. . . . Every atom is . . . animated, and so is the ether; we might, therefore, represent God as the infinite sum of all natural forces, the sum of all atomic forces, and all ether vibrations. . . . 'Homotheism,' the anthropomorphic representation of God, degrades this loftiest cosmic idea to that of a gaseous vertebrate." Pp. 78-79.

Again, on p. 92 of the same work, he says: "As the simpler occurrences of inorganic nature, and the more complicated phenomena of organic life, are alike reducible to the same natural forces, and as, further, these in their turn have their foundation in a simple primal principle pervading infinite space, we can regard this last [the cosmic ether] as all-comprehending Divinity, and upon this found the thesis: 'Belief in God is reconcilable with science.'"

Similar unphilosophical language, to use no stronger terms, is found in "The Religion of Science," by Paul Carus, the chief trumpet and propagandist of Hæckelism in the United States.

For those who are familiar with the life-work of the Jena professor, and know how blindly the multitude follow one who is looked upon as an authority in science, how prone they are to hero worship, there will be no difficulty in answering those questions and in reconciling what are, at least, apparent contradictions.

Hæckel's Limitations.

Hæckel, no one questions it, has achieved deserved eminence in his chosen field of work. But Hæckel is a specialist, an ardent specialist, and his limitations are very strongly marked. As a student of the lower forms of life, to which he has devoted the greater portion of his time, he has probably no superior, and but few peers. But the very ardor with which he has cultivated science, and forced everything to corroborate a pet theory, has made him one-sided and circumscribed in his views of the cosmos as a whole, so as practically to incapacitate him for the discussion of general questions of science and philosophy, and much more those of theology. Like all specialists, he suffers from intellectual myopia, and it is almost inevitable that such should be the case. He examines everything as he would a microbe or a speck of protoplasm, under the objective of his microscope. He applies the methods of induction to questions of metaphysics, and confounds the principles of metaphysics with the data of experimental science. The result, as might be anticipated, is to "make confusion worse confounded." For such a one, the only cure is a broader knowledge and a rigid and systematic drill in the fundamental

rules of dialectics. Verily, for a specialist afflicted as Hæckel is, and he is but a type of the majority of specialists, it behooves him to purge—

“With euphrasy and rue
The visual nerve, for he hath much to see.”

But is this the sole explanation of the manifold errors into which the German naturalist has lapsed, and will this account for his false declamation against religion, and his vehement denunciation of the Church, and of what she regards as most sacred? It is to be feared not. There is more than simple antipathy in his case. There is downright hatred. Only on this assumption can we explain the use of the violent and blasphemous language which is of such frequent occurrence in his more popular works.

As to the reading public, their position is not difficult to understand. They are, as it were, hypnotized, by what a German writer, Wiegand, aptly designates, “the confused movement of the mind of our age,” and are, so far as their ability to think and judge for themselves goes, in a state of chronic catalepsy. They mistake assertions for proof, theories for science, and regard a conglomeration of neologisms, which explain nothing, as so much veritable knowledge.

Verbal Jugglery.

The secret of Hæckel's prestige and influence with his readers, is not due simply to the extent of his information in his special line of study, nor to the astonishing mass and variety of facts which he discusses and compares, but rather to his manner of

presenting facts, and to his adroitness in drawing the conclusions which suit him, whether such conclusions are warranted by the facts or not. With Hæckel, especially when treating of his favorite topics, Evolution and Monism, the wish is always father to the thought, and he has a way of convincing his readers that he is right, even when they have reason to suspect, if they are not certain, that he is positively wrong.

One of the chief reasons for Hæckel's success as a theorist, is to be found in the fact that he is an expert in verbal jugglery, and a consummate master in the art of sophistry. Whether his use of sophism is intentional or not, is not for me to say. It does, however, seem almost incredible, that anyone endowed with ordinary reasoning powers could unconsciously fall into so great, and so frequent, errors of logic, as may be seen on almost every page of Hæckel's evolutionary works. He possesses in an eminent degree, as has been well said of him, what a French prestidigitator declared to be the leading principle of legerdemain, viz., “the art of making things appear and disappear.” This is true. What Robert Houdin is among conjurers, that is Hæckel among what the Germans call the “nature-philosophers” of the present generation.

A striking illustration of adroitness in verbal jugglery is given in his genealogy of man. In his genealogical tree Hæckel recognizes twenty-two “form-stages,” through which he traces human ancestry from monad to man, from the beginning of the Laurentian to the Quaternary Period, when *homo sapiens* first appeared on this planet.

In accordance with his theory of Monism, Hæckel, as might be supposed, is a strenuous advocate of spontaneous generation, to which he gives the new names, plasmogeny and autogeny. His chief reason for believing in autogeny is, that if we do not do so, we must believe in creation and a Creator, which, according to his notions, is both anti-scientific and anti-philosophical.

The first product of spontaneous generation was the moneron, a simple unicellular, structureless bit of slime or protoplasm, or, as Hæckel himself describes it, a form of life of such extreme simplicity as to deserve to be called an "organism without organs." It is due to the action of some natural force, heat, electricity, or what not, on brute matter, and is not only the simplest form of life that can exist, but also the simplest form conceivable. No one, it is true, has ever seen a moneron, not even Hæckel himself. But this matters not. The moneron, if it did not exist, should have existed—because theory demands it.

To confirm his views regarding this first form-stage of the human ancestral line, Hæckel appeals to the famous *bathybius*, over which Huxley and himself went into such ecstasies for awhile, but which eventually proved to be as imaginary as the moneron itself.

The immediate successor of the monera in the phylogeny of man were the amœbæ. These differed from the former in having a nucleus in the cell-substance or protoplasm. Both these stages existed as simple individuals. They were, however, succeeded

by what are termed amœboid communities, "simple societies of homogeneous, undifferentiated cells." Under the action of a favorable environment, these amœbæ developed into various larval or gastrula forms, and these, in turn, by the action of inherent forces, evolved into worms, and into animals similar to our modern sea-squirts, lancelets, lampreys, sharks and mud-fish. The mud-fish, or its prototype, a kind of salamander fish, was followed by animals nearly related to existing sirens, axolotls, and by a cross between tailed amphibians and beaked animals, the precursor of the monotremata. The next in the order of succession were marsupials or pouched animals, semi-apes; tailed, narrow-nosed apes; tailless, narrow-nosed apes, or men-like apes; speechless men, or ape-like men; and finally, as the culmination of all, the crown and glory of the genealogical tree, whose germ was but a simple speck of slime, or plasmon, we have *homo sapiens*—man, dowered with the power of reason and articulate speech.¹

The twenty-two parent forms of the human ancestral line indicated by Hæckel are, we are assured, but a few of those which actually existed. They are

¹ In marked contrast with the atheistic, mechanical theory of Hæckel are the views entertained by Darwin's great rival, Alfred Russel Wallace. Writing in his "Darwinism," chap. xv., of "the introduction of sensation or consciousness," as "constituting the fundamental distinction between the animal and vegetable kingdoms," he expresses himself as follows: "Here, all idea of mere complication of structure producing the result is out of the question. We feel it to be altogether preposterous to assume, that at a certain stage of complexity of atomic constitution, and as a necessary result of that complexity alone, an *ego* should start into existence—a thing that *feels*, that is *conscious* of its own existence. Here we have the certainty that

given only as typical stages, and are far from complete. In reality, instead of being only a score in number, there were thousands and tens of thousands of transitional forms, intermediate between the first moneron and primitive man.

I have said that the existence of the first form of life indicated in this genealogical tree is purely imaginary. So, likewise, are many others. So far as paleontology teaches, fully ten of the twenty-two groups mentioned by Hæckel are unknown as fossils, while a number of the others do not, so far as our present knowledge extends, belong to the periods to which he assigns them. But this matters not. *Se non è vero è ben trovato*. If the facts required for the support of the theory do not exist, they must be manufactured. And if facts are found which contravene the theory which has been elaborated with such care, *tant pis pour les faits*. The facts must be wrong, because, forsooth, the theory is right.

something new has arisen—a being whose nascent consciousness has gone on increasing in power and definiteness till it has culminated in the higher animals. No verbal explanation or attempt at explanation—such as the statement that life is the result of the molecular forces of the protoplasm, or that the whole existing organic universe from amœba up to man was latent in the fire-mist from which the solar system was developed—can afford any mental satisfaction, or help in any way to a solution of the mystery.”

Referring to the origin of man he concludes: “We thus find that the Darwinian theory, even when carried out to its extreme logical conclusion, not only does not oppose, but lends a decided support to a belief in the spiritual nature of man. It shows us how a man’s body may have been developed from that of a lower animal form under the law of natural selection; but it also teaches us, that we possess intellectual and moral faculties which could not have been so developed, but must have had another origin; and for this origin we only find an adequate cause in the unseen universe of spirit.”

False Analogy.

Some of the most striking and characteristic of Hæckel’s methods of ratiocination are specially displayed in the foregoing attempt to outline the genealogy of our species. Among these may be noted the fallacy of regarding analogous processes as identical. Thus, to his mind the development of the individual animal—man, for instance—from a simple germ, is but a repetition within a short space of time of what has actually occurred in the development of the species. Embryological facts in the life-history of the individual animal, ontogenesis, are considered as corresponding *exactly* with those which must have characterized phylogenesis, or the development of any species in geological time. The former being open to observation and study, while the latter are not, the facts which must have obtained in phylogeny are inferred from the known facts of ontogeny.

This fallacy of false analogy is one into which Hæckel is constantly lapsing, and one, therefore, against which the reader must always be on the alert. But it is by no means peculiar to Hæckel alone. It is a frequent occurrence in most of our current scientific literature, and has probably been more productive of error than any other one form of sophism. Instead of being employed in its strict sense, as it should always be used in science and philosophy, analogy is taken most loosely or given a meaning it will not bear. In lieu of being understood to imply a similarity of relations, which is its

proper and specific meaning, it is used to signify essential resemblance, which is wholly inexact.

In order that the argument of analogy should be valid, the data given should be identical, and should refer to two different classes of beings viewed under the same bearings. When this is the case, the identical data given may be regarded as premises, from which conclusions may be drawn applicable to both classes of beings. Until, therefore, Hæckel and his school can demonstrate, that the causes which have operated and the conditions which have prevailed in phylogeny, are identical with those which exist in respect of ontogeny, his argument is inconclusive, if not worthless, and the theories based on his assumptions are at best but simple hypotheses and should be so considered.¹

The suppositions which he continually makes, and the postulates which everywhere abound in his writings, show the looseness of his reasoning and the flimsiness of the structure which he has reared with such a flourish of trumpets, and to which he points with such evident feelings of arrogant exaltation. On almost every page of his "Evolution of Man," and his "History of Creation," we find such phrases as "there can be no doubt;" "which may

¹ It is not my purpose to minimize the force or plausibility of the argument in favor of Evolution which is based on the teachings of embryology. On the contrary, I am quite willing to accept the argument for what it is worth, and in the earlier part of this work I have endeavored to present it as fairly as possible within a brief compass. The facts of embryology *may* justify the conclusions which evolutionists draw from them, but so far there is no positive evidence that such is the case. The argument from analogy *may*, in this particular instance, be warrant-

safely be regarded;" "as is now very generally acknowledged;" "we can with more or less certainty recognize;" "it might be argued;" "a conception which seems quite allowable;" "we can, therefore, assume;" "we may assert;" "this justifies the conclusion;" and numberless others of similar import, which, like the paraphernalia of the magician, are designed to perplex and deceive. Attention, however, to the matter under discussion, will always reveal the imposture in Hæckel's case, and disclose the fact that his plausible statements are often nothing more than rhetorical artifices and tricks of dialectics; the reasonings of a special pleader who has before his mind but one aim, to give vraisemblance to an assumption that cannot be substantiated by fact.

Understanding his methods of reasoning, and the reckless manner in which he draws conclusions not contained in the premises, we need not be surprised to have Hæckel tell us, as he does in his fanciful pedigree of man, that we must "regard the amphioxus with special veneration, as that animal which alone, of all extant animals, can enable us to form an approximate conception of our earliest Silurian vertebrate ancestors." Neither need we be surprised, because we know the man's flippancy and cynicism,

ed, but this remains to be demonstrated. What I take exception to in Hæckel's argumentation are, the exaggerated importance he attaches to faint or imaginary resemblances, and his continual attribution to the argument from analogy of a value which it rarely, and which, as he ordinarily uses it, it never possesses and never can possess. As usually employed in biology, analogical reasoning can at best afford us nothing more than probability; Hæckel would have his readers believe, in the instances referred to, that it gives physical certainty, which it is very far from doing.

when he declares that "the amphioxus, skull-less, brainless and memberless as it is, deserves all respect as being of our own flesh and blood," and that this same brainless creature "has better right to be an object of profoundest admiration and devoutest reverence, than any of that worthless rabble of so-called 'saints,' in whose honor our 'civilized and enlightened' cultured nations erect temples and decree processions."

Type of a Class.

But we need not follow further the Jena professor in his extravagant speculations and his wild diatribes against religion and Christian philosophy. He has already been given more attention than his work deserves. He is, however, a type of a class, and of quite a large class of scientific men who hold similar views, and who reason in a similar manner. The saying, *ab uno disce omnes*, is specially applicable here, because to know one, and, especially, to know the leader, is to know all. The methods of all those belonging to the school of which Hæckel is such an outspoken exponent are identical. They are all experts in the "art of making things appear and disappear," and if not as adroit as their master in the use of sophism, they are, nevertheless, able to deceive the unwary and thus accomplish untold mischief.

Considering the nature of the teachings of Monism, it is not surprising that Hæckel and his school should have such a multitude of adherents and sympathizers as they are known to have.

"In the troublous times in which we live," observes the distinguished savant, the Marquis de

Nadaillac, "and in the midst of the confusion of ideas of which we are the sorrowful witnesses, human pride has attained proportions hitherto unknown. Science has become more dogmatic and more imperious than was ever theology. It counts, by thousands, adepts who speak with emphasis of modern science, without very often knowing the first word about it. But I am mistaken—they have been taught that modern science is the negation of creation, the negation of the Creator. God belongs to the old régime; the idea of his justice weighs heavily on our enervated consciences. Accordingly, when a hypothesis, or a discovery, seems to contravene Christian beliefs, it is accepted without reflection and promulgated with inexplicable confidence. It is in this fact, rather than in its scientific value, that we must seek the *raison d'être* of transformism."¹

But probably no better explanation could be given of the confusion and perplexity which now reign supreme, especially among the masses, in matters of science, philosophy and theology, than is expressed by the old Epicurean poet when he affirms:

"Omnia enim stolidi magis admirantur amantque,
Inversis quæ sub verbis latitantia cernunt;
Veraque constituunt, quæ belle tangere possunt
Aureis, et lepido quæ sunt fucata sonore."²

¹"Le Problème de la Vie," p. 64, et seq.

²"For fools rather admire and delight in all things which they see hid under inversions and intricacies of words, and consider those assertions to be truths which have power to touch the ear agreeably, and which are disguised with pleasantness of sound." Lucretius, "De Rerum Natura," Lib. I, 642-45.