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IIántα δοξιμάζετε, τὸ καλὸν κατέχετε.

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2. Professor Huxley in America. Tribune Pamphlet. 1877.


Calm, dispassionate thinkers—men who are capable of weighing evidence, and of setting aside prejudice—were never more earnestly needed by the Christian world than they are at this present moment. On the other hand, men are quite as earnestly needed, who do not consider all the verdicts of antiquity to be mere prejudice, nor all the cumulative wisdom of the ages mere folly. It is not possible to be too guarded when the strait and narrow pathway of truth lies between the fearful rock of ignorance on the one hand, where all the bright promise of future development and glory may suffer shipwreck; and the awful vortex of materialism, on the other, that is hungrily waiting to engulf all those precious hopes and consolations which are our heritage from the past.

The day has long gone by when the Church, as she arrogantly styles herself, or indeed religion of any name or any creed, can resort to its old weapons of offence and defence. Decrees and anathemas, for the subjugation of rebellious children, or the punishment of incorrigible offenders, are now only so much 'sound and fury, signifying nothing'.

If St. Paul's command to 'prove all things, and hold fast to that which is good', had been laid to heart ages ago; if believers had not forgotten that one of their fundamental duties is to be able to give a 'reason for the hope that is in them'; Christians would not be quite so liable to be beaten about by every wind of doctrine, or stranded high and dry on the barren shores of tradition, as so many seem to be just now. In these days of agitation and stormy conflict, the leaders and guides in religious truth need not only clear intellectual vision and firm faith, but
also, and above all things, they need to have a practical knowledge of the waters over which they are sailing. And that seems to be the very last thing considered.

What, as Christians, we have to fear, as the most deadly evil which can befall us, is, not so much the dangers from without, as the treachery from within. Let our leaders be everything which could be desired, if professing Christians be rebellious or indifferent, the danger is still terrible. All the arguments of all the materialists in the world are as nothing when compared with the argument which the lax morality of the Christian Church offers against Christianity. In what, that is essential, do modern Christians differ from those who make no profession of religion? Is there any more truth, or honesty, or moral purity within the Church, than without it? By the Church we mean, of course, the whole body of men and women who have enrolled themselves under the banner of Christ as his soldiers and servants. How much weight would logic have, when used against the cause of Christ, if we, his children, stood always before the world as the representatives of the highest moral purity, the loftiest honor, the most sublime courage, and the tenderest charity? If the knowledge that a man was a professing Christian in good standing was always a perfect guarantee that he would tell you the truth, that he would scorn to take a mean advantage of your ignorance or of your necessities, that he would be tender of your weaknesses, and would strive to lead you back from evil into virtuous ways, what would it matter how far back, or to what origin, the naturalists should trace the mere physical side of his nature? — the divine side would assert itself; that seal which God set upon man when he breathed into his nostrils alone, of all the animal creation, 'the breath of life', and made him 'a living soul', would stand out clear and unmistakable.

But however true it may be that the most important and impregnable testimony to the divine origin of the religion which we believe, must always come from the lives of professing Christians, still this does not include all valuable testimony to the same effect. And it behooves us, in these days of doubt and dread, to look well to it that our armor be strong at every joint. The time is fully past when the mere ipse dixit of any man, or of any
body corporate, shall settle the fate of either individual or doctrine; but the Church—the body of Christian members and Christian ministers—has not, even yet, waked up to the consciousness, that henceforth it is truth, and not mere authority, which shall reign.

There is something lamentable—more than that, there is something heart-sickening and awful—in the fact with which we are brought face to face every day: that the issues of the present time, the mighty questions which are agitating the modern world, to which on the opposite side have been brought the marvellous observation and acumen of a Darwin, the eloquent style and lucid thought of a Tyndall, and the intellectual power of a host of others, should, on our side, be supported by such men as Joseph Cook.

If this little volume did not come to us endorsed by such names as compose the Monday Lectureship Committee; sanctioned by the most enlightened audiences of the most enlightened city of America (?), supported by crowds of hearers, including, 'in large numbers, representatives of the broadest scholarship, the profoundest philosophy, the acutest scientific research, and generally the finest intellectual culture of Boston and New England',¹ it might not demand or deserve the minute criticism which is now its due.

As a volume of lectures, published from stenographic reports, some things may be pardoned, which would otherwise be insufferable; and yet, when a course of lectures, by one means or another, gets incorporated into literature as a bound volume, with so high-sounding a title, too, as Biology, forgiveness for the unclassical English, the loose statements, the turgid rhetoric, the vulgar sensationalism, such as mar every chapter, and almost every page, of this book, comes very reluctantly, and often will not come at all.

The taste, whether of author or publisher, which has admitted into the text of the volume the words 'applause', 'laughter', 'sensation', &c., enclosed in brackets, is certainly more than questionable. The much-tried patience of Mr. Cook's New Haven reviewer in one place rather amusingly gives way, and

¹Publisher's note to Cook's Biology.
he says: 'We may be permitted to think that the word [sensation] indicates here, on the part of the audience, a sensation of disgust'. It is poor consolation to us, who do not always see the joke, to be informed what our Boston neighbors combined in thinking funny. But mere defects of style or of taste are subordinate matters, when the questions discussed are those bearing upon our spiritual life and death, our eternal hope or despair.

It is a matter of infinitely greater moment to us, who hold to Christianity as being the very air we breathe, the sunshine by which we see, the foundation on which we rest, that those who announce themselves as our champions should be earnest and strong and true, than it can ever be to those who are against us. It is a small thing to Prof. Huxley that Joseph Cook should misrepresent his beliefs and misapply his words; so small a thing that it will be a matter of surprise to us if Huxley should condescend to vindicate himself, or even to notice these statements; but it is a great and terrible thing to us, that the man who calls himself our defender should be wanting in common honesty and uprightness.

Although it is the matter and not the manner of these lectures which demands our most careful attention and criticism, still the manner must not be entirely overlooked. From the very opening sentence of the first lecture of this series, throughout, we are unfavorably prepossessed by the flippant, off-hand style in which Mr. Cook undertakes to dispose of materialism. It is not quite the spirit in which we would see our champions come up to fight the battle of the Lord. Such a spirit, to say the very least, does not inspire confidence; it does not promise that the subject in hand shall receive a thoughtful and masterly consideration. Whatever claims Evolution may make upon our serious attention, whatever it may be in itself, we cannot fail to see that it is one of the most powerful elements in the world of modern thought; that it is sweeping away landmarks which have stood through the ages; and is, moreover, moulding to its service the younger generation of naturalists. As such, if it were nothing more, it claims the most patient attention of our best and clearest thinkers. What it has received at the hands of Mr. Cook, we will now proceed to consider.
The volume under review, although appearing under the title of 'Biology', is really made up of a number of lectures upon various subjects; a little difficult, perhaps, to be gathered together under any one title; the thread of purpose and argument which holds them together being rather the immortality of the soul, than biology proper. General as the title Biology is, it covers but a fraction of Mr. Cook's course, which consists of a discussion of the lowest forms of life, in their physical and metaphysical bearings; two chapters on the concessions of the evolutionists; a consideration of the microscope with reference to materialism—all together taking up less than one hundred pages, which are followed by two hundred pages more on life, death, immortality, and the spiritual body; these being illustrated by the physiology of the brain and nervous system.

In addition to the serious subject-matter of the book, each lecture has a 'Prelude on Current Events', that gives an air of sensationalism and clap-trap to the book which is, to be very moderate, extremely distasteful. Even this enlightened New England audience, it seems, must have its pill gilded.

To begin at the beginning, Mr. Cook opens his first lecture with the following paragraph: 'In 1868 Professor Huxley, in an elaborate paper in the Microscopical Journal, announced his belief that the gelatinous substance found in the ooze of the beds of the deep seas is a sheet of living matter extending around the globe. The stickiness of the deep-sea mud, he maintained, is due to innumerable lumps of a transparent, jelly-like substance, each lump consisting of granules, coccoliths and foreign bodies, embedded in a transparent, structureless matrix. It was his serious claim that these granule-heaps, and the transparent, gelatinous matter in which they are embedded, represent masses of protoplasm.

'To this amazingly strategic and haughtily trumpeted substance, found at the lowest bottoms of the oceans, Huxley gave the scientific name Bathybius, from two Greek words meaning deep and sea, and assumed that it was in the past, and would be in the future, the progenitor of all the life on the planet. "Bathybius", was his language, "is a vast sheet of living matter enveloping the whole earth beneath the seas".' [pp. 1-2].
Huxley, it is true, did write a paper which was published in the Microscopical Journal for 1868 [Vol. VIII. N. S.] In that article he gives a minute description of the constituents of the deep-sea ooze, which is very fairly epitomized in Mr. Cook’s words just quoted; but he nowhere says in that paper, what Mr. Cook professes to quote from it, both in substance in the first clause, and in words in the last clause, namely, that it is a ‘vast sheet of living matter enveloping the whole earth beneath the seas’. Huxley, it is again true, did give to this gelatinous mass the name of *Bathybius*, but he did not derive this name from the Greek words meaning *deep* and *sea*, but from two Greek words meaning *deep* and *life*. It is certainly a curious mistake for a divine and a scholar to make—a mistake which a moment’s reference to any lately issued encyclopedia or good scientific dictionary would have rendered impossible. Such blunders may be mere typographical errors or oversights; but a careful writer, and a conscientious proof-reader, do not make such oversights; and it forms an illustration of the haste and slovenliness of the whole volume, in style, statement and thinking, and, as such, is not quite beneath notice, as it would be if it stood alone.

No better commentary upon the hasty statement of Huxley’s views, quoted from Mr. Cook, could be furnished than is supplied by an extract from the article from which the statement purports to be taken. After a minute description of the coccoliths, coccospheres, granule-heaps, &c., which go to make up Bathybius, Huxley says: ‘Such, so far as I have been able to determine them, are the facts of structure to be observed in the Atlantic mud, and in the coccoliths and coccospheres. I have hitherto said nothing about their meaning; as, in an inquiry so difficult and fraught with interest as this, it seems to me to be in the highest degree important to keep the questions of fact and the questions of interpretation well apart.

‘I conceive that the granule-heaps, and the transparent gelatinous matter in which they are imbedded, represent masses of protoplasm. Take away the cysts which characterize the *Radiolaria*, and a dead spherozoont would very nearly resemble one of the masses of this deep-sea “Urschleim”, which must, I think,
be regarded as a new form of those simple animated beings which have recently been so well described by Haeckel in his *Monographie der Moneren*. I propose to confer upon this new "Moner" the generic name of *Bathybius*, and to call it after the eminent Professor of Zoology in the University of Jena, B. Haeckelii'. This extract includes all of Huxley's statement, in the article referred to [Mic. Jour. 1868], in regard to his general interpretation of the facts. He says nothing here of the general diffusion of Bathybius, or of the place which he considers it to hold in the evolution theory, except by what is implied in his use of the word *Urschleim*.

The whole paragraph of Mr. Cook, while in a certain sense it contains many true things, is a tissue of blunders; either misconceptions or misrepresentations, it is not quite possible to say which. Besides the slight blunder in derivation, and the two misstatements in regard to the contents and drift of Huxley's article on Bathybius, there are in these two short paragraphs two other misrepresentations still to be noticed. The first of these may seem a trivial thing, and it would be so perhaps if it were not typical of the spirit and style of the whole book; and so we notice it, and allow Huxley's own words, just quoted, to form the sole comment needed. Mr. Cook speaks of this new Moner, this Bathybius, as 'an amazingly strategic and haughtily trumpeted substance'. What an amazingly strategic substance may be, we would not be bold enough to say; but haughtily trumpeted it is not. Words could scarcely be used to announce a discovery, more guarded and more modest than those of Huxley, with his modifying 'I thinks' and 'I conceives'. If, as Mr. Cook says, David Friedrich Strauss has used Huxley's discovery on which to found his argument against the supernatural, let Strauss be belabored for his haughty trumpeting, and let Huxley be held responsible only for his own views and his own language. This is certainly no more than common justice and common honesty demand, leaving out of view any Christian duty in the matter.

But the last point to which we would call attention in these opening paragraphs of Mr. Cook's first lecture, is a general statement, which we do not think is sustained, either by the drift
of Huxley's writings, or by any particular passage contained in them. Mr. Cook not only says that Huxley assumed that Bathybius 'was in the past', but also that it 'would be in the future the progenitor of all the life on the planet'. This is assuredly a very loose statement, and it is not easy to tell quite all he means by it; but it certainly indicates that Prof. Huxley considers the process of transmutation of the inorganic into the organic, which forms the hypothetical link between the not living and the living, to be going on now, as it did in the far away geologic times. If Mr. Cook means anything, it seems to us he must mean this; and if he does, he is making a general statement which is diametrically opposed by the facts of the case. The Urschleim being the diffused structureless protoplasm in which the transmutation from the inorganic to the organic was supposed to take place, this modern discovery, this Bathybius, would have no significance to Mr. Cook, or to the evolutionists, except as it represented the missing link in the evolution theory; and so he infers Huxley's belief in this transmutation as going on at the present time, in the face of well-known facts, and accessible statements of Huxley's own.

The facts are as follows: Dr. Charlton Bastian, the most ardent modern advocate of spontaneous generation, has of late years been bringing forward experiment after experiment to prove, that under certain conditions, organized beings of the very simplest kinds are generated from inorganic matter, thus supplying the link needed for the perfection of the evolution theory. Who is it that has, time after time, shown that by some oversight he has left open a loophole by which error has crept in and utterly vitiated his experiments? The strongest opponents of the theory of spontaneous generation whom Dr. Bastian has met, and those by whom he has been finally vanquished, are Huxley and Tyndall — just the very men who need for the perfection of their theory the link he offers to supply. And this they did because they wanted, not victory, but truth. It was after this controversy with Dr. Bastian, and undoubtedly with it in view, that Huxley published his views in the article on Biology [Encyclopedia Britannica, Vol. III. Ed. IX.] and there he says: 'The biological sciences are sharply marked off from
the abiological, or those which treat of the phenomena of not living matter; in so far as the properties of living matter distinguish it absolutely from all other kinds of things, and as the present state of knowledge furnishes us with no link between the living and not living. Other statements by Huxley of his own views are found in the same article on biology in the Encyclopedia Britannica from which quotation has just been made, and which Mr. Cook uses freely whenever any statement in it happens, in his judgment, to tell against its writer. 'The production of living matter,' says Huxley, 'since the time of its first appearance only by way of biogenesis [that is, by way of birth], implies that the specific forms of the lower kinds of life have undergone but little change in the course of geological time; and this is said to be inconsistent with the doctrine of evolution. But, in the first place, the fact is not inconsistent with the doctrine of evolution properly understood, that doctrine being perfectly consistent with either the progression, the regression, or the stationary condition of any particular species for indefinite periods of time; and secondly, if it were, it would be so much the worse for the doctrine of evolution, inasmuch as it is unquestionably true that certain even highly organized forms of life have persisted without any sensible change for very long periods.' This passage, if not as clear in its enunciation of belief as Prof. Huxley is wont to be, is perfectly unmistakable in its tenor, and the want of clearness is partly due to our quoting it for the sake of what it implies rather than for the direct purpose for which it was written.

Before we proceed we must repeat, what we have already said, that in the evolution theory the Urschleim—that diffused, undifferentiated primordial slime, supposed to be discovered in Bathybius and the other Moners, had many years before been assumed to be the link in the far distant geologic past between the inorganic and organic kingdoms.

Huxley did undoubtedly consider the newly discovered Bathybius to be the modern representative of the Urschleim, though in the article from which Mr. Cook purports to quote him there is no word about this view. But the point, which will be made out more clearly by some quotations further on, is this, that Mr.
Cook represents the discovery of Bathybius as being the foundation-stone upon which the whole superstructure of evolution rests, without which it falls. It is a terribly dangerous thing to rest so momentous and vital a question as this upon the mere existence or non-existence of a certain organic form, especially where the burden of proof remains with his own side. From his language we would be inclined to fancy that Mr. Cook had staked his hopes of an immortality, and his belief in a God, on the non-existence of Bathybius; a point which cannot be exhaustively proved till every square foot of sea-bottom has been dredged.

But whether it is proved to exist or not, is of very little consequence in this whole controversy; for the Moners undoubtedly do exist, and answer all the purposes for the evolutionists which Bathybius did; possessing all the characteristics of the hypothetical Urschleim, except the mere accidental one of its wide diffusion. No! if we are to prove the creative power of God, the immortal soul which he breathed into man alone, the eternity which awaits us, our argument must rest on some foundation more true and lasting than this flimsy assumption. A lawyer who would stake his whole case upon an imperfect negative testimony, would not gain great credit for legal acumen among his clients or his professional brethren. Mr. Cook's profound confidence in the value of negative evidence reminds us of the Irishman who, when he found himself about to be convicted of murder on the testimony of two credible witnesses who saw him do the deed, offered to make that all right with the court if they would only wait, for he could bring half a dozen honest men who would swear they did not see him do it.

'Great microscopists and physiologists like Professor Lionel Beale and Dr. Carpenter, rejected Huxley's testimony on this matter of fact.' Mr. Cook goes on to say [p. 3]: 'Dr. Wallich in 1869, in the Monthly Microscopic Journal, presented evidence that the deep-sea ooze has nothing in it to confirm Huxley's views. The ship Challenger, engaged now in deep-sea soundings, has accumulated evidence of the same sort; and at present Bathybius is a scientific myth, and a byword of derision. "Bathybius", says Professor Lionel Beale, in his work on
"Protoplasm", which the North British Review well calls one of the most remarkable books of the age, "instead of being a widely extended sheet of living protoplasm, which grows at the expense of inorganic elements, is rather to be regarded as a complex mass of slime, with many foreign bodies, and the debris of living organisms which have passed away. Numerous living forms are, however, still found upon it." At a meeting of the German Naturalists' Association at Hamburg, in September 1876, Bathybius was publicly interred. It was my fortune to converse for a while, lately, with Professor Dana of Yale College, when I put to him the question, "Does Bathybius bear the microscope?" He replied, "You know that, in a late number of The American Journal of Science and Arts, Huxley has withdrawn his adhesion to his theory about Bathybius". Thus the ship Challenger has challenged the assertion with which Strauss challenged the world; and Huxley himself has left Bathybius to take its place with other ghosts of not blessed memory in the history of hasty speculation' [pp. 3-4].

Let us examine this paragraph in the light of facts. In the first place, Dr. Carpenter not only did not reject Huxley's testimony, as Mr. Cook says, but in the latest edition of his 'Microscope and its Revelations' (p. 366) he says, after speaking of the Monerzoa: 'To this group it would seem that we are to refer these indefinite expansions of protoplasmic substance, which there is much reason to regard as generally spread over the deep-sea bed'. He then goes on to describe minutely the constituents of the deep-sea ooze, giving it Huxley's name of Bathybius. It is not the testimony as to a matter of fact which Beale rejects, but only Huxley's interpretation of the facts; an interpretation which he himself urges, in the quotation previously given from his article on Bathybius, should 'be kept well apart' from the facts themselves.

The quotation which Mr. Cook gives from Lionel Beale, Huxley's opponent, is almost identical with those which he either does not give, or suppresses, from Wyville Thomson and Haeckel, his supporters. In The Depths of the Sea [1873] Wyville Thomson says: 'I feel by no means satisfied that Bathybius is the permanent form of any distinct living being.
It has seemed to me that different samples have been different in appearance and consistency; and, although there is nothing improbable in the abundance of a very simple shellless "moner" at the bottom of the sea, I think it not impossible that a great deal of the *Bathybius*, that is to say, the formless protoplasm which we find at great depths, may be a kind of mycelium—a formless condition connected with the growth and multiplication, or with the decay, of many different things.

Haeckel, one of the most enthusiastic of evolutionists, has given minute attention to the structure of *Bathybius*, and he finds, as Beale and Thomson did after him, that the vast sheet of viscous matter covering the sea-bottom is probably a result of death and decomposition, as well as of life and growth. Now, in fairness, should not Mr. Cook have quoted the testimony of the evolutionists themselves against the discovery of their missing link; for it is stronger and clearer, and more directly the result of experiment than is Beale's. Let us at least be as earnest in our love of truth, in our judicial fairness, in our renunciation of our pet theories and facts, as are the scientists upon whom such men as Cook delight to heap opprobrium and contempt.

Dr. Wallich did from the first oppose Huxley's views in regard to *Bathybius*; and as Dr. Wallich was its discoverer, and had numerous opportunities of observing the ooze in its fresh state, he had some right to be heard. Besides all this, the ground of his objection recommends itself to our reason and common sense. He says that Huxley had only seen and examined spirit-preserved specimens, and those which had been kept for a number of years. This is certainly a most astounding fact, that a man trained to be an observer, as Huxley had been, with a mind so clear and so acute as his, should have ventured to form an opinion in regard to its properties as a living organism, with only spirit-preserved specimens at hand.

Just here, it seems to us, is the very weakest point in all the investigations of the modern school. What is discovered to be true of the dead protoplasm is inferred to be true of the living. And yet a change has come over it, so great, that it ceases to be in any true sense organic; a change so subtle as to escape the most exquisite investigation of the microscope, and the most deli-
cate analysis of the chemist; a change which takes place always in one direction, from life to death; which no power, and no application of power, less than divine, has ever been able to reverse. It seems utterly unphilosophical to leave this subtle, mysterious force, by means of which the machinery of life is moved, entirely out of account.

But to return to Mr. Cook. He goes on to say, with more than questionable taste, that 'Bathybius is a scientific myth, and byword of derision', &c., &c., &c. And then, with a certain pomposity and assumption of knowledge which is offensively prominent throughout the whole work, he says: 'It was my fortune to converse, for a while, lately, with Professor Dana of Yale College, when I put to him the question, "Does Bathybius bear the microscope?"' Rather a superfluous question, one would think, in consideration of the fact that Bathybius is only visible at all, except as a slimy fluid, under the microscope; that it was discovered by the microscope, and the only investigations made of it have been by aid of the microscope.

Now, let us look into Huxley's withdrawal of his adhesion to the much berated theory, in regard to the significance of Bathybius to evolution. Mr. Murray's article on the cruise of the Challenger, to which Mr. Cook's last sentence has reference, may be found in the American Journal of Science and Arts, Vol. XII. p. 267 [1876]. He there says: 'In the early part of the cruise, many attempts were made by all the naturalists to detect the presence of free protoplasm, in, or on, the bottoms of our soundings and dredging, but with no definite result. It was undoubted, however, that some of the specimens of sea-bottom preserved in spirits assumed a very mobile, or jelly-like, aspect, and also that flocculent matter was often present.

'Mr. Buchanan' determined that the flocculent matter was simply the amorphous sulphate of lime precipitated by spirit from the sea-water'.

In Mr. Buchanan's report the statement is made, that the jelly-like mass called Bathybius appeared as 'coagulated mucus', which answered in every respect, except the power of motion, to Huxley's Bathybius. Chemical tests detected in it very little or

1 The chemist of the Challenger.
no organic matter. 'When it is remembered', says Mr. Murray, 'that the original describers worked with spirit-preserved specimens of the bottom, the inference seems fair that Bathybius and the amorphous sulphate of lime are identical; and that in placing it among living things, the describers have committed an error'.

If Mr. Cook had taken the trouble to look into the American Journal of Science and Arts, he might have made his point considerably stronger by the use of these simple facts, than he has been able to do by the use of his rhetoric, and of his rather pointless quotations from Beale.

Now for the last sentence about the Challenger's challenging Strauss who had challenged the world, &c., &c. We confess to being utterly out of patience with this miserable, wishy-washy, schoolboy rhetoric; as rhetoric, it is beneath contempt, but as an argument on the most awful questions which concern humanity, it is almost blasphemous. In the same volume with Mr. Murray's article and Mr. Buchanan's report of the Challenger's expedition, we find on p. 312 a few words from Huxley. These words, which Mr. Cook calls his 'forced recantation' (p. 5) and by other opprobrious names, are: 'Professor Wyville Thomson further informs me that the best efforts of the Challenger staff have failed to discover Bathybius in a fresh state, and that it is seriously suspected that the thing to which I gave the name is little more than sulphate of lime, precipitated in a flocculent state from the sea-water by the strong alcohol in which the specimens of deep-sea sounding which I examined were preserved.'

'The strange thing is, that this inorganic precipitate is scarcely to be distinguished from precipitated albumen, and it resembles, perhaps, even more closely the prolixous pellicle on the surface of a putrescent infusion (except in the absence of all moving particles), coloring irregularly but very fully with carmine, [the usual test used to distinguish living from not living matter] running into patches with defined edges, and in every way comporting itself like an organic thing.'

'Professor Thomson speaks very guardedly, and does not consider the fate of Bathybius to be yet absolutely decided.
But since I am mainly responsible for the mistake, if it be one, of introducing this singular substance into the list of living things, I think I shall err on the right side in attaching even greater weight than he does to the view which he suggests. Whether such a graceful and fair-minded withdrawal deserves the contempt which Mr. Cook casts upon it, we will leave to any candid mind to determine. But it is a most unfortunate thing for Mr. Cook that he has thrown such an enormous responsibility upon this poor Bathybius; for in a later article—translated for the *Popular Science Monthly* and published in the number for October, 1877—Ernest Haeckel re-opens the discussion. He there says: 'It would appear to be especially my right, nay, even my duty, to discuss this question, inasmuch as it was my dubious luck to have stood godfather to the "ill-famed primordial slime of the sea-depths."' When, in 1868, my friend, Thomas Huxley, gave to it, in baptism, the name Bathybius Haeckelii, he, of course, could not have foreseen that the poor neophyte would, like another Icarus, in a very short time became a biological celebrity, ascending to the heaven of terrestrial fame, and then, before the first decennium, tumbling down into the hades of mythology. Let us see, then, whether it is really dead, and whether it has really existed at all. He then goes on to give a description of various 'moners', those creatures which, irrespective of size or shape, are mere masses of undifferentiated protoplasm, possessing no organs, not even a cell-nucleus, of which a number had been discovered previous to the announcement of Bathybius. He then speaks of Huxley's article in the *Microscopical Journal*, to which reference has so often been made, and closes by saying: 'With this formless primordial organism of the simplest kind,—which, occurring in thousands of millions, covers the sea-bottom with a living layer of slime,—a new light seemed to be thrown on one of the most difficult and most obscure problems of the history of creation, namely, the question of the origin of life upon the earth. With Bathybius the ill-famed Urschleim (primordial slime) appeared to have been found, of which it had been prophetically affirmed fifty years before by Oken, that from it was sprung the whole world of organisms, and that this "Urschleim" itself has
sprung from inorganic matter at the sea-bottom in the course of planetary development'.

'Of the living ooze', Haeckel says, 'Wyville Thomson and William Carpenter wrote. This ooze was actually living; it collected in lumps as though albumen had been mixed with it, and under the microscope the sticky mass was seen to be living sarcode'. Wyville Thomson, in his 'Depths of the Sea', says further: 'If the mud be shaken with weak spirits of wine, fine flakes separate like coagulated mucus; and if a little of the mud in which this viscous condition is most marked, be placed in a drop of the sea-water under the microscope, we can usually see after a time an irregular network of matter resembling white of egg, distinguishable by its maintaining its outline and not mixing with water. The network may be seen gradually altering in form, and entangled granules and foreign bodies change their relative positions. The gelatinous matter is, therefore, capable of a certain amount of movement, and there can be no doubt that it manifests the phenomena of a very simple form of life'.

'Vere these investigations', Haeckel says further on in his article, 'confirmed as they have been by sundry other observers, seem to show that at the bottom of the Atlantic, between the depths of 5000 and 25,000 feet, there exists a sort of ooze which, with its other characteristics, contains a great quantity of a peculiar and as yet hardly individualized species of Moners. The error into which we now fell consisted in our hastily generalizing the results of these deep-sea soundings in the North Atlantic, and supposing the bed of the deep sea to be everywhere covered with similar Moners. This inference was flatly negatived by later research. During the cruise of the Challenger, which extended over three and a half years, though careful search was made for Bathybius in the depths of various seas, it was nowhere found. We have no ground for calling in question the diligence and accuracy of the eminent naturalists attached to the famous Challenger expedition, and all the less because its director, Sir Wyville Thomson, had been himself the first to observe the movements of the living Bathybius. Hence we must suppose that, in the portion of the sea-bottom explored by the Challenger,
there were no Bathybius moners. But does it hence follow that all previous observations and inferences were incorrect?

The idea was in consequence suggested that, as the Challenger could find no Bathybius, its existence was a myth; and therefore Professor Huxley, Haeckel goes on to say, 'recanted — prematurely, as I believe — his earlier views concerning Bathybius'. After quoting Huxley's retraction, he says: 'These words of Professor Huxley awakened marked interest, and were pretty generally thought to be the death-blow of poor Bathybius. But in proportion as the real parents of Bathybius show a disposition to abandon their child as being beyond hope, the more do I consider it to be my duty, as its godfather, to defend its rights, and, if possible, to restore its expiring vital spark'.

He then quotes from Dr. Emil Bessel's description of great masses of free undifferentiated protoplasm discovered in Smith's Sound, which he called Proto-bathybius, and which corresponded perfectly with the Bathybius of Huxley; and concludes as a result of all these observations and discussions, that Bathybius does really exist, but that it covers only a limited geographical area.

Immediately after this grandiloquent sentence in regard to the Challenger's challenging, Mr. Cook goes on to say: 'Nevertheless, [the italics are his own] in his New York definition of the doctrine of evolution, Professor Huxley speaks of a "gelatinous mass which, so far as our present knowledge goes, is the common foundation of all life". As, by his own confession, no such gelatinous mass has ever been observed, his popular assertion that our "knowledge" goes "so far" as to establish that this gelatinous mass not only exists but is the foundation of all life, is contradictory of his published retraction of his theory before scholars. The observed Bathybius having turned out to be a myth, its place is now occupied by an inferential Bathybius. The chasm between the inorganic and the organic was not bridged by the results of actual observation; but it must yet be bridged, if only with a guess and with a recanted theory'. It would be a little difficult, we think, to match this paragraph with another so unfair, so full either of ignorance or else of misrepresentation and mean insinuation as this, even in the history of religious controversy.
Does not Mr. Cook know, or does he simply ignore the fact, that the evolution theory had placed a hypothetical Urschleim at the base of organic life, long before Bathybius, or even the Moners, were known to have existence? Why did the evolutionists value the discovery of Bathybius so highly, and hail it so gladly, except that they thought they had possessed themselves of experimental proof of the truth of one portion of their theory? The gelatinous mass of which Professor Huxley speaks, is not at all an 'inferential Bathybius'; the context, which Mr. Cook has omitted here, but which he has, rather unfortunately for himself, given in another connection, in a succeeding paragraph, shows that it is the primordial protoplastic mass, in the far geological past, to which he refers, and which was held, and is held, entirely irrespective of any discoveries, or supposed discoveries, of Bathybius. Mr. Cook, therefore, entirely misrepresents Huxley when he says that he makes a 'popular assertion' that this 'gelatinous mass not only exists, but is the foundation of all life', which is contradictory to his published retraction before scholars; and he misrepresents him with an insinuation upon his honor and honesty which is beneath the dignity of a Christian and a gentleman. 'The chasm between the inorganic and the organic was not bridged by the results of actual observation', Mr. Cook says, 'but it must yet be bridged, even if only with a guess and a recanted theory'. In the light of Huxley's retraction; of his calm investigation into Bastian's experiments on spontaneous generation, and of his frank avowal that the 'present state of knowledge furnishes us with no link between the living and the not living', could any statement be more ungenerous, or, in essence, more untrue? In order to leave nothing in doubt as to the correctness of our statements, we will give the extract to which Mr. Cook refers, in its proper connection, premising the quotation with the statement, that in the little volume in which these lectures were afterward gathered together, the expression 'undifferentiated protoplastic matter' is substituted for 'gelatinous mass', as less capable of being misunderstood.

In his definition of the theories of creation, Huxley opens the subject by giving two hypotheses. The first, he says, is 'the

assumption that the order of Nature which now obtains has always obtained; in other words, that the present course of Nature, the present order of things, has existed from all eternity. The second hypothesis is, that the present state of things, the present order of Nature, has had only a limited duration, and that, at some period in the past, the state of things which we now know—substantially, though not, of course, in all its details the state of things which we now know—arose and came into existence without any precedent similar condition from which it could have proceeded’. After going more minutely into detail on these two hypotheses of creation, the Uniformitarian and the Miltonic, as he denominates them, he gives the following statement of the third hypothesis, ‘which is’, he says, ‘the hypothesis of evolution, and that supposes that at any given period in the past we should meet with a state of things more or less similar to the present, but less similar as we go back in time; that the physical form of the earth could be traced back in this way to a condition in which its parts were separated as little more than a nebulous cloud, making part of a whole, in which we find the sun and the other planetary bodies also resolved; and that, if we traced back the animal world and the vegetable world, we should find preceding what now exist, animals and plants not identical with them, but like them, only increasing their differences as we go back in time, and at the same time becoming simpler and simpler, until finally we should arrive at that gelatinous mass which, so far as our present knowledge goes, is the common foundation of all life. The tendency of science is to justify the speculation that that also could be traced further back, perhaps to the general nebulous origin of matter’ [p. 16].

So far we have reviewed precisely four pages of the two hundred and ninety-nine which go to make up this volume; but this will answer the purpose of showing something of Mr. Cook’s fitness to assume the office of stating the positions of our antagonists, and of fairly meeting them. Although we can justly say that there is nothing new in these lectures, that they reproduce the really powerful arguments against materialism which Lionel Beale has brought forward in his works upon Protoplasm, &c., in a much weaker form, still the arguments are popularly put, and
may reach many who would never consult Beale himself; and so they may perhaps do some service, though, as a general thing, error is only the more deadly for its mixture with truth, because its nature and tendency is thus disguised.

Mr. Cook’s metaphysics, from various little allusions he makes, seem to be none of the clearest. On p. 21, 6, in comparing the established definition of matter, with a definition which he calls Tyndall’s, and which he has compounded out of half a dozen sentences culled from his different works, he says: ‘The established definition is justified, and Tyndall’s is not, by the irresistible testimony of consciousness that the will has efficiency as a cause;’ and yet, on p. 27, he reprobates the materialistic teaching of Bain and Haeckel, who deny the freedom of the will.

It is but fair, and we desire above all things to be fair, to quote some of the best and strongest passages in the volume under review. ‘If inertia is a property of matter,’ says Mr. Cook, ‘the power to evolve organization, life and thought, cannot be; but that inertia is a property of matter, is a proposition susceptible of overwhelming proof, from the necessary beliefs of the mind, from common consent, from the agreement of philosophers in all ages, and from all the results of experiment and observation.

‘Of course, the logical existence of the alternatives implied in the argument, is denied by those who attribute both inertia and spiritual properties to matter, as a mystic, transcendental, double-faced unity; but while they use the word “inertia”, their definition of it is not the established one, as is that here employed. By force I mean that which is expended in producing or resisting motion. By inertia, I mean the incapacity to originate force or motion, or that quality which causes matter, if set in motion, without other resistance than itself can supply, to keep on moving forever; or if left to rest, without any force than its own, to remain at rest forever. Materialism, hylozoism, and Tyndall’s definition of matter, cannot justify themselves, unless it be proved that inertia is not a property of matter. Every student of this theme knows, and in this presence it is unnecessary for me to state what the proofs are, that matter cannot move itself. They are far more superabundant than even those which support the belief in the existence of gravitation. Newton him-
self did not regard attraction as an essential property of matter. . . . If the established definition of matter, and the consequent proof of the spiritual origin of all force, or of the Divine immanence in natural law, are not to be disestablished until that late day when the proof that inertia is not a property of matter, that is, that matter can move itself, can be put into the form of a syllogism, then the yoke of Socrates, Aristotle, and Plato — of which Tyndall complains, that after twenty centuries it is yet unbroken,—is likely to continue to be what it now is, one of the best examples in history of the survival of the fittest.

2. The established definition of matter rests on facts verifiable by experience; Tyndall's, confessedly, is demanded and supported only by the tendencies of an unproved theory of evolution.

"Those who hold the doctrine of evolution," says Tyndall himself, "are by no means ignorant of the uncertainty of their data, and they yield no more to it than a provisional assent. They regard the nebular hypothesis as probable; and in utter absence of any evidence to prove the act illegal, they extend the method of nature from the present into the past, and accept as probable the unbroken sequence of development from the nebula to the present time" [Frag. of Science, p. 166].

In his Belfast Address, Tyndall says: "The strength of the doctrine of evolution consists, not in an experimental demonstration, but in its general harmony with the method of Nature as hitherto known." But his definition of matter rests only on this theory, which, as he admits, is not verified by experiment, while the accepted definition of matter is so verified. It is notoriously to experiment and to ages of experiment, and to necessary belief, that the accepted definition appeals; it is to the exigencies of an unverified and experimentally unverifiable theory that Tyndall appeals.

3. According to the doctrines of analogy and uniformity, on which Tyndall relies, matter must be supposed to be inert where we cannot experiment upon it, since it is so where we can.

4. Tyndall admits that the manner of the connection between matter and mind is unthinkable, and that "if we try to comprehend that connection, we sail in a vacuum". His own definition, therefore, involves propositions which are unthinkable. They must
have been reached by sailing through a vacuum, and can be proved only by a similarly adventurous voyage.

'Pertinent exceedingly to the criticism of his definition of matter are Tyndall's famous admissions, that "molecular groupings and molecular motions explain nothing"; that the passage from the physics of the brain to the corresponding facts of consciousness is unthinkable; "and that if love were known to be associated with a right-handed spiral motion of the molecules of the brain, and hate with a left-handed, we should remain as ignorant as before as to the cause of the motion" [Frag. of Sci. pp. 120-121]. If the connection between matter and thought in the brain is so obscure that neither Tyndall, nor Spencer, nor Bain, calls it the connection of cause and effect, but only that of antecedent and consequent, how can the connection between matter and thought in the nebula be so clear that Tyndall can discern in it at that distance, "the promise and potency of every form and quality of life"? How is it that the relations of mind and matter are unthinkable as they exist in the brain, and thinkable as they exist in the nebula? How is it that the nervous vibrations and the corresponding events of consciousness are, as Tyndall believes them to be, simply consecution or correlation—a case of "parallelism without contact"—while the matter of the universe, and the life and thought existing in the universe, are so far from being a case of parallelism without contact that the potency of the latter is all in the former?' [pp. 17-21].

There are many points, both in the style and in the argument of this long extract, that are open to criticism; but taking it all in all, it is, perhaps, as good a specimen of Mr. Cook's best work, in manner and matter, as could be selected. The expression of Tyndall's about 'sailing in a vacuum' we have not been able to find, though our search has not been exhaustive; and the extract from 'Fragments of Science', though correct in the idea and general expression, has no right to the quotation marks, for it is very far from being a quotation verbatim.

We will pass over the number of passages marked for notice for their extraordinary violations of good taste, of correct rhetoric, even of accurate grammar, and close by dwelling for a short time
on one point which ought to be omitted in no review of this book.

Towards the close of Lecture V., On Living Tissues, after speaking of different modes of growth and of generation, he says, quoting Huxley's article in the Encyclopaedia Britannica: "Throughout almost the whole series of living beings we find agamo genesis, or not sexual generation." Eggs in the case of drones among bees develop without impregnation'. [pp. 686-7].

"[After a pause Mr. Cook proceeded in a lower voice] —When the topic of the origin of the life of our Lord on the earth is approached from the point of view of the microscope, some men, who know not what the Holy of Holies, in physical and religious science, is, say that we have no example of the origin of life without two parents. There are numberless such examples. "When Castellet," says Alfred Russell Wallace, Darwin's coadjutor, "informed Reamur that he had reared perfect silk-worm moths from the eggs laid by a virgin moth, the answer was, 'ex nihilo, nihil fit!' and the fact was disbelieved. It was contrary to one of the widest and best established laws of nature, and the supposed law ceases to be universal." [Wallace, Alfred Russell, Miracles and Modern Spiritualism, p. 38].

"Among our common honey bees," says Haeckel, [History of Creation, Vol. 1, p. 197], "a male individual, a drone, arises out of the eggs of the queen, if the egg has not been fructified; a female, a queen or working bee, if the egg has been fructified." Take up your Mivart, your Lyell, your Owen, and you will read this same important fact which Huxley here asserts, when he says that the law that perfect individuals may be virginally born extends to the higher forms of life. I am in the presence of Almighty God; and yet — when a great soul like the tender spirit of our sainted Lincoln, in his early days, with little knowledge but with great thoughtfulness, was troubled by this difficulty and almost thrown into infidelity, by not knowing that the law that there must be two parents is not universal — I am willing to allude, even in such presence as this, to the latest science concerning miraculous conception. [Sensation]'. This is the particular [sensation] which our New Haven reviewer very pardonably and charitably infers to be a sensation of disapprobation and disgust.
Does such an expression of opinion as this need to be commented on? Does it not furnish its own most eloquent commentary? But we cannot let it pass without at least a few words. Mr. Cook professes to believe in miracles; he gives the following definition of miracle as endorsed by himself: 'A miracle is unusual—natural law is habitual—divine action'; and yet this miracle, this that holds within it all of our religion—the divine paternity of Christ—is denied, and his birth is explained by reference to purely natural causes. He to whom we look for our salvation, is no longer God; according to the view of our apologist, he is only half a man. There is something too awful and blasphemous in such a view to be contemplated. It seems to us infinitely worse than all the materialism of all the materialists in Christendom. But even here, Mr. Cook's mere statements of facts, if not absolutely untrue, are exceedingly misleading. What does he mean, after quoting Haeckel for the well-known fact that among the honey-bees the drones are reared from unfertilized eggs, by saying, 'Take up your Mivart, your Lyell, your Owen, and you will read this same important fact which Huxley here asserts when he says that the law that perfect individuals may be virginally born, extends to the higher forms of life', when he must know, if he knows anything at all, that it extends, so far as the latest scientific knowledge goes, no higher than the insects; and that it is limited to very few genera even among insects, though he says 'there are numberless such examples'?

The 'sainted Lincoln' would be infinitely better without any faith at all, than with a faith so bolstered. If Professor Tyndall has invented a new definition of matter, it would, perhaps, be well for Mr. Cook so far to imitate him as to invent a new definition for faith.