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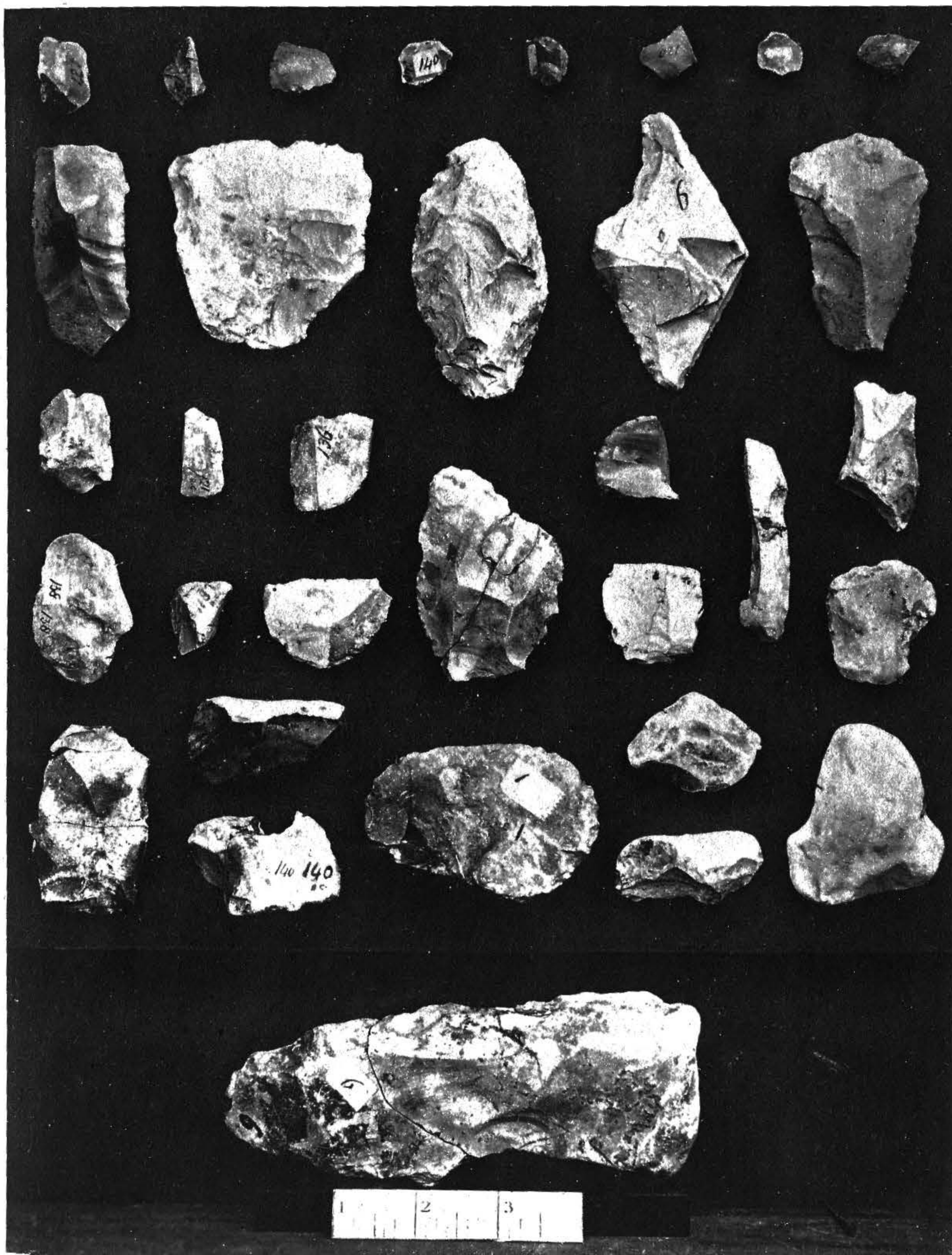
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JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.

VOL. XI.



INCHES.

Photographed by MANSSELL & Co

PIECES OF FLINT EXHUMED FROM BRIXHAM CAVERN, 1858-9;—AND DEPOSITED IN
THE CHRISTY MUSEUM, 1874. SAID TO BE "FLINT IMPLEMENTS."

JOURNAL OF
THE TRANSACTIONS
OF
The Victoria Institute,
OR
Philosophical Society of Great Britain.

EDITED BY THE HONORARY SECRETARY,
CAPT. F. W. H. PETRIE, F.R.S.L., &c.

VOL. XI.



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PREFACE.

THE Eleventh Volume of the *Journal of the Transactions of* the VICTORIA INSTITUTE is now issued ; from the papers it contains and the discussions thereon, it will be seen that an increasing public interest in the work of the Society has tended to maintain the character of both. To all the writers of papers, and those who, at home and abroad, have added to the value of the proceedings by contributing to the discussions, the best thanks of the Members and Associates are due. Amongst the papers—we do not allude to any with a view to invidious comparison—one from Professor Morris of Michigan University, in the United States—where the Members of the Society are steadily increasing in number—finds a place ; there is also a paper dealing with certain statements of ancient Egyptian records which demand attention by reason of the doubtful arguments which some now seek to found upon them. As regards the inquiry conducted and the matters involved in this paper (and another, recently read, on the Horus Myth),* it is a question whether the investigation has not now proceeded as far as the present limits of modern research admit ; and therefore whether it is not desirable that a thorough inquiry should be undertaken, with the aim of gathering from various sources, especially

* Vol. xii., page 33.

from ancient monuments, information that would throw greater light upon the earliest days of Chaldean and Egyptian History, an inquiry including careful and systematic exploration in Assyria and Egypt. Two other papers are Geological, and have reference to the antiquity of man, a subject not out of place, as the Institute is "ever ready to examine with respectful attention all theories founded on actual observation, and on cautious induction from observed facts:" and here it may not be inappropriate to quote some recent remarks by the Radcliffe Observer.*

"We need not, in accepting the Bible narratives of man's creation, repudiate one fact accurately deduced from modern scientific research. * * * * It is only when we come to deductions unauthorised by the strict rules of scientific investigation * * * * that we demur. * * * *

"I would say in the cause of science, that we seem to be philosophizing and theorizing too fast in the present age. Both in the physics of astronomy and in the natural sciences, we seem to be leaving the cautious processes of induction, and rather to be trying to adapt facts to preconceived theories, than to frame theories which shall explain (as in the instance of gravitation) large multitudes of facts.

"In the interests of science then, as well as of religion, I would deprecate, not the research, not the brilliant practical successes resulting from it, but the incautious use, as it seems to me, which has been so frequently made of it, under the dazzling influence of a few of its great expounders. Especially, too, must we be cautious when the interests of religion are, or seem to be affected by the recent developments of science. Truth must be preserved at all hazards; and religion, which is the service which we owe to the God of all truth, will never ultimately be found at variance with it."

And Principal Dawson, LL.D., F.R.S., in his new work,† says:—

"The great discoveries as to the physical constitution and probable origin of the universe, the doctrine of the correlation and conservation of forces, the new estimates of the age of the earth, the overthrow of the doctrine of spontaneous generation, the high bodily and mental type of the earliest known men, the light which philology has thrown on the unity of language, our growing knowledge of the uniformity of the constructive and

* *Relig. Hist. of Man*, p. 5.

† *Origin of the World*.

other habits of primitive men and of the condition of man in the earliest historic times, the greater completeness of our conceptions as to the phenomena of life and their relation to organizable matters—all these, and many other aspects of the later progress of science, must tend to bring it back into greater harmony with revealed religion.”

In conclusion, a reference may be made to some of the more remarkable results of scientific inquiry during the past year.

In 1874 this Institute had the privilege of joining the leading scientific societies in urging adequate preparations for observing the then approaching transit of Venus; the result from the English observations of Ingress and Egress, so far as they have been ascertained, is now found to be a mean parallax of $8.760''$, corresponding to a mean distance of the Earth from the Sun equal to 93,300,000 miles; the results of the foreign observations have yet to come.

The discovery by Professor Asaph Hall of the satellites of Mars has been characterised by M. Leverrier as “une des plus importantes observations de l’astronomie moderne.”

I am indebted to a member for the following:—

“The recent searching investigations of Professor Tyndall, Dr. Burdon Sanderson, Professor Lister, and others, have forcibly shown that there is no reliable foundation for the theory of ‘spontaneous generation,’ or as it is now more logically termed, ‘abiogenesis,’ *i.e.* the development of life without any influence derived from pre-existing life. Professor Lister has recently shown that the lactic acid fermentation of milk (the ordinary process of turning sour) does not take place without the presence of a peculiar organism; of which if the invisible germs be excluded, the milk remains sweet for an almost indefinite period of time. And Professor Tyndall has observed that if fluids the most prone to decomposition and the development of organic life be carefully exposed to the pure air wafted over the snow-clad summits of the Alps, they undergo no change.”

F. PETRIE,

Hon. Sec. and Editor.

DECEMBER 31, 1877.

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JOURNAL OF THE TRANSACTIONS

OF THE

VICTORIA INSTITUTE,

OR

PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

ORDINARY MEETING, MARCH 20, 1876.

VICE-ADMIRAL E. G. FISHBOURNE, C.B., R.N., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBERS :—Captain C. E. Foot, R.N. ; Mrs. Corsbie, London.

ASSOCIATES :—Rev. J. Dawson, B.A., Cantab., Darley Abbey ; Rev. R. Green, Liverpool ; Rev. N. K. McLeod, L. Th., Ellon, Aberdeen.

Also the presentation of the following Works to the Library :—

“American Philosophical Society’s Journal,” Part 95. *From the Society.*

“Philosophy of Art.” By Professor Morris. *The Author.*

Two smaller works, presented by Rev. R. Gordon and W. H. Ince, Esq.

The following paper was then read by HENRY MICHELL WHITLEY, F.G.S.

*A CRITICAL EXAMINATION OF THE FLINTS FROM
BRIXHAM CAVERN, SAID TO BE “KNIVES” *
AND “HUMAN IMPLEMENTS.” †* By N. WHITLEY,
C.E., Honorary Secretary of the Royal Institution of
Cornwall.

SO far back as July, 1858, the exploration of Brixham Cavern was commenced by a committee, under the auspices of the Royal and Geological Societies of London, of which

* *Antiquity of Man*, 1st ed., pp. 100, 101.

† *Transactions of Devon Association*, vol. vi. p. 828.

Dr. Falconer, F.R.S., was the Chairman and Secretary, and Mr. Prestwich, F.R.S., the Treasurer. A local sub-committee was "deputed by the London Committee to co-operate with them, and superintend the actual working of the cave. It is, however, to Mr. Pengelly that the Committee are indebted for the active and constant superintendence of the work, and for the record of each day's proceedings. This gentleman, in fact, saw personally to the execution of the whole work, noted all the physical features, and arranged and tabulated all the specimens found in the cave, devoting to the investigation an amount of care and time without which it would have been impossible for the London Committee to have obtained the exact record which is now submitted to the Society."* The work proceeded with such celerity that it was completed within twelve months, and Mr. Pengelly then "forwarded to the Geological Society of London all the flint implements and the remains of animals which had been found, together with a considerable number of typical specimens of the stalagmite, as well as samples of the beds of mechanical origin, and a register briefly descriptive of the whole."† It was not, however, until May 16th, 1872, that the report of the Committee was presented to the Royal Society; nor until the latter part of 1874 that the exhumed flints were deposited for public inspection at the Christy Museum, London, in accordance with the stipulation on which £200 of the Royal donation was given by the Society towards the expense of the exploration.

Thus for fifteen years the relics from the cavern were not accessible to outsiders, and during that long period these rubble pieces of shattered flint were persistently described as flint knives, relics of man, and manufactured tools. The haste with which this opinion had been adopted, and the zeal by which it was propagated, presents a remarkable contrast to the long delay in the issue of the final report.

On the 9th of September, 1858, a preliminary report was sent to the London Committee, signed by "H. Falconer, M.D., Andrew Ramsay, and Wm. Pengelly"; in which they state that "one result of great interest has already been brought out, namely, the superposition of undoubted remains of the reindeer above the so-called 'flint knives'; from which the inference arises that the reindeer continued to be an inhabitant of Britain after the appearance of man in this island."‡

* *Transactions of Royal Society*, vol. clxii. p. 475.

† *Transactions of Devon Association*, vol. vi. p. 776.

‡ *Transactions of Royal Society*, vol. clxiii. p. 478.

In the same September, at the Leeds meeting of the British Association, Mr. Pengelly, F.R.S., read a paper on the results which had been obtained, and stated, "that in the new cavern flint implements had been found under an unbroken floor of stalagmite, deep in the cave-earth, and mingled with the remains of the ordinary extinct cave-mammals."*

Again, in the following year, Sir Charles Lyell brought the evidence obtained from this cavern before the meeting of the British Association at Aberdeen, in reference to its bearing on the high antiquity of man; and from that early date, down to the issue of the final report of the Royal Society in 1874, the flints from Brixham Cavern have been constantly referred to, as furnishing incontestable evidence of the contemporaneous existence of man with the extinct mammalia of the Drift period; but let it be observed that during these fifteen years the flints themselves were never produced, never even described in detail, or the nature of the evidence of their human manufacture made known; and if the exploration of Brixham Cavern (as it has been said) "produced an entire revolution of opinions on the antiquity of man"; † such opinion was founded on faith, and not on sight.

On the 2nd of October, 1874, I visited the cavern and found a glass case within the entrance, in which some relics from the cave were placed, and shown to visitors by the proprietor; among other things were some plaster casts of a very perfect and large flint flake, $3\frac{3}{4}$ inches long, and well adapted to be used as a knife. I was told by the proprietor that these casts were models of one of the "flint-knives" found in the cavern, and deposited with the Geological Society of London. The case also contained the cast of a stone axe of a neolithic form. I purchased three of the casts of the knife, and one of the axe. My suspicions of the genuineness of these things were aroused, and afterwards confirmed, by comparing the cast of the flake with the description of the flints given in the report of the Royal Society. On the 21st of November, 1874, I forwarded one of the casts, and the model of the axe, to the Secretaries of the Royal Society, and ventured in a letter to entreat the Council to put an end to this deception of the public, by depositing the real flints in the British Museum, as stipulated by the engagement entered into so far back as 1858. The casts were laid before the Council, and Professor Huxley was directed

* *Quarterly Journal of Science*, April, 1874, p. 144.

† *Journal of the London Institution*, January, 1873, p. 5. See also Lyell's *Antiquity of Man*, p. 96, 1st ed.

to inform me that the relics had been deposited in the Christy Museum. I lost no time in going to inspect them, and in order to give a more perfect knowledge of these famous flints; and having obtained permission to have a photograph of them taken, I requested Messrs. Mansell & Co. (who had before produced such perfect photographs of the antiquities in the British Museum) to do this for me. Three negatives were taken, one as near as could be to the natural size of the flints, the others of a size suited to the page of the journal of this Society, a photograph from which forms the frontispiece to this paper. A scale of inches was photographed with the flints, in order that they might be accurately measured; and with the aid of a lens their most minute features and fractures can be examined. The flints now speak for themselves.*

In a former paper on this subject I described the cavern and its geological surroundings, and showed that similar shattered flints and gravel to those within the cave were found in the adjoining soil of Windmill Hill above it; and I inferred, that the so-called flint-knives were only subsoil flakes, washed into the cavern with the gravel and loam in which they were found.†

In this supplemental paper I purpose to examine the claim of the flints to be implements made and used by man, and critically to investigate the evidence which has been brought forward in support of such claim.

An inspection of the photograph will show that fully one-half of the flints are undefinable pieces of broken flint, no larger than the tip of a man's finger; they are neither flakes, nor cores, nor scrapers—they are without any regularity of form, and show no evidence of design, and are unlike any implements known to have been made by man. To call these bits of rubble flint implements, undistinguishable as they are from the gravel which we tread on in a footpath, seems to be an abandonment of common sense; and without any confirmatory evidence to rely on, the judgment revolts from the inference that they are manufactured tools.

There are, indeed, some very minute perfect flakes, which, notwithstanding their minuteness, are still said to be implements, and so small that Mr. Evans considers that they must have been severed from the core by the use of a punch, yet he

* The full-size photograph may be inspected at the rooms of the Victoria Institute, or obtained from Messrs. Mansell & Co., Oxford Street.

† *Journal of Victoria Institute*, vol. viii. p. 217.

finds it difficult to suggest to what use they could have been applied.* The imagination of Professor Nilsson, however, masters this difficulty; he says: "The very small specimens which are sometimes to be met with, resembling the large ones in everything but their size, and which have likewise been regarded as symbols, if they were not ornaments, were perhaps made for boys, to give them an early training in the use of arms."† Mr. Evans adopts the same opinion; of the American stone implements he says: "They were made of various sizes, the smaller for boys, and those for men varying in accordance with the purpose to which they were to be applied."‡ And these bald assertions, these childish trivialities, are now received as the deductions of high science in support of high antiquity.

But, again; some four or five of the other flints are simply pebbles, or water-worn pieces of broken flint, such as might be picked up on a beach, or from the newly-spread metalling of a road; and most men of intelligence who (to use the words of Dr. Carpenter) "have that trained and organized common sense which we call scientific method," would reject the conclusion that they are human implements.

The remainder of these cavern flints are flakes and splinters of flint; the flakes are few, fragmentary, and most imperfect in size and form, and as knives far inferior to some of the sub-soil flakes, the natural origin of which I have shown in a former paper, where I have adduced good evidence to prove that such flakes have had a geological and not an antiquarian origin—that a flake is the result of the natural fracture of the flint, and that a nodule of flint mechanically crushed by a stone-breaker produces as perfect flakes as are now referred to human workmanship.

In addition to this evidence before produced, of the natural formation of the flakes, I am now enabled to show that change of temperature will split flints, and other silicious minerals having a similar fracture, into flakes, knives, and scrapers.

The black slag from the tin and iron smelting-works of Cornwall is a coarse kind of obsidian; rejected from the works at a high temperature, it breaks with a decided conchoidal fracture in the act of cooling into fragments, from which flakes and spear-points may be selected, in every respect resembling the so-called flint implements of the caverns; and the perfec-

* *Ancient Stone Implements*, p. 249.

† *Nilsson on the Stone Age*, p. 99. 1868.

‡ *Ancient Stone Implements*, p. 362. 1872.

tion of the fracture and form of the flake is proportionate to the silicious purity of the slag.

It is most convincing to observe the whole process of the formation of such flakes at Seend, near Devizes. Here the iron is smelted out of the native rock in blast-furnaces by intense heat, and the molten slag is poured into iron caldrons, and tipped from the tram-waggon to the refuse-heaps; the external surface of the mass is first cooled by contact with the caldron, and converted into a kind of artificial obsidian; and, during the further act of cooling, most delicate, semi-transparent films are formed on the surface of the slag, and fall from its sides or come down in a shower by the slightest touch of a walking-stick; and from these most beautifully tinted and delicate flakes of knife-like forms and sharp cutting edges may be picked out.

It is further satisfactory to learn from a late number of the *Journal of the Geological Society*, that Mr. John Milne, F.G.S., is of opinion that the shattered flints on the surface of the desert of the Tih have been split by change of temperature. Describing his journey from Akaba to Suez over the plateau of the Tih, he says: "After passing Jebel Duppa the ranges on the right, growing higher, show a more definite character as compared with those upon the left. Whilst the latter remain horizontal, the former are almost turned on end, dipping at an angle of 45° to the north. They consist of limestones, which are whitish at their base and yellowish near their summit. With them there are bands of flint, which, being tilted up with the rock in which they are stratified, stand up along the ridges of the hills, forming low parallel walls to hollow troughs. Numerous angular and apparently freshly-broken fragments of these flints are strewn over the plain below, apparently broken by the more or less sudden expansion and contraction occasioned by the great variations in temperature, this action being probably aided by a jointed structure in the flint at the time of its removal from the limestone. That there are such variations in temperature may be inferred from the fact that many nights when we were in the desert the thermometer sank below zero, and shrubs and other objects were in the morning covered with a thick coating of hoar-frost; this low temperature being invariably followed shortly after sunrise by a heat that readily scorched and peeled the skin from the face.

"In addition to this it may be mentioned that several rounded and apparently whole flakes were seen, which, on being touched, fell to pieces, showing them to have been broken by

some force that had not been violent in its action, but had simply divided them and not scattered the fragments.

“Materials being in this way continually supplied from a mountain, then being broken by the sun and afterwards buried in the sand, may perhaps give a clue to the origin of certain breccias.”*

These suggestive observations lead us to notice the instructive fact, that these sharp splinters of flint are found in great abundance on the surface of uninhabited and uninhabitable deserts, and are but rarely found in the rich alluvial valleys which have been the birthplace of ancient nations. They occur on the Great Sahara,† on the Libyan desert,‡ on the sterile terraces and slopes which border the Nile, but not on its rich alluvial soil;§ they are most abundant in the stony valleys of the Sinaitic peninsula,|| and on the desert of the Tih;¶ they are embedded in cliff breccias on the death-stricken shores of the Dead Sea,** and scattered over the central ridge of Syria, and they so abound on the surface of that great and terrible desert between the Jordan and the Euphrates as to have given it the name of the “Desert of Flints.”††

Tradition, history, and the necessities of the case all agree in their testimony that the rich alluvial valleys of the Euphrates and the Nile were the cradle in which the human family was nursed in its infancy; but on their fertile soils no relics of palæolithic man have been found. According to modern theories of his origin, he came to the very verge of fertility, and beheld a Paradise before him replete with all the necessaries and luxuries of savage life, and then turned back into the desert to manufacture flint implements, where there was no soil to cultivate, and no animal food to sustain life. That these sterile deserts could have supported a population sufficiently large to have made the innumerable so-called implements is as false in fact as it is wild in theory.

With all this mass of evidence in support of the natural formation of the flakes, to persist in calling these pieces of rubble flint and fragmentary flakes from Brixham Cavern, “thirty-six rude flint implements of indisputable human workmanship,” and that not only without evidence, but against evidence, is a delusion, a deception, and a snare.

* *Journal of the Geological Society*, vol. xxxi. p. 26. † Canon Tristram.

‡ *Journal of the Anthropological Institute*, vol. iv. p. 360.

§ *Ibid.*, vol. iv. p. 215.

|| See specimens in the Museum of Practical Geology.

¶ *Journal of the Geological Society*, vol. xxxi. p. 26.

** Lynch's *Survey*, p. 274, and Tristram's *Travels in Palestine*, p. 253.

†† *Bible Atlas*, plate 2. Society for Promoting Christian Knowledge.

The “*round-pointed lanceolate implement*” (so named by Mr. Evans) found in the cavern has a curious history. It is formed of two pieces of flint, discovered some distance apart, and fitting so completely together as to show that they are parts of the same stone; it is, however, yet incomplete as an implement, and the part required to perfect the form is assumed to be lost. The butt end appears to have been, in the first place, described by Sir C. Lyell as a “core from which flint flakes had been struck off on every side”;* leading to the inference that the flake knives had been made in the cavern. But this flint does not appear in the report as a rejected core, but as the most important part of a lance-head; the metamorphose being in this manner completed, it is now said to “resemble one type of the pointed instruments from the valley gravels.”† The claim of such rough flints to be implements I have examined in a former paper.‡

The “*remarkably symmetrical scraper*.” This flint is figured by Mr. Evans, said to have been found in the cavern, and described as having been “dexterously trimmed into a horseshoe form,” and “well adapted to have been held in the hand.”§ It has, however, one blot on its evidence as a witness in this case,—*it was not found in the cavern*;|| nor is it now with the flints placed in the Museum. Of this flint Mr. Pengelly says: “The following is the history, or rather so much of it as is known to me, of the specimen in question:—After finding flint tools in the cavern, search was made from time to time, on various parts of the hill, especially when and where the surface was in progress of being broken up, for the purpose of ascertaining whether any such specimens were to be met with there as well as within the cavern. This search being by no means fruitless, I sent one of the specimens thus met with to the Cavern Committee, and with it the following statement:—No. 134, June 3rd, 1859, found on Windmill Hill, about 44 feet above the cavern level, in a thin layer of gravel lying beneath the soil and on the limestone rock, one flint. A sample of the gravel in which it was found was also forwarded.”¶

This important statement, first made public in July, 1874, excludes this symmetrical flint from the cavern specimens. It also confirms the statement which I had previously made, that

* *Antiquity of Man*, 1st ed., p. 100.

† *Ancient Stone Implements*, p. 469.

‡ “The Palæolithic Age Examined.” *Transactions of Victoria Institute*, vol. viii. p. 14.

§ *Ancient Stone Implements*, p. 470.

|| *Transactions of Royal Society*, vol. clxiii. p. 551. See foot-note.

¶ *Transactions of Devon Association*, vol. vi. p. 835.

shattered flints were found in the soil outside and above the cavern, as well as within it; and it justified my complaint, that this significant fact, indicative of the geological origin of the flints, had "been either overlooked or ignored,"*—and it further tends greatly to confirm the opinion which I had expressed, that the cavern flints were subsoil flakes washed into the fissure with the gravel and loam in which they were embedded.

The *evidence of work and use on the cavern flints*. Mr. Prestwich, in the report to the Royal Society, expresses his opinion that fifteen of the flints show unmistakable evidence of having been artificially worked; that on nine others the workmanship is very rude or doubtful; while there are seven which he thinks show no trace of having been worked at all.†

Mr. Pengelly, in his early, more cautious, and most valuable report, appears not to have been aware that any such evidence of use had then been found on the flints. He says, indeed, "that one of the ends of the solitary bone (No. 59), found on the surface in the west chamber, had been cut off, apparently, with some sharp instrument"; ‡ but Mr. Busk has identified this relic as being the rib of a sheep (a neolithic animal) sawn across—and a recent bone.§

Mr. Evans, however, concludes his account of the cavern with this remarkable statement:—"Most of the implements prove not only to have been made by man, but to have been actually in use before becoming embedded in the cave-loam; while, from *the whole of the flints discovered* presenting these signs of human workmanship or use upon them, it is evident that their presence in the cave must in some measure be due to human agency, though they were probably deposited by means of water in the position in which they were found."|| Agreeing with the latter clause, and accepting the acknowledgment that the flints were probably washed into the cavern, which is a part of my case, I utterly deny that any such marks of workmanship or use can be shown to exist on the cavern flints.

It is true that many pages descriptive of Brixham and Kent's Caverns in *Ancient Stone Implements* are loaded with language indicating workmanship or marks of use on the flints; but then these reiterated and constantly recurring phrases, so confidently asserted, are only words, which require not assertion, but proof;

* *Transactions of Victoria Institute*, vol. viii. p. 216.

† *Report*, pp. 561-2.

‡ *Transactions of Devon Association*, vol. vi. p. 818.

§ *Transactions of Royal Society*, vol. clxiii. p. 502.

|| *viz: Stone Implements*, p. 471.

and that clearly is a point which can only be decided by a minute and careful inspection of the flints themselves. Now that Mr. Evans has given us engraved representations of these marks of use, we are for the first time in a position to apply this crucial test, by which the evidence of these flints to the antiquity of man must either be confirmed or rejected.

Figure No. 410 in *Ancient Stone Implements* has these marks of use the most pronounced, and they appear at the first glance very indicative of human workmanship; by the aid of a lens it will be seen that a succession of regular and minute scallops, with sharp points at their junctions, are shown on both sides of the *engraving* of this flint, and they are more distinctly exhibited in the side view of the same. They are throughout similar in size and form, and are so regular that they look like the links of a delicate chain traced along the edge of the flint; and most persons, from this pictorial representation, would be inclined to accept the statement that this flint at least had been trimmed by secondary chipping on its edges. On examining the photograph in a strong light and in the same manner, we are surprised to find that no such minute trimming or secondary chipping as that shown in the drawing can be found on the edges of this flint. The rough fractures on the surface run boldly out to the edges, the minute chipping shown on the edges of the flint in the engraving wholly disappears, the sharp angular points of the scallops cannot be found; and we must come to the conclusion that while the drawing in general outline and artistic merit is admirably done, and fully justifies the compliment paid to the skill of the engraver in the preface, yet, in the vital point of secondary trimming indicative of workmanship, it is wholly and entirely untrue.* It is worthy of remark, also, that it is said of this flint, that "some parts" only of the cutting edge "present appearances of wear by use,"† while of others, which are not figured, it is said, "most of them bear *decided marks* either on their sides or ends of having been in use as scraping tools";‡ leading to the inference that this evidence of use or secondary

* In the cause of truth it is much to be regretted that the woodcut of this flint has been reproduced in the *Transactions of the Royal Society* (see the *Report*, p. 551, at foot). The electrotype was also lent to Mr. Pengelly, to illustrate his report on Brixham Cavern in the *Transactions of the Devon Association for the Advancement of Science*, vol. vi. p. 832. Thus, a large number of scientific men, members of these societies, who probably have not seen the original flints, will see this representation of evidence, which has no existence in fact.

† *Ancient Stone Implements*, p. 469.

‡ *Ibid.*, p. 471.

chipping is more full developed on the other flints found in the Cavern. Clearly this is not so; examine the most typical flake of the few on the board, that at the extreme left corner of the second row from the top, and it will be seen that the three facets on its right side run completely out to the edge of the flake, and are untouched by secondary chipping. The edges of this flake must have been very delicate and sharp when it was first severed from the natural nodule; they are in a few places slightly indented and jagged, but this must have occurred if it had been carried onward with other stones, and battered in a mountain stream; yet these minute notches, and the slightly water-worn butt end, are said to be indications of use and wear. I have fully met and examined this kind of evidence in my former paper.*

I may, however, observe here that the effect of cutting or scraping ordinary substances with a sharp stone would obviously be to round and smooth the edge rather than to jag it; and, in fact, Mr. Evans gives us numerous instances of this undoubted evidence of wear by use: he says: "Among some hundreds of scrapers, principally from the Yorkshire Wolds, I have met with between twenty and thirty which show decided marks of being worn away along the circular edge by friction. In some, the edge is only worn away sufficiently to remove all keenness or asperity, and to make it feel smooth to the touch, and this perhaps along one part only of the arc; in others the whole edge is completely rounded, and many of the small facets by which it was originally surrounded entirely effaced."†

With regard to the evidence of human manufacture which flint-knives should present, Sir Charles Lyell quotes Mr. Evans, who says "that there is a uniformity of shape, a correctness of outline, and a sharpness about the cutting edges and points, which cannot be due to anything but design."‡ We desire no better rule than this by which to test the claims of the whole of these Brixham flints to be implements and knives. It is obvious from the general view which the photograph gives, that the flints present no such uniformity of shape, no such correctness of outline, or sharpness about the cutting edges and points, as would, in accordance with this test, justify the inference that fifteen flints selected from the whole can be said to be manufactured knives.

* *Transactions Victoria Institute*, vol. viii. p. 220.

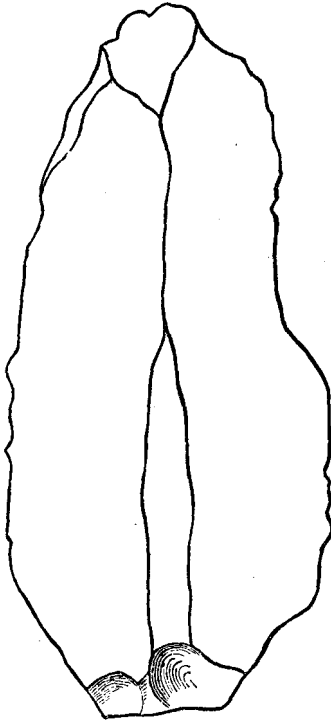
† *Ancient Stone Implements*, pp. 279, 280.

‡ *Antiquity of Man*, 1st ed., p. 117.

Mistaken Identity.—One of the so-called thirty-six implements—No. 3 in Table IV. of the Report—has since been

found to be “merely a fragment of slate, nearly covered on one side with stalagmite.”* But this slight mistake of a piece of slate for a flint implement is happily balanced by an opposite error, by which a piece of flint has been mistaken for a bone, and described as “a fine small tibia”;† and the care with which the examination had been made is indicated by the animal to which it belonged not being determined, a note of interrogation being put to show that there was doubt on that point.

The Plaster Cast of a Flint-knife.—I have before stated that I purchased in the cavern, in 1874, three casts of a very perfect flint-knife, said to have been moulded from one of the knives found in the cavern. That such spurious articles had before been so represented, and sold to visitors, is now confirmed by the testimony of Mr. T. K. Callard, F.G.S., who purchased one of the casts several years ago, believing it to be, as he was informed, a model of one of the knives found in the cavern.‡ The subject was brought before the British Association for the Advancement of Science at Bristol, in 1875, and the whole



Outline and Cross Section of the Plaster Cast. — Natural Size.

history of these spurious casts made known. It is sufficient for my present purpose that it was then acknowledged that the

* The *Report*, p. 562—a foot-note.

† *Ibid.*, p. 506, No. cxvi. in table.

‡ See p. 35 of a most valuable essay by Mr. Callard, *The Geological Evidences of the Antiquity of Man Reconsidered*. (E. Stock, 62, Paternoster-row).

flint from which the casts were taken *was not found in Brixham Cavern*, but in a barrow in the north of Ireland, and was lent to the owner of the cavern in 1860, with a stipulation that he would engage to state, whenever the cast was exhibited, that it was not a cast of one of the flints found in the cavern.* Thus for the past fifteen years this cast of what was probably a Celtic flake-knife of most perfect form and size, has been placed amongst some of the bones of the extinct mammals and other relics exhibited in the cavern, and no doubt has been seen by numerous visitors without any account of its origin being given, and most probably also sold to a considerable number without the stipulated explanation. It is therefore not surprising that the evidence of the "flint-knives" should have been so generally received as a satisfactory proof of the co-existence of man with the extinct mammalia.

The Duke of Argyll having expressed the opinion "that a whole group or fauna of great quadrupeds have utterly perished since man appeared," adds, "I know no better example of the evidence to this effect than one which is very easily accessible in our own country. We have only to go down to the pleasant shores of Devon, and in one of the pleasantest spots upon those shores, the south-western promontory of Torbay, overhanging the little harbour of Brixham, where two hundred years ago William of Orange landed, there is a steep limestone hill, at the foot and on the face of which the houses of the town are built. Close to the summit, a few years ago, a cavernous hollow was discovered. . . . in this cave the works of man, flint arrow-heads and knives, were found, along with the bones of the elephant, the rhinoceros, the bear, the hyæna, and the reindeer."† If the Duke is correct in this, that no better evidence than that of Brixham Cavern can be adduced to prove the antiquity of man, then Palæolithic man is doomed—

"And, like a demon of the night,
Will pass and vanish from our sight."

Thus much for the flints themselves. I proceed to examine the additional evidence which has been put forward of the indications of man's presence in the cave, by which the claim of the flints to be implements has been bolstered up.

The Ivory Rod.—We are informed by Mr. Evans, "that a portion of a cylindrical pin or rod of ivory was found in the cave, being the only object wrought from an animal sub-

* *Western Daily Press*, August 28, 1875. † *Primæval Man*, pp. 116-8.

stance.”* An ivory rod was found with the “red lady” in Paviland’s cave by Dr. Buckland, and “a cylindrical piece of ivory about $\frac{3}{8}$ inch in diameter was found in a cavern in the south of France, and is now in the Christy Collection.”† In former days a rod was an emblem of authority and power; therefore, we are led to infer, without much effort of the imagination, that the ivory rod of Brixham might have been the sceptre of a Palæolithic prince, or the “baton of command” of an ancient chieftain; and as no doubt can be cast on the human origin of such a relic, it must, if verified, be the most important piece of evidence produced from the cavern. We are, however, left in complete ignorance of all the vital points of the case; we are not told by whom it was found, or when, or where. Mr. Prestwich mentions it in the report to the Royal Society, and dismisses it with one sentence: “the position of this is not certain.”‡ Mr. Pengelly says: “I have no recollection of this specimen. . . . I am inclined to suspect that it does not belong to the cavern series of specimens. It may, I believe, be safely stated that every object forwarded to the Committee was numbered by myself, and that its position was duly recorded in the register.”§ It is not placed amongst the relics in the Christy Museum; and Mr. Philp, the proprietor of the cavern, writes to me: “As to the ivory rod you ask me about, I am sure I never saw it, neither do I know anything about it.” In this matter, Mr. Evans has probably been imposed on, but he should either confirm or withdraw this mythic wand.

A Cut Bone.—We are informed in the Report to the Royal Society, that “Dr. Falconer alludes to part of a reindeer’s horn which has an apparently artificial incision”;|| but we are told in a foot-note “that Mr. Busk sees reason to question this conclusion (see page 537).” On referring to that part of the Report prepared by Mr. Busk, we find that this scratch was not on the horn of a reindeer, but on the rib of a bear; and is thus described: “On one of the ribs is a small notch, which Dr. Falconer observes might have been made by means of a flint or stone implement. Of course this may be so; but upon close inspection I am inclined to think that it is not an incision or scratch at all, but a mere indentation by some blunt edge, which has simply depressed the soft texture of the bone without breaking the surface. The bottom and sides, therefore, of this very trifling mark appear rounded, smooth, and under a magni-

* *Ancient Stone Implements*, p. 471.

† *Ibid.*

‡ *Transactions of the Royal Society*, vol. clxiii. p. 564.

§ *Transactions of the Devon Association*, vol. vi. p. 636. || *Report*, p. 564.

fyng glass, exactly like the surrounding surface; but the appearance of antiquity which would thence attach to the indentation, were it really an incision, may, as it seems to me, be readily explained on the presumption of its being merely an accidental impression.* Thus the artificial incision on the horn of a reindeer turns out to be an accidental impression on the rib of a bear.

A nearly round pebble of silicious sandstone about the size of a cricket-ball was found in the gravel-bed below the bone-earth. It is said to bear distinct marks of having been used as a hammer-stone. Mr. Prestwich considers that it is a Budleigh-Salterton pebble, that "it seems to have been brought from a distance, and could not have been introduced by natural causes into the cave." † Mr. Pengelly describes it as "composed of very compact grit, approaching to quartzite," ‡ and adds, "that a drab pebble of fine-grained grit or quartzite was found in Kent's Cavern, and bore no indications of having been used as a hammer-stone, and that such stones are somewhat common on all the raised beaches of Devonshire." † That Budleigh-Salterton pebbles are found in raised beaches, and have been drifted great distances, we learn from Mr. Prestwich himself in his excellent paper on the *Quaternary Phenomena in the Isle of Portland*. § And when we consider that these pebbles are derived from Silurian strata, and must have been drifted eastward from the ancient rocks of South Devon or Cornwall; || that they are found in the drift gravels of South-eastern Devonshire, scattered over the surface of the land from the bottoms of the valleys, up the slopes to the summits of the hills; ¶ and that in this case the pebble is actually embedded in drifted gravel, precisely similar to that of the neighbouring raised beaches; ** it is difficult to come to any other conclusion than that it had been introduced into the cavern by natural causes, and battered, no doubt, by a thousand storms.

"*The Charcoal Bed*."—Mr. Bristow, in his notes on his survey of the cavern, tells us that "for some distance from the entrance (33 to 34 feet) a dark-coloured deposit rests upon the bed just noticed (the cave-earth); it is composed of small angular fragments of limestone, with a white powder embedded in a brown, loamy base. From the circumstance of its being

* *Report*, p. 537.

† *Ibid.*, p. 564.

‡ *Devon Association Transactions*, vol. vi. p. 803.

§ *Journal of Geological Society*, No. cxxi. p. 44.

¶ *Ibid.*

|| *Denudation of Rocks in Devonshire*, by W. Pengelly, F.R.S., p. 19.

** *Report on Briham Cavern*. Notes by Mr. Bristow, p. 496.

darkly stained with carbonaceous matter (apparently), the name 'charcoal bed' has been conferred upon it; its thickness is very variable.* Dr. Percy, however, who saw it *in situ*, stated "that it did not contain anything entitling it to this appellation." †

I have now noticed all "the slight indications of man's presence" ‡ mentioned in the Report, in addition to the so-called flint implements; and there is none of them which can be relied on as witnesses to give any support to the evidence of the flints; these stand alone, and in the expressive language of Mr. Prestwich are "without any corroborative adjuncts." §

Yet the language of the Report still shows a desire to lean on these miscalled "slight indications of man's presence," where it is said, "But although the evidence, taken altogether, sufficiently indicates the existence of man at the Cave period, we doubt whether Brixham Cave was at any time inhabited by man." ||

It is often insisted on by our law judges in summing-up cases of doubtful evidence, that however minute and apparently inconclusive detached facts may be in themselves, if they dovetail into each other as to time and place, and thus tend to form one harmonious and complete whole, then they greatly strengthen any hypothetical case. But if they are found to be irreconcilable with each other, and most of them false, in fact, then the aggregate adds no strength whatever to the cause which they are adduced to support; but that this casting about for additional and defective evidence is rather an indication of the inherent weakness which requires such support.

The Animal Remains.—The large number of bones of all kinds found in the cavern were very unequally distributed in the different beds. The remains also of the extinct and recent animals were often mingled together in the greatest confusion, and comparatively modern bones were mixed with others, presenting all the characters of the most remote antiquity. ¶ The whole group of animals also appear to belong to one geological period, as the remains of the mammoth, the bear, and the horse were found both in the lower gravel-bed and in the modern stalagmite.

The distribution of the bones and the flints in the various beds of the cavern is as follows:—

* *Philosophical Transactions*, vol. clxiii. p. 496.

† *Ibid.*, p. 486.

‡ *Ibid.*, p. 564.

§ *Ibid.*, p. 565.

|| *Ibid.*, p. 564.

¶ *Ibid.*, vol. lxiii., p. 493.

	Bones.	Flints.
In the stalagmite	25 ..	none
In the "charcoal beds" ..	52 ..	none
In the cave-earth.....	1,537 ..	20
In the gravel-bed.....	7 ..	16
	<hr/>	<hr/>
Total	1,621	36

Thus, 95 per cent. of all the bones were found in the cave-earth, and of these more than one-half lay on its surface.*

"In relation to its area the west chamber was the richest part of the cavern in the "flint implements," as well as in bones.†

"Excluding the more doubtful smaller animals, the list, as determined by Dr. Falconer and by Mr. Busk, of animal remains found in the Brixham Cave consists of: ‡—

		Number of determined specimens.
1. <i>Elephas primigenius</i> ...	Mammoth	11
2. <i>Rhinoceros tichorhinus</i>	Tichorine Rhinoceros	67
3. <i>Equus caballus</i>	Horse	30
4. <i>Bos primigenius?</i>	Great Fossil Ox } Small Fossil Ox }	28
5. — <i>longifrons?</i>		
6. <i>Cervus elaphus</i>	Great Red Deer ...	12
7. — <i>tarandus</i>	Reindeer	72
8. <i>Capreolus capreolus</i> ...	Roebuck	13
9. <i>Felis spelæa</i>	Cave-Lion or Tiger	9
10. <i>Hyæna spelæa</i>	Cave-Hyæna	57
11. <i>Ursus spelæus?</i>	Cave-Bear	354
12. — <i>arctos</i>	Brown Bear	
13. — <i>priscus s. frox</i>	Grisly Bear } }	
14. <i>Canis Vulpes</i>	Fox	15
15. <i>Lepus cuniculus</i>	Hare	2
16. <i>Lagomys spelæus</i>	Lemming	1

Some four or five of the animals in the above list are said to be extinct, the most important of which, indicative of antiquity, are the mammoth, the tichorine rhinoceros, and the cave-bear.

The bones of the bear exceed in number those of all the other mammals together,§ and they are found in all the beds of the

* *Philosophical Transactions*, vol. clxiii. p. 493.

† *Ibid.*, p. 495.

‡ *Ibid.*, p. 556.

§ *Ibid.*, p. 557.

cavern, from the surface of the stalagmite to and inclusive of the gravel-bed.* Mr. Busk appears not to have obtained any satisfactory evidence of the presence of the cave-bear; but, after an elaborate examination and measurement of the fossil molar teeth of the bear found in the cavern, he comes to the conclusion "that most of the Brixham teeth have altogether the facies of *U. priscus* (the grisly bear), and there is certainly none that can be referred to the cave-bear."† This decision is important, as two bones of bear were found two feet deep in the most ancient stratum, the gravel-bed of the cavern, leading to the inference that it was deposited during the geological age of the grisly bear, now living in North America, or of that of the common brown bear, which was abundant in England at the time of the Roman occupation, and is now an inhabitant of large districts in Europe.‡

It may, however, be readily admitted that there appears to be conclusive evidence that the large and fierce animals mentioned in the above table, at some distant period frequented the neighbourhood of the cave; but their existence, so far from indicating the presence of man, tends to show that it is improbable he could have lived surrounded with such companions. There is one famous specimen, that of the entire left hind-leg of a bear, which it is imperative to notice. It was first described by Dr. Falconer as "a superb specimen of the left hind-leg of the cave-bear, comprising the femur, tibia, and fibula folded together, with the patella and astragalus *in situ*." This description is embodied in the preliminary Report of the 9th of September, 1858, to the Royal Society; it has been adopted and amplified by Sir Charles Lyell in his *Antiquity of Man*, and is adduced by him to give a value to the evidence, and to stamp an antiquity on the "flint-knives" which it is admitted they do not in themselves possess. Sir Charles says of the flint-knives: "Neglecting the less perfect specimens, some of which were met with even in the lowest gravel, about fifteen knives recognised as artificially formed by the most experienced antiquaries, were taken from the bone-earth, and usually from near the bottom. Such knives, considered apart from the associated mammalia, afford in themselves no safe criterion of antiquity, as they might belong to any part of the age of stone, similar tools being sometimes met with in tumuli, posterior in date to the era of the introduction of

* *Transactions of the Devon Association*, vol. vi. p. 813.

† *Philosophical Transactions*, vol. clxiii. p. 546.

‡ *Popular Science Review*, vol. x. pp. 246-7, 8.

bronze. But the anteriority of those at Brixham to the extinct animals is demonstrated not only by the occurrence at one point in overlying stalagmite of the bone of a cave-bear, but also by the discovery at the same level in the bone-earth, and in close proximity to a very perfect flint tool, of the entire left hind-leg of a cave-bear." "Every bone was in its natural place; the femur, tibia, fibula, ankle-bone, or astragalus, all in juxtaposition. Even the patella, or detached bone of the knee-pan, was searched for, and not in vain." "If they were not all of contemporary date, it is clear from this case, and from the humerus of the *Ursus spelæus* (cave-bear) before cited as found in a floor of stalagmite, that the bear lived after the flint tools were manufactured, or, in other words, that man in this district preceded the cave-bear."*

The whole of this evidence in support of the high antiquity of man is destroyed by the single fact that neither the humerus in the stalagmite, nor the leg of the bear in the bone-earth, can be identified as belonging to the extinct cave-bear. The latter famous specimen, we are now told by Mr. Pengelly, is "probably that of *Ursus arctos*,"† the common brown bear which lived in England in post-Roman times, and still inhabits central Europe.

But, further, this whole statement, so fully set out and insisted on by Sir C. Lyell in the first edition of his *Antiquity of Man*, is now found to be loaded with erroneous and mistaken facts. Thus, the bone described as the fibula proves to be the radius; and that said to be the patella is, in reality, the detached end of the radius above noticed; the "flint tool" was not in close proximity to the bear's leg, but twelve feet from it; the tool was not at the same level in the bone-earth as the leg, but fifteen inches above it;‡ and if the age of the so-called knives must be inferred from the associated mammalia, then (on the assumption that they are knives) they may have belonged to neolithic or even to historic times.

It is curious that this hind-leg of the bear, the most famous specimen of the cavern, does not appear to have been recorded in the register;§ and the flint so prominently associated with it, and said to be the best-formed implement in the series, we are now told was accidentally broken after its exhumation; and has, "unfortunately, been mislaid."||

* *Antiquity of Man*, 1st ed., pp. 100, 101.

† *Transactions of the Devon Association*, vol. vi. p. 826.

‡ *Philosophical Transactions*, vol. clxiii., p. 534.

§ *The Report*, p. 533.

|| *Transactions of the Devon Association*, vol. vi. pp. 830, 831.

Considering the large number of errors which thus cluster round this once-important specimen, it is not surprising to find that, in the fourth edition of the *Antiquity of Man*, the whole of the evidence founded on it, and indeed on the *very presence of the cave-bear*, is wholly omitted; the antler of the reindeer found on the surface of the stalagmite taking the vacant place; and the result of the exploration of this famous cavern, which Mr. Pengelly more than once has told us, "revolutionized the scientific world on the question of human antiquity,"* has now been toned down by Sir Charles Lyell to the more moderate conclusion that man in Devon preceded the reindeer.†

In conclusion, I may be permitted to say that I have undertaken the examination of such of the relics from this cavern as are said to indicate the presence of man, with a strong desire to ascertain the facts of the case, and to understand and test the evidence which they are said to furnish in support of the high antiquity of man. To this end I have explored and mapped the cavern, examined the remaining portions of its beds, surveyed the geological structure of the land around, and inspected the materials contained in the so-called raised beaches of the neighbourhood, and the character of the pebbles of the present shore-line; and I have further carefully studied the somewhat voluminous literature of the cavern evidence. I therefore vouch for the substantial accuracy of the facts put forward in this paper, which, if they cannot be met and rebutted, reduce the evidence in support of the presence of man in this cavern to a minimum of contention; that is, Do the flints show secondary chippings indicative of design, or evidence of use on their edges, so confidently contended for by Mr. Evans, and shown on the engraved flint, No. 410 in *Ancient Stone Implements*? I am content to rest my whole case on this one point; and it may now be determined by any one who will examine the flints in the Christy Museum or their photograph contained in this paper.

I am aware of the weight of authority which must be attached to the high names whose opinions I have here combated, but I have at least this vantage-ground, that I stand on well-ascertained facts, and on these alone; and dogmatic assertions can no longer be considered a reply to the inexorable logic of facts, the only certain foundation on which to build scientific truth.

I have now shown that the so-called "thirty-six rude flint

* *Transactions of the Devon Association*, vol. iv. p. 73; and *Journal of the London Institution*, Jan. 1873, p. 5.

† *Antiquity of Man*, 4th ed., p. 102.

implements, of indisputable human workmanship,** are, for the greatest part, small undefinable pieces of rubble flint, mixed with a few imperfect subsoil flakes.

That the marks of use, on secondary chipping, so strongly asserted to be found on the edges of the flints, and so clearly shown on the woodcut, fig. 410 in *Ancient Stone Implements*,† are not to be found on the flint itself.

That the flint described in *Ancient Stone Implements* as a remarkably symmetrical scraper, and said to be found in the cavern,‡ was not found there, but in the soil without and above it.

That the cast of a very perfect flint-knife exhibited among other relics in the cavern, and sold to visitors as a cast of a cavern specimen, is a deception.

That the portion of a cylindrical pin or rod of ivory, said to be found in the cave,§ was not found by the committee of exploration, is not now with the flints in the museum, and that there is no evidence to show that it is a cavern specimen.

That the "charcoal bed" contains no charcoal.|| That slate has been mistaken for flint, and flint for bone; and that the description given of the "whole hind-leg of a cave-bear," the most famous specimen of the cavern, has been found to be so loaded with erroneous facts and false conclusions, that its evidence has been withdrawn and abandoned.

The carefully-prepared report of the Royal Society¶ does, indeed, correct many of the mistakes which had been made; and we are indebted to Mr. Pengelly for further corrections and admissions, by the publication of his original report, drawn up in 1862 for the Cavern Committee,** with some recent additions. But these statements, buried in the transactions of learned societies, are not accessible to the great mass of people who receive their information from popular lectures and cheap publications; and thus Brixham Cavern is still referred to as furnishing the best evidence of the high antiquity of man.

If the facts which I have brought forward in this paper are true and undeniable, as I believe them to be, then we have a right to ask those by whom we have been misled to reconsider the evidence in this case; and either openly and honestly to

* *Cave Hunting*, p. 320.

† *Ancient Stone Implements*, p. 469. ‡ *Ibid.*, p. 470. § *Ibid.*, p. 471.

|| *Transactions of the Devon Association for the Advancement of Science*, vol. vi., p. 800.

¶ *Philosophical Transactions*, vol. clxiii. for 1873.

** *Transactions of the Devon Association for the Advancement of Science*, vol. vi. p. 779.

retreat from a false position, or to fortify and hold it by such additional evidence as they can produce; and if this be not done, we may safely infer that the conclusion of my former paper is established, "that this cavern furnishes no satisfactory evidence of the existence of palæolithic man, no chronological scale by which to estimate the date of his early appearance."* "He (says Locke) whose assent goes beyond his evidence, owes this assent of his only to prejudice, and does in effect own it, when he refuses to hear what is offered against it; declaring thereby that it is not evidence he seeks, but the quiet enjoyment of the opinion he is fond of, with a forward condemnation of all that may stand in opposition to it, unheard and unexamined."

The CHAIRMAN (Vice-Admiral E. G. Fishbourne, C.B.), after conveying a vote of thanks to Mr. Whitley for his paper,† read the following passage from a work called "The Childhood of the World," by Mr. E. Clodd, F.A.R.S.:—

"There is a large cavern at Brixham, on the south coast of Devonshire, which was discovered fourteen years ago through the falling in of a part of the roof. The floor is of stalagmite, or particles of lime, which have been brought down from the roof by the dropping of water, and become hardened into stone again. In this floor, which is about one foot in thickness, were found bones of the reindeer and cave-bear, while below it was a red loamy mass, fifteen feet thick in some parts, in which were buried flint flakes, or knives, and bones of the mammoth. Beneath this was a bed of gravel, more than twenty feet thick, in which flint flakes and some small bones were found. Altogether, more than thirty flints were found in the same cave with the bones of bears and woolly elephants; and as they are known to have been chipped by the hand of man, it is not hard to prove that he lived in this country when those creatures roamed over it."—p. 29.

He added, that when statements such as this were published, it was high time that the facts should be brought to light, as done in Mr. Whitley's paper.

Rev. Prebendary Row asked if Mr. Whitley's attention had been drawn

* *Transactions of the Victoria Institute*, vol. viii. p. 223.

† Mr. J. Evans, F.R.S., President of the Geological Society, and author of the work on "Ancient Stone Implements," referred to by Mr. Whitley, was invited to be present at the reading of this paper. A correspondence ensued, in which the honorary secretary mentioned that he was aware that Mr. Whitley intended to refer to several parts of Mr. Evans's work, amongst others, to the "remarkably symmetrical scraper," figured and described on page 470; the history of which he submitted to Mr. Evans, who at once saw the mistake into which he had fallen, and wrote, "March 17, 1876. I shall, of course, alter the passage, or rather suppress it, should I ever print second edition."—Ed.

to the current number of the *Westminster Review*, in which there was a notice of the Brixham Cavern, containing several statements strongly opposed to what he (Mr. Whitley) had now advanced. The controversy seemed to him (Mr. Row) to rest on this: did these flints contain evidence of being made by man? a question rendered more easy of solution by the fact of the vast amount of flint flakes that were scattered over these islands. He had picked up a great quantity at Newhaven and it might be said that they were surface flints, the peculiar forms of which might have been occasioned by the processes of agricultural cultivation; but he dug up one specimen from a depth of five or six feet in the chalk, and it was a far more perfect specimen than any to be found on the surface; it was so sharp that it would inflict a considerable wound. Now, did that particular flint flake bear marks of human manufacture, or was it a natural production? On the Sussex Downs a very large quantity of flint flakes were to be found extending over a great area; and near Portsmouth there were whole fields covered with shattered flints. The existence of such immense quantities must disprove the idea that they were manufactured articles. He very much doubted whether all the savages who ever lived could have manufactured all the flints which he had himself seen.

Rev. W. B. GALLOWAY said he had brought with him one or two flints, which were simply the result of natural fractures, and not intended to show any design. They were picked up at Eastbourne from a crushing-machine, which crushed flints for road "metal"; and no savage could manufacture arrow-heads better adapted for his purpose than those which the crushing-machine supplied. One of these flints had the edge bevelled, and, as a secondary chipping of the flint with a view to bevelling was mentioned by Mr. Evans as an evidence of human manufacture, it was most important to find that bevelling existed in an accidental form of flint.

Mr. JORDAN thought that the reasons advanced by Mr. Row for the natural rather than the artificial formation of the flints were scarcely sufficient, for it might be urged that the manufacture of such flints would extend over a long period of time, and hence that many would be made. The question was, did such flints show signs of natural cleavage? If a flint would not naturally cleave into such forms, it was reasonable to suppose that they were of human make. If, on the contrary, the cleavage was such as would be naturally produced by blows or crushing, then we ought to look with great suspicion upon such flints as were found in association with the extinct animals. If the cleavage was natural, it would be reasonable to suppose that the flints would be found of all sizes; but if the flints were of human manufacture only, such sizes would be formed as were suitable for the purposes for which they were made. It was unquestionable that, in Nature's own laboratory, they were found of all sizes.

Rev. A. J. HARRISON, Ph.D., remarked on the extraordinary amount

of flint flakes that were to be found in the Yorkshire Wolds, and in the Staffordshire Potteries, where flints were imported from all parts, the diversity of shape among the unworked flints was most remarkable.

Mr. CALLARD said he had purchased, in 1871, one of the casts which had been referred to in the paper, as from an original found in the Brixham Cavern, and when he was in the cavern in 1875 he saw similar casts still being sold. Of course he knew that Mr. Pengelly had no wish to impose upon the public*—but had only been rather injudicious in these scientific matters, in which the greatest amount of care was necessary; and even with all the care that could possibly be taken, mistakes would continue to be made. It certainly was a very dangerous experiment for a gentleman like Mr. Pengelly to lend the person who was going to exhibit the cave, a well-formed flint, to show visitors what a flint-knife was like. Just what might be expected from such a circumstance, was what had really taken place. As to the production of flint flakes, change of temperature would do that. On one occasion he (Mr. Callard) ^{he cast} ~~received~~ a piece of flint, and then ran a stream of iced water over it, and the most perfect little specimens were produced, without the application of any blow or crushing power whatever.

Mr. S. R. PATTISON said he had not had the advantage of seeing the Brixham Cavern, but he had seen some of the specimens taken from it, and the whole question really amounted to this, whether the fifteen selected flints gave evidence of human manufacture or not, and whether any that did afford such evidence were found in the right cave, lying with the bones of the mammoth. Some of the specimens certainly had impressed him with the belief that they were produced by man, but others were of a contrary opinion; and who was to decide?

The Bishop of MELBOURNE thought the Institute was greatly indebted to Mr. Whitley for his paper, for it was very important that scientific men should examine these things before they questioned the Word of God. His own conviction was, that when the facts which were alleged were inquired into, they would not be found to lead to the conclusions which were founded upon them. He had been waiting for some time and with some degree of anxiety, to learn what conclusion scientific men would come to with regard to these flints, and he confessed that he was glad to find that the evidence of human workmanship could not satisfactorily be made out. Mr. Whitley had shown that at least a very great degree of doubt existed, as to whether the flints were of human manufacture or not, and his arguments were such as, at any rate, to prevent many people from adopting the conclusions which some scientific men of the present day had arrived at.

* For Mr. Pengelly's report on the Brixham Cavern and the mistakes that have been made, see the 1874 *Report of the Devon Association for the Advancement of Science*, especially pages 793-5, 800, 826, 829, 832, 835 836.—N.W.

Mr. E. CLODD thanked the Council of the Institute for having invited him to be present, and though he differed much from Mr. Whitley's conclusions, he also cordially thanked him for investigating this subject so thoroughly, for what was really wanted was, that the most arrant scepticism should be directed to every specimen which was reputed to be the handiwork of man. It was impossible to discuss such a question satisfactorily except in the presence of experts. It was, he thought, to be regretted that the discoveries made in other caves had been received with silent scepticism on the part of the Royal and other Societies, while the discoveries made in the Brixham Cavern had had an undue measure of importance given to them. So far as he was able to judge from comparing the Brixham Cave specimens exhibited in Somerset House, and the flints in the Christie Collection, he had no hesitation in pronouncing these so-called knives—but that was too strong a term for them—these flint flakes, to be the handiwork of man. After making every allowance for changes and differences of temperature and for the vast number of flint flakes found in certain localities, there was abundant evidence left to show the existence of a stone period in the past, which extended even down to the present time. No one could look at the carefully arranged collection of Col. Lane Fox in the Bethnal Green Museum, or at the collection in the Christie Museum, without feeling that there was strong evidence of a stone age before an age of metal, when man was content, in a state of savagery, to make use of the handiest materials he could find for his weapons. If Brixham Cavern were gone altogether, there would still be sufficient evidence to be drawn from the remarkable flints found in the valley of the Somme,* in the Thames Valley, and elsewhere; and that evidence no theory of attrition and no theory of change of temperature would upset.

Professor TENNANT pointed out that silicate in any form would never break in a straight line, but always conchoidally. If two flints were struck against each other, many flint flakes would be produced. Not very many years ago, before the percussion cap came into use, extensive flint manufactories were kept up for our old muskets. With regard to the flints that had come from the diamond fields in South Africa, the greater part of the diamonds were not found upon the surface, but were dug up from a depth of 200 feet, and at that depth there were no flints. Out of £15,000,000 worth of diamonds that had been found, not £1,000 worth had been found upon the surface. He could not reconcile his own opinion with the idea that all the flints which had been found were of human manufacture, but he certainly thought that some of them were.

Mr. WHITLEY, in replying upon the discussion, said.—I will, in the

* See Vol. VIII., page 51, where Mr. James Parker deals with the question. He urges that from the position of the flints of the Somme Valley, and the geological changes that have taken place there, it may not be at all necessary to claim the very great age that Professor Lyell and some others have done, for their formation by man.—ED.

first place, say a few words on what has been said in opposition to the opinions which I have brought before the meeting this evening. I heard with very great pleasure—because I am simply desirous of ascertaining the actual truth—that one gentleman on my left rose to take the opposite view to that which I hold, but the meeting will have observed that not one word was said in contradiction of the facts contained in my paper. The facts there set down remain untouched and unanswered. That gentleman said that I had made an attack on the honesty of gentlemen who are opposed to me, in reference to the question of these so-called implements. Now, I should exceedingly regret it if I had done any such thing; but I have looked into my paper again and I find that I have in the plainest language simply stated the facts, and made no imputations whatever. The facts may be, as they are, strong ones, but I could not have expressed them in more moderate language. One other speaker—Mr. Clodd—is the author of a clever book entitled “The Childhood of the World,” in which he has relied wholly and entirely on the Brixham Cavern evidence. Not a word was written by him, not a piece of evidence was adduced by him, from any other cavern. He said not a single word about the gravel-beds of the Somme, of which he has spoken so strongly to-night, to show that they bear testimony to the great antiquity of man. Now, I have been to the Somme three times to examine those beds, and I hold a contrary opinion to his, and probably Mr. Clodd has not given that personal attention to these gravel-beds which I have done. In the *Langham Review* there is a paper by Mr. Clodd on “The Antiquity of Man in Western Europe,” and in that paper Mr. Clodd has abandoned the whole of the Brixham evidence—he has not said one word about it. That magazine was issued in March—this month—and in it the whole of the evidence of the antiquity of man is drawn from other sources. I do not think it is quite fair when, after great care and investigation, I have produced the evidence and examined the whole literature of a special subject, that an opponent should not say one word as to the truth of my evidence, but bring forward evidence which I may not have had an opportunity of investigating. However, I have been to the Somme three times, and I have seen the whole of M. Boucher de Perthes’ collection, and that at Salisbury, and I have been to Pressigny le Grand and to Belgium, and I would not take up the position which I have taken up without having carefully and thoroughly convinced myself that I am right in this matter.*

* Mr. Whitley writes as follows:—“The Woodwardian Professor, Mr. M’Kenny Hughes, read before the *Cambridge Philosophical Society* (in November, 1876) an important paper ‘on The Evidence of Man’s Existence before the Glacial Period,’ and showed the weakness of that evidence in many cases, including the Settle Caves, and the Brandon ‘scare.’ This paper will be published in the ‘Proceedings’ of that society. *Nature*, for November 30th, 1876, contains a paragraph, showing that the drawings on bone—said to have been found in the Thayngen cave near Schaffhausen—

I, however, quite agree with Mr. Clodd that the question of the antiquity of man cannot be judged from Brixham Cavern alone, for that is an isolated case, and the only way by which we can arrive at satisfactory results, is to judge all the cases as they arise. Mr. Row has spoken of the immense number of flints found in the South Downs, and I can fully confirm his statements. On Cissbury Hill, north of Worthing, you may shovel up the split flints and flakes by cart-loads; and from thence to Eastbourne they are abundant everywhere on the surface, but more especially on the high ground; and where the down land has recently been brought into cultivation, they are turned up from the subsoil to the surface by the plough. On the chalk high lands of Central France, the flakes and the so-called tools are even more numerous, especially in the provinces of Poitou and Perigord; and what is still more remarkable, they occur in similar quantities in wide-spread deserts, where man, savage or civilized, never could have made his permanent home. Canon Tristram found them on the northern part of the Great Sahara. Eastward they occur in vast numbers on the Libyan Desert, and close up to the rich alluvial deposits of the Nile; but on the productive soil of the Egyptian Valley, which at all times supplied the means of life to a large population, they are not found; and the antiquaries who have observed and described them, mainly favour the opinion of their natural formation. M. Chabas says that the Egyptian stone implements are comparatively of modern date, and asks with surprise what could have been the use of the small flakes found in Egypt. Dr. Lepsius considers that most of them have been naturally formed, and has expressed his opinion that the flint flakes found in such abundance are natural flint fragments, splintered by the alternation of temperature; and M. Pruner-Bey considered that the

‘are pure inventions, and intentional deceptions.’” I may add that it was announced, some little time ago, that the skeleton of a man had been found “600 feet below the surface of the earth at the delta of the Mississippi,” and Sir C. Lyell calculated therefrom, that man had existed there 57,000 years ago. On inquiry, it transpired that, in excavating for the New Orleans gasworks, some burnt wood and the skeleton of a man, the cranium in good preservation, had been found at the depth of *sixteen* feet. To the foregoing I would add an extract from No. 323 (November, 1876) of the *Abstracts of the Proceedings of the Geological Society of London*:—

“Professor RAMSAY said that there was a growing opinion that the forest-beds were interglacial, and remarked that traces of man had been found in interglacial deposits in Switzerland.”

“Professor HUGHES, referring to the statement of Professor Ramsay, thought that the discovery referred to was probably that of Dr. Scheuermann, recorded by Professor Rüttimeyer, of sticks apparently artificially pointed, which had been found in lignite, and were considered to be of the age of the Dürnten Coal. He thought, however, that there were many sources of error in the observations, and was not inclined to accept the facts as recorded until further evidence was produced.”—Ed.

evidence of their human manufacture was doubtful. Sir John Lubbock, however, who appears to have especially visited Egypt for the purpose of inspecting these so-called implements, comes to the conclusion that they have been artificially formed, and in this opinion he is supported by M. de Mortillet and M. Broca. Again, on the sterile ground between Cairo and the Red Sea they occur in great numbers; and they also abound in the wadies of the Sinaitic Peninsula. Mr. J. Milne found angular and apparently freshly-broken fragments of flints, which he considers to have been broken by variation of temperature, strewn over the desert of the Tih, and thence over the high ground of Syria to Lebanon shattered flints may be found on the surface; and again, over the great and terrible desert between Syria and the Euphrates, the flints are so numerous on the surface as to have given it the name of the Desert of Flints. A knowledge of these facts, and a careful investigation of the sites of the so-called Palæolithic manufactories, within my reach during the past twelve years, have so impressed my mind with the certainty of the natural production of these imaginary flint implements, that I should be untrue to my convictions if I did not firmly hold this opinion; and unfaithful to myself if I did not express it through evil or good report. My views on this question have lately been strengthened by the opinion, now generally held by the American antiquaries, that they fail to find any line of demarcation between the implements of the Palæolithic and Neolithic ages; and such appears also to be the opinion of Mr. William Gray, from an extensive examination of the shattered flints in the north of Ireland. The inference being, that there is, in fact, no Palæolithic age.

The meeting was then adjourned.

NOTE.—Mr. Whitley could scarce desire a better justification for some of the statements in his paper than is afforded by the following:—"A Conference on the question of the Antiquity of Man was held on May 22, 1877. The President, Mr. J. Evans, F.R.S. (President of the Geological Society), in opening the conference, alluded to the altered position of the question since it was first brought before the British public in 1859, and pointed out the extreme caution which was necessary in dealing with the subject, as it lay within the domain of the archaeologist, the anthropologist, and the geologist; neither of whom was sufficient, alone by himself, to offer a very strong opinion on the subject. Great care was also necessary with regard to the facts of the discoveries themselves, as the objects discovered were liable to get mixed with other objects below them; and this was important in the case of cave-deposits, in which there might be interments of a later date than the human skeletons deposited in the caves. The question was now very much within the province of the geologist, whose business it was to determine the antiquity of the deposits in which the discoveries may have been made. After alluding to several recent discoveries in France, Spain, and Switzerland, the President remarked that each successive discovery, or presumed discovery, must be received in a cautious but candid spirit; and, looking to the many sources of doubt and error which attached to isolated discoveries, their watchword must for the present be 'caution, caution, caution'."—*Nature*.

FOSSIL AGRICULTURAL IMPLEMENTS. A Note on
American Flint Hoes. By Principal DAWSON, LL.D.,
F.R.S.*

LITTLE attention seems to have been given by European Archæologists to the possibility of some of the ruder flint implements found in the river gravels having been agricultural tools, though I suggested this many years ago in a paper published in this country after a visit to the celebrated Amiens localities. My attention has recently been again directed to the subject in preparing a few popular papers † on the application of American antiquities to the explanation of European prehistoric remains.

The American Indians, before the European discovery, carried on the culture of maize, beans, and pumpkins from the Gulf of Mexico northward to the St. Lawrence, and the region of the great lakes. As they had no domesticated animals, their tillage of the ground was all done by manual labour, and their ordinary tool, according to the testimony of all the early voyagers and travellers, was that time-honoured implement, the hoe. In the absence of metal this had to be constructed of wood, shell, bone, or stone, or some combination of these. Among many tribes a curved stick, or a stick with a branch or prong, served the purpose. Others attached to the wooden handle a flat bivalve shell, the blade-bone of a deer, or a flat stone, sometimes provided with notches at the side.

The most artificially-constructed flint hoes known are those from the neighbourhood of St. Louis, described by Professor Rau in the Smithsonian Report for 1868, and by Mr. Jones, in his *Antiquities of the Southern States*. I had an opportunity of inspecting one of these recently, in the collection of the latter gentleman. It was slightly rounded in the front of the blade, and evidently polished by long use in the soil. Near the upper part were two deep notches to facilitate its firm attachment with thongs to the end of the handle.

* Read Feb. 5, 1877.

† In the *Leisure Hour*.

The more usual form of hoe found throughout the agricultural regions of America is an oval or ovate flat chipped flint, not very dissimilar from many of those of the so-called Amiens type, but usually somewhat thinner, and often of very large size. Foster, in his *Prehistoric Races of America*, describes several such implements from Illinois. Some of them are as much as thirteen inches in length, and may have been used as spades rather than as hoes. It is characteristic of these implements that they are found in large numbers together. Thus Abbott describes a cache of such tools, called by him hatchets, found in New Jersey, and containing one hundred and fifty. In the collection of the Brooklyn Historical Society is one of these implements, stated to be from a similar deposit. But, as might be expected, the greatest repositories of these tools are among the remains of the semi-civilized "Mound-builders" of the Ohio and Mississippi valleys, one of the oldest peoples of the American continent. Squier describes a deposit in Ohio in which as many as six hundred of these tools were found, while a vast number besides must have existed in it. These were under a mound supposed to have been of sacrificial character, and their discoverer seems at a loss to conjecture their use.

The same writer informs us that the "Flint ridge," which is one of the quarries from which the mound-builders obtained the material of these and other implements, "extends for many miles, and countless pits are to be observed throughout its entire length from which the stone was taken. These excavations are often ten or fourteen feet deep, and occupy acres in extent." Similar repositories of flints where very extensive manufactures have been carried on, in the Uintah hills in Wyoming, are described in one of Hayden's reports on the Western territories.

The occurrence of these roughly-shaped hoes in large deposits may be explained in several ways. Mr. Jones has pointed out to me a statement of Carver, that the makers of flint implements were in the habit of hiding away quantities of them until required for use, or for purposes of trade. Deposits of this kind would, however, consist of various kinds of weapons and implements, not usually of one kind alone. Again, in the case described by Squier, the accumulation may have been a great act of sacrifice. It was the practice of the mound-builders to offer public sacrifices, and the occasion (or some rule of their worship) caused that in some instances tobacco-pipes were offered, in others weapons, in others ornaments; and there seem to have been some of these rites in which agricultural tools were proper offerings, perhaps to

secure an abundant harvest, or to avert injuries from the crops. Another and probably more important reason was that the tillage was often done by large bands of men and women working together on grounds common to the tribe. When the work was finished, the tools prepared for it would be covered up in some place where they could remain safely till again required. In the same way, and for the same reason, the stone gouges used by the Indians in their sugar-camps in spring were hidden away in numbers till the returning season again brought the tribe to the sugar-grove.

These facts applied to the stone implements found in river gravels in Europe give some probability at least to the theory that they were agricultural hoes and picks. An agricultural population would cultivate the alluvial lands near the rivers. They would seek in the neighbouring flint-gravels for the material of their hoes. After use they would leave these in their fields or garden-beds in large numbers. Subsequent river-floods might mix the used and unused hoes with the rejected pieces in the re-arranged gravel-beds, and all this might take place without mixture of the other implements used by the people. It would thus appear possible that the valley of the Somme, for example, may have been the seat of a primitive agricultural people, whose residences may have been in fortified "pahs" or villages on the high grounds, while their fields lay along the stream. Where they resided, domestic implements, pottery, and weapons of polished stone or bone may be found.* Where they laboured the fields, only palæolithic implements may occur. There may also have been contemporary hunting populations in the hills who would not use any hoes, but only spears, arrow-heads, &c. Further, in any case such implements as hoes would be little likely to occur in caves or Swiss lake-habitations, while they might be very abundant in valleys and the beds of streams. Lastly, the case of the American mound-builders shows that a people may use palæolithic stone instruments in their agriculture, while they have in other respects attained sufficient civilization to possess polished and often elaborately-carved weapons, and ornaments of stone and metal, good pottery, and even textile fabrics. This, which was actually the case in America, may have also held good in prehistoric Europe.

In connection with this, it is interesting to reflect that the Scriptural history seems to imply the existence of a great agricultural population in antediluvian times in the valleys of certain rivers in Western Asia. If these people tilled the

* Genesis iv. 17, v. 29, vi. 1, vi. 21.

ground with rude stone implements before the extensive introduction of metals and before the domestication of the ox, they must have left vast numbers of palæolithic implements to be swept away by the waves of the deluge or buried in the river alluvia, and they must also have left behind extensive excavations and quantities of chipped stones in the localities where they quarried and manufactured their agricultural tools. All who attach a historical value to the Book of Genesis must be prepared for the discovery of such remains in beds far older than the oldest Assyrian monuments. We have perhaps a hint of the difficulties of the labour question in those days, in the saying attributed to Lamech on the birth of his son Noah, "This shall comfort us concerning our work and toil of our hands because of the ground which the Lord hath cursed." Whatever the reason of the hope expressed, the saying is the groan of a man oppressed by the hard labour of manual husbandry, carried on perhaps with implements no better than the flint hoes of the ancient Americans.

(I should have stated above that in the paper of Professor Rau on "Agricultural Flint Implements," he suggests that many of the rude implements found in deposits underground may be "roughly-edged fragments, destined to be made into spear or arrow-heads at a future time," and buried in order to preserve them in a moist and easily chipped condition. In any case this habit of the American aborigines of forming large deposits of roughly-chipped implements, is of great interest with reference to the so-called Palæolithic remains of Europe.)

A discussion ensued, in which the following took part:—Vice-Admiral E. G. Fishbourne, Rev. J. Fisher, D.D., Mr. T. K. Callard (who considered that—what were termed—the Abbeville and Amiens "flint implements," which he had seen, did not present indications of having been made by man), and the Honorary Secretary (who drew attention to Mr. Parker's report on the Somme Valley, *Transactions*, vol. viii. p. 51; and Dr. Dawson's present Remarks as to the "so-called Palæolithic remains in Europe").

The meeting was then adjourned.

ANNUAL GENERAL MEETING,
HELD AT THE HOUSE OF THE SOCIETY OF ARTS,
MONDAY, MAY 29, 1876.

THE RIGHT HONOURABLE THE EARL OF SHAFTESBURY, K.G.,
 PRESIDENT, IN THE CHAIR.

The HONORARY SECRETARY, Capt. F. PETRIE, read the following Report:—

TENTH ANNUAL REPORT of the Council of the
VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF
GREAT BRITAIN.

Progress of the Institute.

1. In presenting the TENTH ANNUAL REPORT, the Council desires to state that the progress of the Society, due in no small degree to the personal interest taken in its welfare by those who have become its supporters, has been such as to encourage the hope that it may speedily be adequately powerful to undertake all it was designed to accomplish; but that this hope may be realized, it is not the less necessary that those efforts which have placed it in its present position should not be relaxed. The average increase of Members and Associates during the past five years has been upwards of one hundred annually, and the actual number of additional names has slightly increased each year. Such progress has greatly contributed towards making the objects of the Society more widely known, and its work more telling.

* During the year, 1875, 115 Members and Associates have joined (12 being foreign, 64 country, and 33 resident in town).

2. The election of the Vice-Presidents and Council has been carried out in accordance with the proposition agreed to at the 1874 Annual Meeting, namely, by voting-lists being forwarded to the members. The following have been elected:

President.—The Right Honourable the EARL OF SHAFTESBURY, K.G.

Vice-Presidents.

The Right Honourable the EARL OF HARROWBY, K.G.

PHILIP HENRY GOSSE, Esq., F.R.S.

CHARLES BROOKE, Esq., M.A., F.R.S., P.R.M.S., &c.

Rev. ROBINSON THORNTON, D.D. C. B. RADCLIFFE, Esq., M.D., &c.

W. FORSYTH, Esq., Q.C., LL.D., M.P. Rev. Principal T. P. BOULTBEE, LL.D.

Hon. Treasurer.—WILLIAM NOWELL WEST, Esq.

Hon. Sec. and Editor of Journal.—Capt. F. W. H. PETRIE, F.G.S., F.R.S.L., &c.

Council.

ROBERT BAXTER, Esq. (*Trustee*).

Rev. A. DE LA MARE, M.A.

REAR-Admiral E.G. FISHBOURNE, R.N.,
C.B.

R. N. FOWLER, Esq. (*Trustee*).

WILLIAM H. INCE, Esq., F.L.S.,
F.R.M.S.

ALEX. M'ARTHUR, Esq., M.P.

EDWARD J. MORSEHEAD, Esq., H.M.C.S.

(*Hon. Foreign Sec.*).

ALFRED V. NEWTON, Esq.

WILLIAM M. ORD, Esq., M.D.

S. D. WADDY, Esq., Q.C., M.P.

WILLIAM VANNER, Esq., F.R.M.S.

ALFRED J. WOODHOUSE, Esq., F.R.M.S.

Rev. J. H. RIGG, D.D.

Rev. Prebendary ROW, M.A.

Rev. Canon TITCOMB, M.A.

J. A. FRASER, Esq., M.D., I.G.H.

Rev. CHARLES GRAHAM.

T. W. MASTERMAN, Esq.

H. CADMAN JONES, Esq., Barrister-at-
Law.

Rev. J. G. WOOD, M.A., F.L.S., &c.

Rev. W. ARTHUR, D.D.

C. R. BREE, Esq., M.D., F.Z.S.

JOHN ELIOT HOWARD, Esq., F.R.S.

Rev. G. W. WELDON, M.A., M.B.

Rev. Principal J. ANGUS, M.A., D.D.

J. BATEMAN, Esq., F.R.S., F.L.S.

The MASTER of the CHARTERHOUSE.

3. The library has received several valuable additions through the generosity of members.

4. The Council regrets to announce the decease of the following valued supporters of the Institute:—

The Rev. Prebendary E. B. Elliott (Member); T. Ensor, Esq. (Foundation Associate); the Rev. G. Lawless, M.A. (Associate); the Ven. Archdeacon Long, M.A. (Member); P. McFarlane, Esq. (Foundation Life Member); W. Foster Newton, Esq. (Member); S. H. Smith, Esq. (Associate); the Ven. Archdeacon Stanton, M.A. (Member); the Rev. J. Williams, M.A. (Foundation Associate).

5. The following is a statement of the changes which have occurred during the past twelve months :—

	Life		Annual	
	Members.	Associates.	Members.	Associates.
Numbers on 1st June, 1875	29	13	294	248
Deduct deaths ...	1	—	4	4
	<u>28</u>		<u>290</u>	<u>244</u>
Withdrawn	—	—	9	14
			<u>281</u>	<u>230</u>
Joined between June 1st, 1875, and May 1st, 1876	2	1	46	67
	<u>30</u>	<u>14</u>	<u>327</u>	<u>297</u>
	44		624	
Total			668*	

Hon. Foreign Correspondents and Local Secretaries, 13.

Finance.

6. The Audited Balance Sheet of the Treasurer for the year ending 31st December, 1875, is appended, showing a balance due to the Treasurer of £14.† It will be observed that the Balance Sheet is no longer divided under two heads ("General Account," and "Special Fund for Library," &c.). The total amount now invested in the New Three per Cent. Annuities is £666. 0s. 1d.

7. The arrears of subscription are now as follows :—

	1872.	1873.	1874.	1875.
Members	1	3	3	6
Associates.....	1	1	3	11
	<u>2</u>	<u>4</u>	<u>6</u>	<u>17</u>

8. The estimated ordinary assets of the Institute for the

* Joined during May, 3 Members and 6 Associates; total, 677, and 13 = 690. The total number on the 1st of January, 1871, was 201.

† It should be noted that the sum of £71. 11s. was due to the Society from various Members and Associates on account of unpaid subscriptions for the year 1875; all but £23. 4s. of this has since been paid. (See sect. 7.)

current year, exclusive of arrears and of new subscribers, are as follows:—

Annual Subscribers.	£.	s.
327 Members, at £2. 2s.	686	14
297 Associates, at £1. 1s.	311	17
Vice-Patrons, Life Members, and Life Associates.		
(Dividend on £666. 0s. 1d.		
Three per Cent. Stock) ..	18	11
Total.....	£1017	2

Meetings.

9. The following is a list of the papers for the present session, viz.:—

“On Present Day Materialism.” Rev. J. McDUGALL. December 6, 1875.

“On Scepticism.” By the Rev. ROBINSON THORNTON, D.D., V.P.; being the Fourth and concluding portion of the Arguments brought forward in the Author’s Papers on “The Logic of Scepticism,” “The Credulity of Scepticism,” “The Varying Tactics of Scepticism,” read in 1866, 1869, and 1874. The present Paper will be entitled “The Sorrows of Scepticism.” January 3, 1876.

An Examination of a work entitled “The Unseen Universe, or Physical Speculations on a Future State”; its Scientific Conclusions and Theological Inferences. By Rev. Prebendary W. J. IRONS, D.D. January 17.

“On Heathen Cosmogonies compared with the Hebrew.” By Rev. B. W. SAVILE. February 7.

“On Traces of early Phœnician, Jewish, and Carthaginian Intercourse with the British Isles.” By F. A. ALLEN, Esq. February 21.

“The Horus Myth.” By W. R. COOPER, Esq., Sec. Soc. of Biblical Archaeology. March 6.

On “A Critical Examination of the Flint Knives from Brixham Cavern.” By N. WHITLEY, Esq., C.E. (With Photographic Illustrations.) March 20.

“Egypt and the Bible.” By J. E. HOWARD, Esq., F.R.S. April 3.

“The Place of Science in Education.” By Professor A. ALLEYNE NICHOLSON, M.D. (St. Andrew’s University). April 10.

“The Metaphysics of Scripture.” By Professor CHALLIS, F.R.S., F.R.A.S. (Cambridge). May 1.

Anniversary Address. By Professor BIRKS, Cambridge. (*At the Society of Arts’ House, John Street, Adelphi.*) May 29.

On “The Theory of Unconscious Intelligence as opposed to Theism.” By Professor MORRIS, M.D., Michigan University. (*At the Society of Arts’ House, John Street, Adelphi.*) June 19.

Extra Meeting) Special Discussion on Rev. Prebendary IRONS’ Paper, read January 17th as above. July 3.

10. The meetings during this session have been as well attended as usual, the Anniversary, and the meeting of the 19th of June being held at the House of the Society of Arts, the rooms of the Institute not affording adequate accommodation.

Publications.

11. The Ninth Volume of the *Journal of Transactions* has been issued, and the several quarterly parts for the current year will appear in due course.

12. In the publication of the *Transactions* the Council has continued the practice of printing in full the papers read, and the discussions thereon, so that country and foreign members, although unable to be present at the meetings, may enjoy, as far as possible, the same advantages as those attending them; and in many instances communications in regard to important points not taken up at the meetings have been sent in by country members. These, being added to the *Journal*, have enhanced its value.

13. Lectures (in furtherance of Object V.) have been given in England and Ireland by some of the members, the papers in the *Journal* being the basis of such lectures. One member in a North of England town (noted for the prevalence of scepticism therein) has been giving lectures for some time past, once, and sometimes twice, a week, to audiences of from 1,500 to 2,000. This member reports that he has found in the *Journal* exactly that which he needed for his work, and which he had looked for in vain elsewhere.—The Institute is also indebted to him for a considerable addition to its Library.—In Italy the papers in the *Journal* are translated and published.—In India, the *Journal* has been found valuable in work among the Brahmins.*—In America, the *Transactions* are becoming popular; and the impartiality of the mode of carrying out the investigations has attracted attention.

14. The Hon. Local Secretaries have been added to, and their work is being supplemented by, the efforts of other members, and by two supporters of the Institute now making

* The late Sir Donald McLeod urged strongly the need of extending the Institute's sphere of action to India, &c. See *Speech at Annual Meeting* vol. vii. p. 180.

a tour in some of the Colonies. Such efforts not only promote the first objects of the Society, and increase its powers of action, but also tend to make the Society, its design, and its publications, more widely known.

15. "The People's Edition."—The vast amount of unsound, and in many cases avowedly infidel, cheap literature on philosophical and scientific subjects, now in circulation, especially in the larger towns of the United Kingdom, induced the Council in 1874 to begin the issue in a cheap form of single copies of some of the papers in the *Journal*; since then six papers have been issued in this form, entitled "The People's Edition." The plan has been carried out, by deciding beforehand upon the paper to be so issued, and, when it was printed for the *Journal*, striking off extra copies upon common paper. For the sale to the public of the "People's Edition" (and of the *Journal* generally) a scheme of bookseller-agents in fifteen leading towns of the United Kingdom, having been matured, has been in full operation since August last: the results have in some cases exceeded anticipation. Nearly half the Institute's accumulated stock of single papers has been issued to these Agents, some of whom have begun to include our publications in their own circulated list of books. Although the profits have been small, by reason of the low scale of prices necessarily adopted for the "People's Edition" when starting the scheme, yet the importance of the step taken will be apparent. Altogether about 20,000 copies of the papers which appear in the *Journal of the Transactions* were published in a separate form during 1875, and the demand for them appears to be increasing.

16. From time to time the Institute receives requests from clergymen, missionaries, Scripture-readers, &c., for grants of the single papers, for circulation amongst certain classes of the population (working-men in manufacturing, mining, and other districts—especially those districts in which lecturers or literature advocating views tending to scepticism are common). The smallness of the "People's Edition" Fund (founded by a non-member) has not allowed of more than a few such requests being complied with; but should this fund receive further support,* the Institute will be better able to meet any urgent application of the kind.

* The donation of £50 from Mr. J. E. Howard, F.R.S., to this fund was, according to stipulation, expended in issuing a large edition of his paper on Professor Tyndall's Belfast address.

Conclusion.

17. The good understanding existing between this and other scientific societies continues to increase, and with many of the leading ones at home and abroad, the Institute exchanges Transactions.

18. Finally, the future of the VICTORIA INSTITUTE rests in no small degree with its present supporters; it is most important that it be maintained in a state of thorough efficiency, and the present Members and Associates may greatly contribute thereto by introducing new supporters; more especially such as may take a leading part in carrying out its objects.

19. The Council cannot but feel thankful for the success which has attended the Society's exertions, and the place it occupies in the estimation of those best qualified to judge of its value.

Signed on behalf of the Council,

SHAFTESBURY, *President.*

**DONATIONS TO THE ENDOWMENT FUND
DURING 1875.**

	£.	s.	d.
Miss CURTEIS	1	1	0
(<i>Funded.</i>)			

**DONATIONS TO THE LIBRARY FUND
DURING 1875.**

	£.	s.	d.
A. WOODHOUSE, Esq.	3	0	0
Miss CURTEIS	1	1	0

**DONATIONS TO THE "PEOPLE'S EDITION" FUND
DURING 1875.**

	£.	s.	d.
J. E. HOWARD, Esq., F.R.S. (for a Special Paper).....	50	0	0
G. HARRIES, Esq.	10	0	0
I. BRAITHWAITE, Esq.	5	5	0
F. BISSET HAWKINS, Esq., M.D., F.R.S.....	5	0	0
Rev. J. RATE	2	0	0
J. H. WHEATLEY, Esq., Ph.D.	2	0	0
A. WOODHOUSE, Esq.....	2	0	0
Rev. Preb. BROOKS.....	1	1	0
Miss CURTEIS	1	1	0
Admiral NOLLOTH, R.N.	1	1	0
	<u>£79</u>	<u>8</u>	<u>0</u>

(*Now used up.*)

The following balance sheet was then read :—

TENTH ANNUAL BALANCE SHEET, *from 1st January to 31st December, 1875.*

RECEIPTS.	£.	s.	d.
Balance from 1874, brought forward	35	10	3
Subscriptions:—			
3 Life Members	63	0	0
1 Member for 1873	2	2	0
11 „ 1874	23	2	0
271 „ 1875	569	2	0
4 „ 1876	8	8	0
39 Entrance-fees	40	19	0
2 Life Associates	21	0	0
1 Associate, 1873	1	1	0
10 Associates, 1874	10	10	0
234 „ 1875	245	14	0
8 „ 1876	8	8	0
1 „ 1877 to 1880	4	4	0
	997	10	0
Six months' Dividend on £581 17 0			
New 3 per cent. Annuities	8	13	1
Six months' Dividend on £666 0 1			
New 3 per cent. Annuities	9	18	2
	18	11	3
Received for use of Room	1	1	0
Donations to Library Fund	4	1	0
„ Special Fund (£50 for a special Paper)	79	8	0
Endowment Fund	1	1	0
Sale of Journals, &c.	60	6	6
Balance, Dr.	14	0	0
	£1,211	9	0

EXPENDITURE.	£.	s.	d.
Printing	396	5	0
Binding	16	17	5
Reporting	28	17	6
Stationery	42	10	6
Postage	89	18	0
Advertising	88	7	2
Expenses of Meetings	22	14	6
Rent to Christmas, 1875	157	10	0
Salaries for Year, Clerk	39	5	0
„ Extra Clerk	8	14	6
	47	19	6
Rent for Clerk	13	0	0
Housekeeper	20	9	8
Travelling Expenses	13	19	7
Coals	3	1	6
Gas and Oil	4	12	0
Insurance	0	12	0
Sundry Office Expenses	8	7	8
To Expenses of Hon. Secretary	100	0	0
Bankers' Charges	0	11	1
Investments £118. 4s. 2d. New 3 per cent. Annuities	111	15	0
Library, Books, Bookcase, Repairs, &c.	26	5	6
Cost of Removing Institute, &c.	17	15	5
	£1,211	9	0

We have examined the Balance Sheet with the books and vouchers, and find a Balance due to the Treasurer of £14.

G. C. HARRISON, }
JOHN ALLEN, } *Auditors.*

W. N. WEST, *Treasurer.*

Mr. J. E. HOWARD, F.R.S.—I will confine myself to the simple duty of moving, “That the report of the council, now read, be received, adopted and circulated among the members and associates.”

Admiral NOLLOTH, R.N.—I have great pleasure in seconding this resolution.

The resolution was then put and carried unanimously.

The Right Rev. Bishop RYAN, D.D.—I have to move, “That the thanks of the members and associates be presented to the council and honorary officers for their efficient conduct of the business of the Victoria Institute during the past year.” I have great pleasure in moving this resolution, because of the very great importance of the work of the Institute, and also because of the efficient manner in which that work has been carried on. I think that only those who have laboured, as I have, in the large towns of the north of England, can have any idea of the great importance of the work that is being done by this Institute. The most infidel sentiments are very largely circulated among the working people there, in publications that are printed and diffused widely throughout these districts; and, in addition to that, lecturers are continually coming to our great northern towns, endeavouring to subvert the principles of religion, and even the belief in an intelligent Creator. It may very naturally be asked, “Why do not the clergy meet them?” The truth is, that the clergy have not the time to do so, having to attend to the sick as well as to all their other duties in parishes, the population of which may often be numbered by tens of thousands. I have 30,000 people attached to one church, and although I have six curates acting with me, we have not time for performing all our duties, or for visiting the people with the view of bringing the truths of religion to bear upon them. At the close of one Sunday service a short time ago, a young man, himself once an infidel, came and asked me if I could tell him any way in which he could procure some of our publications, and he would distribute them on Sunday nights to those who were going to hear the infidel lecturers. This is one instance of the value of such a society as ours, and I am glad we have such publications as it affords, because, and I am sure our noble chairman will agree with me, it is better not to answer infidels at all than to answer them in an imperfect way. I did not hear from the honorary secretary, in the account he gave us of the proceedings of the past year, of the almost gratuitous way in which the services we are acknowledging in this resolution have been performed; the fact being, I believe, that the item of salaries has only cost the Institute about £38 per annum. (Hear, hear). For this small outlay a great deal of honorary service is done, and you will doubtless agree with me that we should not overlook this fact. (Cheers).

Mr. M. J. STEWART, M.P.—The best test of the good done by this society is to be found in the statement which our honorary secretary has just read to us. The results have, as we must all acknowledge, been extremely satisfactory; especially when we notice the fact that the increase in the number of our members during the past year has been no less than 115. The

expenses have, at the same time, been so diminished that they have been reduced to the lowest possible point. For instance, the item of salaries has averaged about £38 per annum during the past five years, while the operations of the society have been so extended, as not only to reach those cases that have been alluded to as occurring in the busy manufacturing and mining parts of the country, but they have also stretched as far as America and our Colonies. (Hear, hear.) But beyond this, we have during the past year had printed and published a people's edition of certain treatises which have been put forth here. (Hear, hear.) All this points to one fact, namely, the earnestness and zeal which has been displayed by the honorary officers, which together with their genial manner and tact, redounds greatly to their credit. I think the best thanks of the society are due to them. (Applause.) We all know that a machine, however well put together, and however skilful the workmanship that has been employed upon it, unless it be well handled and ably managed, will not do much good work. We look forward to the time, and we trust that it will not be far distant, when the operations of this society will be even more largely diffused throughout the world, and especially in this country. It cannot have escaped the attention even of the most thoughtless of our statesmen, or of those who are not necessarily associated with politics, that immense importance attaches at the present moment, perhaps far more than at any other time, to the putting into the hands of our people good, and pure, and sound reading. (Hear, hear.) Not only has this fact been acknowledged by other societies that have been successful in disseminating the best works of the best authors, but this society has adopted a somewhat higher and more elevated point of view, and endeavours to instruct those sceptics, those rationalists and those materialists, of whom, alas, so many are found in this country, in the more abstruse and difficult points connected with Bible teaching; and, as was truthfully and practically remarked by the last speaker, unless we are able to direct the minds of these classes into the very best channel, and to explain the real meaning of the more difficult questions and points of philosophy and science, especially those bearing upon the great truths revealed in Holy Scripture, we had better not attempt to meddle with those points at all. (Hear, hear.) A new and very practical object of this Society may be found in "the people's edition" of some of the more popular papers which they have thought fit to publish this year. It is stated in the report, that with increased funds this useful department of the Institute's operations might be very greatly extended, and I trust that the friends of this Institute will bear in mind, that with a view to placing "the people's edition" within the reach of the people generally, it is sold at a nominal profit. It is a remarkable fact that the earnestness of inquiry into scientific truth, exhibited by members of this society, extends not only among those who are philosophers and men of large education in connection with our universities and our great centres of learning, but a similar zeal is to be found among a lower stratum in this country. We have many skilful artizans and miners and persons

engaged in our factories, who are most eager and anxious to grasp the difficulties that beset them on scientific and Biblical subjects—persons whom you would have supposed to have been the very last to read such treatises as those of the late Mr. John Stuart Mill ; but these are the very persons who are found bringing their acumen to bear on those abstruse questions which the more generally educated classes pass over, and it is to such minds as these that we are also directing our efforts, in the endeavour to show them the truth and the purity of the Scriptures and revealed religion. (Hear hear.) And not only is such the case in this country, but only a very short time ago I heard discussed at a very large meeting, the question, how came it that, at this moment, in India, people not only ranking among the native princes and others who have recently been entertaining the Prince of Wales so magnificently, but persons holding a much lower position in the social scale, are striving to work out those difficulties and problems. Now a society such as this, which has already commenced operations in India, may be extended so as to do great and lasting good there. (Applause.) I do not propose to trespass longer on the time of the meeting, and I will only add that I have come hastily, like the right hon. gentleman near me (Mr. S. Cave, M.P.) from the House of Commons, in order to show my sympathy with the work in which the society is engaged, rather than to add anything new in the way of information to the knowledge you already possess. I thank you for having so kindly listened to me, and beg to second the resolution. (Applause.)

The Right Hon. S. CAVE, M.P.—I have to apologise for having been detained in the House of Commons rather longer than I expected. I ought to have seconded the first resolution ; perhaps, however, I may be allowed to speak to the one just moved and seconded (cheers), though probably very little remains for me to say after what has been already stated. Unfortunately, I have only heard my honourable friend who spoke last, and I am sure I most cordially agree with every word he has said. Our best thanks, no doubt, are due to all who have taken part in the operations of this society, not only for the energy and zeal they have displayed, but also for the tact and discretion with which they have acted ; because, if ever there was a work which more than another required not only energy and zeal, but also the soundest judgment and discretion, it is such a work as that in which we are engaged. We must remember that our motto is “Defence, not defiance,” and we must recollect that we are dealing with difficult problems which are exercising intellects of very different kinds. There are those sceptics, whom I may call political sceptics, such as those who arose during the first French Revolution ; who hated religion, as the badges of the party they opposed, and who sought to upset old forms of faith as well as the existing political and social status. There are also sceptics who are so from mere pride of intellect, men who fancy that there can be nothing which they do not understand, and exalt the goddess of reason above all other powers. And there are sceptics of another kind, those who are

sincere doubters, who are struggling towards a proof of that to which their honest minds refuse to give a blind assent, and to which their intellects do not permit them to agree. Among people of this class are those of whom we must expect to meet more and more in the present transitional state of things. We are beginning to educate the people, and there is nothing, as we know proverbially, so dangerous as "a little knowledge." The masses of this country are in that position in which they may be said to have a little knowledge; therefore, it is to be expected that doubts of all kinds, on religious, as on other topics, will creep in amongst them. They will, to a certain extent, possess and display that pride of intellect to which I have referred, and which refuses to believe things that do not commend themselves to their understanding, and at the same time they will have that difficulty in appreciating the truth which is always found amongst those who have "a little knowledge." But we must look these things in the face, and do the best we can to alter them; and we must do this by employing sound and appreciable argument. (Hear, hear.) You cannot tell people to receive things without question as a matter of faith, any more than you can persuade your children to sit still and ask no questions. I recollect that when I was a boy, and asked a difficult question, I was sometimes told it was not my business to ask; but I am afraid that this was an indication rather of the inability of the person so as asked to answer the question, than of my being wrong in asking it. In dealing with those whose opinions we desire to modify or influence, we must be careful not to impute motives, we must simply state facts. We may, no doubt, show, as we have endeavoured to show, the inconsistencies of those who start forward in their pride of intellect, and proclaim that those old stories which we have believed from our childhood are not true. Some one once said, I think, of Voltaire, "Oh, infidel, great is thy faith!" and if we can show that the sceptics with whom we have to cope, are prone to fall into inconsistencies greater than those they sneer at in us who believe, we shall, in my humble judgment, be doing good work. (Hear, hear.) Lepsius, the scientific traveller who explored the East, refused to believe the miraculous character of the journey of the children of Israel from Egypt to Canaan. He said that Moses was a great general, who conducted his people from one district to another, and had good reasons for every movement that he made. He entirely refused to believe that the children of Israel were fed with manna by a miracle. Manna, he said, was simply a distillation from the tamarisk bush—a distillation which I myself have frequently tasted—and that Moses took one route rather than another because tamarisks were more abundant. Now, surely the idea that two millions of people, or more, were fed for so many years by the exudations of the tamarisk, which only drop at one season, and the whole supply of which, throughout the whole district, would not have afforded them one meal, required a greater capacity for belief, than the whole history which the Book of Exodus has put before us. Well,

what we have to do is simply to state the case fairly, to adduce arguments in favour of facts that are thus disputed, and to bring people's minds to bear upon them in such a way that they may be convinced of their truth, and if so convinced, their convictions will be far stronger than those of people who are from the first ready to take everything on trust. There is one thing that we should be most careful about in conducting our arguments. Very often people arguing on these subjects do mischief by suggesting fresh doubts, while endeavouring to clear up others, and although, no doubt, those who have strong well-regulated minds may experience no difficulty in passing successively on from one stage to another—and there are, and have been, many philosophers who, in our own day, and in days that are past, began as sceptics, and by convincing themselves at each step that they had still farther to go, have ultimately risen from a youth of scepticism to an old age of belief, yet who can tell how many sceptics there have been who have died in their unbelief? There is nothing so dangerous as to sow doubts without knowing upon whose minds the seed may fall. We know that many a great author has, in his latter days, looked back with remorse when impressed with the idea that the tendency of his earlier writings has been to do much mischief; and I am afraid that many of those who have suggested doubts, for the mere purpose perhaps of getting up an argument, or from curiosity to hear what may be said on the other side, and then have passed on and thought no more about it, may have done the same sort of mischief. (Hear, hear.) It is no excuse to say, "I was then imperfectly informed, now I know better." He ought to recollect in time, how very limited are our own intellects, and that things may soon appear quite clear which we formerly doubted, whilst on the other hand we may wonder at our believing others which appeared very clear to us a short time before. What can be more extraordinary or impossible of belief than many of those truths of natural history which are now known and believed by every man, woman, and child, who has received any education on the subject, but which scarcely any one in the last generation would have given credence to? I think that one of the first points we ought to consider and inculcate is, how very humble the limited intellect of man ought to make him. (Hear, hear.) It seems to me that true humility is not more the attribute of an unquestioning childlike faith, than it is of the highest genius, and that the higher the genius, and the more profound the knowledge, the more humble is the mind and intellect of the truly wise man. (Hear, hear.) But, at the same time, we must recollect in all these arguments, that different minds are differently affected. We all know the old story of Charles V, who tried to make all the clocks in his palace go alike, and who, on finding that he could not succeed, said, "How very foolish I must have been in trying to get all men to believe my own creed." We ought, therefore, to be very tender in dealing even with those who put forward the most extraordinary notions or ideas that are most repugnant to our own. We must remember that

we are in a transition state, and that none of us can say what it is that science may not yet discover. If a discovery be only a step to something else in the direction of the truth, we may be misled by it. Many a path may lead apparently in an opposite direction to that which we expected, and yet lead us right in the end. So, if a discovery be a truth, we may be sure, that whatever appearances may be, it will not be inconsistent with revelation. (Hear, hear.) There are few lines that express this truth better than those of Miss Ingelow, who has suggested many thoughts that will be appreciated by a society like this. She says :—

“Wait, nor against the half-learned lesson fret,
Nor chide at old belief as if it erred,
Because thou canst not reconcile as yet
The Worker and the Word.”

This reconciliation must take place sooner or later—it may be later, or it may be sooner. Events follow each other rapidly in the progress of this world in which we find ourselves, and if we can by our efforts influence only some very few of those to whom I have made allusion, and induce them to take different views of these important matters, and to change a restless unsatisfying scepticism, for the calm consent of undoubting faith, we shall have done some good, not only in this world but also with reference to the next. (Cheers.)

The resolution was then carried unanimously.

The Earl of SHAFTESBURY, K.G.—As President of this Institute, I have now a very agreeable duty to perform, which is to present the testimonial before you to Captain F. Petrie, who has devoted more than five years of his time to the work of this society (during which period it has risen from 200 to 694 members), and whose patience, affability, zeal, tact, and assiduity have done so much to bring it up to its present position. I am sure those who belong to the Society will heartily endorse what I have said, and what is here inscribed (on a salver, which, together with a silver tea and coffee service, formed the testimonial) :—

“Presented, with a Purse of 100 Sovereigns, to Captain Francis W. H. Petrie (late 11th Regiment), by the President and Council of the Victoria Institute, or Philosophical Society of Great Britain, in testimony of their high esteem, and in recognition of the very energetic and valuable services he has rendered as honorary Secretary to the Society.”

Captain F. PETRIE, Hon. Secretary.—It would indeed require a far more eloquent tongue than mine adequately to express the thanks which I feel are due, for the great honour which has been done to me in the presentation of this generous gift from the Institute, and more especially as the presentation is now carried out by your Lordship, with whose high name it will ever be associated ; and when I shall leave the work I am now engaged in and take up once more an appointment under the Crown, which, for private reasons

I have of late sought, I shall look upon this kind gift as a memorial of many happy years, spent in the best of labours, and under the direction and superintendence of a council remarkable for its unity and its generous and kindly feeling to all—certainly to me on every occasion ; in fact, I feel that your Lordship and the council have always been too kind, too indulgent to my many faults. I have never had to trespass on your Lordship but I have afterwards felt that I could not have asked more than has been accorded to me : and with the council it has been the same—ever kind in expressing their desires, and ready to help with the results of their mature knowledge. Therefore I feel that I cannot fully express how fortunate I have been. May I add, that one and not the least of my pleasures in receiving this gift will be the placing it in the hands of her who has cheered and encouraged me in many a difficulty. (Cheers.)

The Rev. Professor BIRKS then read the following address :—

THE ANNUAL ADDRESS.

THE UNCERTAINTIES OF MODERN PHYSICAL SCIENCE.

MY LORD SHAFTESBURY, LADIES AND GENTLEMEN.

The word Science, now so much in vogue, occurs once only in our English version of the New Testament. It is where St. Paul counsels Timothy to avoid “profane and vain babblings and oppositions of science falsely so called; which some professing, have erred concerning the faith.”

Those Gnostic heresies and speculations, to which the warning first applied, are extinct long ago. Nothing is left of them but some fossil skeletons in the works of the Fathers. But oppositions of pretended science to the Christian faith have revived in other forms, and exist at the present day. In the name of scientific progress, faith in God, in a life to come, and in supernatural revelation, has been vigorously assailed. The chief leaders in this philosophical sect may be called Agnostics, and their creed Agnosticism. They affirm that of a Creator, a First Cause, a Supreme Governor of the universe, nothing whatever can be known. But by way of compensation they claim that their own advance in natural knowledge is “all but infinite,” compared with their predecessors. From this lofty

pedestal they affect to look down upon all faith in a living, personal God, and supernatural religion, as a superstition that is waxing old, and ready to vanish away.

A severe moral conflict is thus forced on all Christian believers. And in this strife, which cannot be avoided, a purely defensive attitude, a timid, apologetic tone, ill befits either the dignity of their cause or the strength of their position. There can be no conflict between the genuine sense of God's messages to mankind, and the real facts and authentic conclusions of science. But false constructions of Scripture, on the one side, and the crude hypotheses or fanciful guesswork of men of science, on the other, may and will contradict and clash, while they depart equally from the truth. It is now the fashion with many to assume that the risk of error is wholly on the side of Christian believers. Physical science as a whole, including the newest and latest guesses of its students, has the same infallibility claimed for it, which is claimed by the Vatican Council for the Bishop of Rome. It has been made a test, not only for interpretations of the Bible, but for the Bible itself; which must be rejected and cast aside, wherever it differs from this new and later revelation, of which modern men of science are the self-appointed prophets. Religion, we are told, consists simply of blind emotions about things unknowable, while the students of nature have a rightful monopoly of knowledge, truth, and wisdom.

It is our duty to sift these proud claims, and see if they have any warrant at all in the actual state of things. This is needful in the interest of genuine science, no less than of Christian faith. An inflated paper currency must be not less unsafe and mischievous in matters of science than in those of trade. Credulity is no monopoly of religious believers. It may sometimes be found even among the leaders of modern research; while among their disciples and admirers its recent growth has a tropical luxuriance, and is really almost prodigious.

Physics and physiology have no doubt made great and real progress in the last fifty years. But what, after all, is their present stage? Do they form a complete, mature, and perfect scheme of truth, a firm and lofty pedestal, from which their students may look out, unvexed themselves, like the gods of Epicurus, on the tossing waves and storms of ethical debate and religious controversy? Are they not rather in a nebulous stage, where a solid nucleus of certain or nearly certain truth is encompassed and concealed by a copious mist of unexplained phenomena, unproved guesses, and dim, hazy, floating speculations? Does not a vast cloudland or dreamland enve-

lope this world of science, shrouding it usually with a dull, watery fog of thick vapour; but ever and anon, in some wild and monstrous hypothesis, streaming off, like the tail of a comet, into infinite space and the outer darkness? The second and not the first, I hold to be the true description of modern science, in spite of all its progress. This is true both in physics, which deal with lifeless matter, and physiology, which deals with living creatures. If true in the first, it must be doubly true in the second and higher department, which all confess to be more difficult and mysterious. My object in this address will be to establish its truth, even in physics, and for this end to consider these topics in succession; the law of gravitation; the nature of matter; the existence of ether; the conservation of energy, with the doctrine of evolution, and the nebular theory; the dissipation of energy and the solar percussion theory; the molten nucleus theory of the earth's formation; and the astro-glacial theory of the great ice-period, supposed to have lasted for ages before man appeared on the earth.

I. The Law of Gravitation stands foremost among the doctrines of modern physics. The evidences of its truth have gone on increasing for two full centuries, ever since the *Principia* of Newton appeared. That any person of intelligence should still doubt it, after it has been confirmed by all the complex calculations and verified results of astronomy through these two hundred years, is to me a matter of wonder and amazement.

But has this truth, however firm and solid, no nebula still surrounding it? In that case, such a paper as the one in your fourth volume by your former secretary, on "Current Physical Astronomy," would have been impossible. And that paper by no means stands alone. Statements of Dr. Tyndall and Mr. Spencer, and the hypotheses named by Professor Maxwell in his articles on "Atoms" and "Attraction," prove still more decisively how much remains debated, uncertain, and obscure, even in the most certain of scientific truths.

And first, what do we mean by a physical law? Dr. Tyndall answers boldly, a fatal necessity. Torricelli, Newton, the scientific men of the present day, all knew, he says, that the succession, besides being permanent, is necessary; that the gravitating force *must* produce the observed course of the seasons. "If the force be permanent, the phenomena are necessary, whether they do or do not resemble what has gone before. Nothing has occurred to indicate that the operation of the laws has ever been suspended, or nature crossed by spontaneous

action." Hence miracles are incredible. Strong in this premise,—the inherent necessity of natural laws,—he issues an imperial edict to all theologians: "Keep to the region of the human heart; but keep away from physical nature. Here, in all frankness, I would say, you are ill-informed, self-deluded, and likely to delude others."

So frank a statement demands a frank and simple reply. The exclusion of all theologians and believers in miracles from the fields of science rests on two grounds, a plain historical falsehood, and a patent logical sophism. If this scientific interdict is valid, Sir Isaac Newton must share in the exile denounced against all Christian divines. His authority is here quoted to prove that very doctrine which he has most clearly, strongly, and pointedly denounced and condemned. According to him, the law of gravitation and the other laws of nature are no product of a blind and fatal necessity. "This beautiful system," he says, "of sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being." And again—"Blind, metaphysical necessity, which is the same always and everywhere, could produce no variety of things. All that diversity of natural things which we find, could arise from nothing but the counsel and will of a Being necessarily existing." Thus Newton is invoked to establish, as a test of scientific competence, that conception of natural laws, which he has plainly denounced as unscientific, unreasonable, and absurd.

But the reasoning of Dr. Tyndall is here no less defective than his inversion of historical truth is surprising and extreme. He confounds two things wholly distinct; a hypothetical necessity that certain results must follow, if such and such laws operate undisturbed; and a real necessity, that these laws must continue to operate, and can never be varied or suspended, either by some higher law unknown to us, or by the free choice of the Creator. His dictum, then, is not less opposed to common sense than to Newton's real teaching and authority. Whenever there are diverse laws among which a calculator may choose, so as to trace the consequences of one or another at his pleasure, the real existence of any one of them can be due to no blind fate, but, as Newton justly maintains, to the wise and intelligent choice of a Divine Lawgiver.

This necessity, which Dr. Tyndall affirms of all natural laws, Mr. Spencer also asserts of the law of gravitation, near the opening of his scheme of philosophy. Physicists, he says, have assumed variation by the law of the inverse square, because any other was excluded by the laws of space. He

then proceeds to infer that repulsions, as well as attractions, must follow the same law, that a body in equilibrium will remain so, if the bulk be reduced to one-eighth, or the distance of all the molecules to one-half; and hence that matter can offer no resistance to compression. The conclusion, he remarks, is absurd. This absurdity, however, does not strike him as proving the utter falsity of the premise from which it is logically derived. On the contrary, he sets it down merely as one added proof that the nature of matter and of force is inconceivable.

That many other laws of force have been assumed, and their mathematical results developed, is one of the most familiar and patent facts in the history of dynamics. Five whole sections of the first book of the *Principia* are occupied with calculations of this very kind. The premise, then, in this reasoning is a clear historical falsehood, and the conclusion, as Mr. Spencer himself admits, plainly absurd. In the third edition of his work, after fifteen years, the paragraph has been silently withdrawn. But no explanation has been given how this double inversion of fact and logic was left so long standing sentinel in the porch and gateway of the new material philosophy.

Gravitation, then, is no blind necessity, but a law of nature, proved by a combination of experience and deductive reasoning, and which thus implies and requires the choice of a Divine Lawgiver. But is it mediate or ultimate? If mediate, so as to have some other physical cause, what is the medium on which it depends? If ultimate, which is the true conception of it, universal attraction, or universal appetency? Here we find the nucleus of certain truth surrounded by a large and ample nebula of mere theories and doubtful speculations.

Newton has been careful to remark that he gives no decision on the physical cause of gravity, if such there be. "I use the words," he says, "attraction, impulse, or propensity, promiscuously and indifferently one for another. Wherefore the reader is not to imagine that by these words I anywhere take on me to define the kind or manner of any action, the causes or physical reasons thereof, or attribute forces in a true and physical sense to certain centres, when I speak of them as attracting, or endued with attractive powers."

Gravitation, if a mediate result, can hardly be attractive. For this would require us to conceive a line physically connecting every pair of masses or atoms in every varying position, and exercising a contractile power to bring them nearer. Also that the contractile force should be increased, after it has brought them nearer, and not, as in every known case of the

kind, diminished. This hypothesis, then, seems never to have found a patron. But the other mediate view, that gravity is the result of propulsion, and that bodies and atoms are pushed and driven together by pressure or impact from behind or beyond, has been a very frequent view. Newton inclines to it in his 21st Query. But in Query 28 he leans, I think, just as plainly to the opposite notion, that gravity is one of two or three ultimate principles, of which cohesive force is another, which enter into the defining essence of matter, or "by which the things themselves are formed."

Of this general view, that gravitation results from ethereal impact or pressure, there have been three varieties. First, that of Le Sage, that it depends on the impact of ultra-mundane corpuscles, flying in streams in all directions through space. He conceives them to come from beyond the limits of the known universe, and to produce attraction by impact on the molecules of matter, each screening its neighbour from some part or fraction of this celestial bombardment. A most grotesque machinery for securing the desired result! But there is a plain and fundamental objection. If the molecules of matter are perfectly elastic to their ethereal assailants, the differential effect would cease, and the action be equal on all sides. If their motion is quenched after the impact, the energy thus transferred from the ether to the matter on which it impinges must raise the whole universe to a white heat in a few seconds.

A second theory, hinted at, rather than proposed, is of this kind. "If we suppose all space filled with a uniform, incompressible fluid, and that material bodies are always generating and emitting this fluid at a constant rate, the fluid flowing off to infinity, or else absorbing and annihilating it, the fluid flowing in from infinite space, the result would be an attractive tendency between any two bodies as the inverse square." On this suggestion of Sir W. Thomson, Professor Maxwell justly observes, that such a hypothesis, of a fluid constantly flowing out with no source of supply, or flowing in without any escape, is so contrary to all experience that it cannot be called an explanation. But, with all deference to two mathematicians so eminent, I believe that the hypothesis is self-contradictory and impossible. If each particle of matter is surrounded by a plenum, nothing could flow out of it, for no room would be left into which it could flow. If by a fluid not a plenum, but homogeneous, as the hypothesis requires, it must cease to be homogeneous from the first moment when the outflow began.

A third hypothesis assumes that gravitation results from unequal pressure of the ether on the inner and outer side of each pair of masses or atoms. This is the view modestly proposed in Newton's 21st query. But his mind could not have found rest in it, since later on he inclines to a different and really opposite view. The one thing of which he seems to be sure is the exact converse of modern materialism. The main business, he says, of Natural Philosophy is to argue from phenomena, and deduce causes from effects, "till we come to the First Cause, which is certainly not mechanical."

But this attempt to explain gravity, either by vibrations of ether, or differences of ethereal pressure, in spite of the high names which have inclined to it or adopted it, seems to me open to a decisive and fatal objection. The action of the ether is assumed to depend on variations in its density. It would press equally on all sides, and be inactive, if its density were uniform. Now in ether, which was a plenum, no differences of density could exist. Space could not be more than perfectly full. And in elastic ether, not a plenum, the chief effect of the elasticity must be to equalize the density, and reduce the differences to nothing. While this change was in progress, the result must be to increase the mutual distance of all the matter floating in the denser portions, and to bring nearer to each other those which were placed in the rarer portions only. Thus, instead of universal attraction, the necessary result would be attraction or nearer approach in one half of space, and repulsion or further separation in the other half, and by a law or rule wholly differing in both from the inverse square of the distance. And when once an equal density of the ether was attained, or nearly attained, all further action must cease. The final result could be nothing else than stagnation, silence, and death.

But if gravitation be an ultimate law, and cannot be resolved into a secondary result of impact or pressure, as I fully believe, a further doubt remains. Is attraction its true and proper name? When A and B are in presence, and B draws nearer to A, does A pull B towards it? Then the law is rightly called one of universal attraction. Or does B seek A and draw nearer to it by an inward instinct or impulse? Then the proper name of the law will be universal appetency. This last, though not the usual, I hold to be the more natural and reasonable view. It places the activity where the change occurs, not in every other place beside. It also brings the law into harmony with the higher forms of desire and appetite in all living creatures. Instead of a type of selfishness,

an action that aims to contract and absorb all things into itself, it becomes a type and resemblance, in matter, of that higher law of human and divine love, which goes forth in desire for closer union and communion with the whole universe of being.

But "whether thus these things, or whether or not," whether gravitation be mediate or immediate, attraction or appetency, I think it must be plain that the nucleus of solid truth, even in Newton's great discovery, is encompassed to this hour with a vast nebula of what is doubtful, indeterminate, and obscure.

II. The Nature of Matter is the next subject to be considered. Are modern materialists fully agreed in the nature of this new divinity, which is their only substitute for the God of the Bible? Dr. Tyndall discerns in it "the promise and the potency of all terrestrial life." Professor Huxley prophesies—"As surely as every future grows out of past and present, so will the physiology of the future extend the reign of matter and law, until it is coextensive with knowledge, with feeling, and with action." "The consciousness of this great truth weighs," he thinks, "like a nightmare on many of the best minds of the day, and they watch the progress of materialism with such fear and powerless anger, as a savage feels when the great shadow creeps across the sun." And Professor Haeckel, of Jena, extols Kant's Nebular theory, because "it is purely mechanical or monistic, makes use exclusively of the forces of eternal matter, and entirely excludes every supernatural process."

A philosophy, then, in which matter supersedes and swallows up mind, and dispenses wholly with a God, ought surely to give some distinct utterance as to the nature of its own divinity. But when we look closely, what do we find? Nothing but obscurity and contradiction, clouds and thick darkness.

And first, does this matter which has "the promise and the potency of all terrestrial life," really exist at all? The leaders of the new philosophy are not agreed, even as to its bare existence. The doctrine of Berkeley, which denies an objective material world, and reduces everything to mental ideas and sensations, has had many disciples down to our own day. Mr. Mill speaks with scorn of those who profess to see in this theory any contradiction of reason and common sense. He adopts it fully, and would baptize all material objects by a new name. They are things no longer, but only "permanent possibilities of sensation." But how can feelings and sensations be possible, if there is no thing to be felt, and

no person to feel? The whole universe of thought becomes a multiplied heap of sentences, in which the copula only is left, and both the subject and the object are stolen away.

Such is the first variety in that sensational creed, which is to replace Christian faith, and belief in the Bible. Mind perhaps may exist, and at least a compromise is proposed. "The wisest thing is to accept the inexplicable fact (of memory) without any theory of how it takes place; and when we speak of it in terms which assume a theory, to use them with a reservation as to their meaning. No such difficulties attend the theory in its application to matter." That is, in plainer words, we may speak of minds as existent, reserving a secret doubt whether they exist or not. But in the case of matter the reserve is needless, and we may safely adopt the theory of its non-existence, as any thing apart from a percipient mind.

It is the striking remark of Gibbon on the history of Bajazet—"The savage would have devoured his prey, if in the fatal moment he had not been devoured by another savage stronger than himself." And here we have a sign that, while Materialism is prophesying its victories, and seeking to engulf both morality and religion within its ravenous jaws, Nihilism, another form of error, is lying in wait for it to destroy it in its turn, and replace it by a negative creed of nothingness and utter darkness.

Let us turn to Mr. Spencer, and see there another form of the materializing theory. His doctrine may be summed up in two or three principles. First, matter is indestructible, and this indestructibility is an *à priori* truth, since no demonstration of it *à posteriori* is possible. Secondly, matter, as an absolute reality, is some mode of the unknowable, related to the matter we know as cause to effect. Thirdly, phenomenal matter, the relative reality we know, is made up of the phenomena or sensations we experience from material objects.

We are thus involved, a second time, in a hopeless contradiction. Phenomenal matter is constantly destroyed. The candle burns away and disappears. The gunpowder explodes and vanishes, and the sensations it gave to our touch and sight come to an end. The cloud melts away into the blue sky, and is no more. But non-phenomenal matter, the absolute reality, by the theory is one form of the unknowable. Of this we cannot know, then, whether it can or cannot be destroyed. And still the indestructibility of matter is to be reckoned a fundamental *à priori* truth. What contradiction can be more complete? How can we found an all-conquering, all-inclusive philosophy on the basis of a palpable contradiction?

But this is only the first step in the internal antagonisms of this material philosophy. First, physicists are not agreed whether matter is to reign alone, or whether there is an ether also, to share its dominion. M. Comte, Justice Grove, and some others, hold the first alternative, but nine-tenths of scientific students adopt the other view. In this, I believe, they are fully justified by the facts of science. But then we have, in this one fact, a barrier which the tide-wave of materialism can never surmount, and though its waves may toss themselves, they can never prevail against it. It is hard and impossible to conceive of millions or trillions of atoms creating themselves. But it is harder and still more impossible to conceive that each of them chooses in the moment of its birth, whether it shall become an atom of matter or one of ether.

Let us briefly compare our knowledge and ignorance on this question of the nature of matter, so fundamental in the philosophy of materialism. We know, first, in spite of Mr. Mill's dissent, that matter does exist, is an objective reality, and no mere possibility of mental sensations. We know, next, in contrast to Mr. Spencer, that some knowledge of its properties is attainable, and that it does not belong to an Absolute Something wholly unknowable. We have strong reason to believe that it is composed of ultimate atoms, whether finite in size, or force-centres and points, whether of various shapes or spheres only. My conviction is that we may know further that the vortex atoms of Helmholtz are impossible figments, and that the hypothesis, instead of being self-consistent, involves more than one direct and essential contradiction. But what do we know beside concerning its nature? Almost nothing. We do not know certainly whether these atoms are finite in size, or force-centres, whether various in shape, if finite, or spheres; whether the chemical elements have atoms essentially distinct, or convertible into each other; whether or not these atoms have any powers at all, except change of place, attraction and repulsion, or appetency and aversion. In their laws, as detected by science, there is nothing at all which can explain either their number, why they are not fewer or more numerous; or their position, why they are at such and such distances and in such directions, and not in others; or their distinctive laws of mutual action, in approaching to or receding from each other. For all these there is and can be no key or reasonable explanation, but in the decree and will of an all-wise Creator, the Supreme Lord and Architect of the material universe.

III. The Existence and Nature of Ether is a third subject, on

which there rests a still greater obscurity. If it really exists, the knowledge of matter and of ether are plainly be the two pillars on which the science of physics must rest. But the doubts are greater, and the conflicts of opinion still more various than before.

And first, does this ether exist? Such is the general opinion of physical students; and for myself, I have no doubt of its truth. But the dissentients are not few. M. Comte denounces the theory as an equal illusion with the vortices of Descartes. Mr. Lewes, his disciple, shares the same view. Mr. Mill, in his *Logic*, inclines to the same side. The hypothesis, he says, is not without an analogy to that of Descartes, only that "it is not entirely cut off from the possibility of direct evidence in its favour." He has the strange idea that there can be some evidence of an hypothesis, besides that of its accounting for the phenomena it has to explain. Mr. Justice Grove, in his "Correlation and Continuity," holds strongly to the negative view. But the idea that the immensely diluted and attenuated matter of the planetary spaces can have the intense elasticity implied by the speed of light seems to me wholly incredible.

Next, if ether exists, is it of one kind only, or more than one? By way of compensation to the last opinion, some theorists affirm that there are two kinds of ether, one called electric, the other luminous. Others go further. The authors of the *Unseen Universe* seem disposed to suggest a series of ethers, more and more subtile, of which the second may have nearly the same relation to the first which the first bears to common matter. This is very like a reproduction of the *aeons* and genealogies of the early Gnostics in a physical and material form.

Again, is the ether continuous, or discontinuous and atomic? Professor Challis seems to me to hold strongly the former, but Newton, Young, Fresnel, Airy, Cauchy, Stokes, and most other physical philosophers, the latter view.

Is this ether attractive or self-repulsive? The latter, the usual opinion, seems to me essential to a just conception of its nature. But Professor Bayma, in his *Molecular Physics*, maintains that it must be attractive. And Sir George Airy, in private, once told me that, in his opinion, the phenomena of light require the notion of attractive or contractile forces, and stretched strings, rather than repulsive force-centres, though this must imply some kind of fastening or attachment to walls of the universe.

Again, what is the relation between ether and common

matter? Newton suggests that ether is denser outside of solids, and less dense within them. This would imply that they exert on each other a repulsive power. But Mosotti, Norton, and most other modern theorists, make the mutual action attractive, so that it would be denser within bodies, and at their surface, than in free space.

Once more, if the ether is self-repulsive, and intensely elastic, how is this elasticity maintained? Must it not diffuse itself into empty space? Or are we to conceive the universe bounded by a solid wall, able to resist an almost infinite pressure? Sir John Herschel has remarked: "Under no conception but that of a solid can an elastic and expansible medium be self-contained. If free to expand, it would require a bounding envelope of sufficient strength to resist its outward pressure. To evade this by supposing it infinite in extent, is to meet the difficulty by words without ideas, and to take refuge in a negation of that which constitutes the difficulty."

Thus, from Newton to the present day, all these various doctrines about ether have been held by men of eminence; that there is no such ether distinct from matter, that there are two kinds, or many, each rarer than the one before it, or one kind alone; that it is a solid and a fluid, attractive and repulsive, a continuous plenum, or made up of discontinuous atoms; that these are solid and finite, or points and force-centres only; that it is attracted by matter, that it is repelled by it, and that it is neither attracted nor repelled, but merely is shut out from the space which matter occupies; that it is finite in extent, and that is infinite, a repulsive variety of material substance, or a bridge between the visible worlds and an unseen universe.

Physical science, with regard to the nature of matter and ether, its two constituent elements, is thus in its merest childhood. It has yet to decide which is true out of a dozen or a score of rival theories. Its teachers, then, and still more its disciples, will do wisely to assume a far more modest tone in dealing with moral and religious questions than has been their practice of late years. It is ridiculous for those to declaim on the diversity of religious creeds, and the controversies and strifes of theologians, who can hardly agree in laying a single stone in the foundations of their own philosophical system.

IV. The Conservation of Energy, the Doctrine of Evolution, and the Nebular Theory, are so closely related that it will be better to examine them together. The great divergence among scientific theorists, and the large amount of what is doubtful or untrue in their reasonings will thus be seen in a clearer

light. Has there been really that almost infinite progress, of which Dr. Tyndall speaks, beyond Newton and Leibnitz and the students of last century? Have the present generation of physical students, by virtue of these doctrines, a far deeper insight into the true system of nature than their predecessors could ever attain? This, I believe, is a grand illusion, fraught with no small degree of moral mischief. Analysts have made some real advance in dealing with various dynamical problems. Observation and experiment have unfolded more clearly the connection between diverse forms of physical change, usually expressed by different names. But along with this advance there is great danger, what with the coinage of new phrases for old ideas, and free scientific guess-work, of going backward instead of forward. Already, in more cases than one, mere verbiage, or even direct contradictions, have been palmed on the credulous as grand experimental discoveries, or still more grand *a priori* truths.

What, then, is this Energy, about which such great discoveries have been made? Few of those who speak or write about it seem to have settled clearly what they mean by the term. Is it force or motion? Is it both or is it neither, being something quite distinct from both? All these four opinions seem to be held, and by writers of some eminence. According to Mr. Spencer, it is force, and the better name for the conservation of energy is the persistence of force. According to Mr. Grove it is motion, and the various forms of energy are "modes of motion." According to Professors Thomson and Tait, who understand the subject better, it is both, or rather it is each in turn. It is of two kinds, potential and kinetic. The first is an integral of forces, such as have acted or will act, when a system passes from a first to a second position. Kinetic energy is an integral of velocities or motions, or their total amount from zero up to the actual values at any given time. These are three varieties; that it is force, motion, or partly one, partly the other. Mr. Brooke adds a fourth variety, that it is neither force nor motion, but something, distinct from both. While he distinguishes it from force, he also inverts the use of the two terms. His Energy is exactly the same as the Force of Newton's definition, and of nearly every work on dynamics; while his Force is the Potential Energy of Sir W. Thomson's analytical theory.

According to Mr. Spencer, the Conservation of Energy, or as he prefers to call it, the Persistence of Force, is the chief and foremost of all *a priori* truths. It holds in his philosophy exactly the same place as the Being of God in the

Christian system. It transcends both demonstration and experience, and is the widest and deepest of all truths. But no sooner has this doctrine, borrowed from the analysts, been adopted by Agnostic metaphysicians, and raised to an intellectual throne, as a substitute for the living, personal God of the Bible, than it is confronted by a rival, a younger son of the same parents, the Dissipation of Energy. It is the same analysts, from whom the first doctrine has been borrowed, who are the sponsors of this rival and successor. Like the giant in the Hindoo tale, the new divinity of fatalism places its hand on its own head, and in a moment is reduced to ashes. I will give three statements of this second doctrine from Professor B. Stewart's *Conservation of Energy*, Thomson & Tait's *Natural Philosophy*, and the recent work, *The Unseen Universe*. The first writes as follows :—

“Although in a strictly mechanical sense there is a conservation of energy, as regards use or fitness for living things, the energy of the universe is in process of deterioration. Diffused heat forms what we may call the great waste-heap of the universe, and this is growing larger every day. We have regarded the universe, not as a collection of matter, but as an energetic agent, a lamp. Looked at in this light, it is a system that had a beginning, and must have an end; for a process of degradation cannot be eternal. If we regard it as a candle that has been lit, we become absolutely certain that it cannot have been burning from eternity, and that a time will come when it will cease to burn.”

Sir W. Thomson writes thus in his joint treatise, with Professor Tait, on *Natural Philosophy*. “It is quite certain that the solar system cannot have gone on, as at present, for a few hundred thousand or a million years, without the irrevocable loss, by dissipation, not annihilation, of a considerable portion of the entire energy, initially in store for sun heat and Plutonic action. It is quite certain that the whole store of energy in the solar system has been greater in all past time than at present. It is probable that the secular rate of dissipation has been in some direct proportion to the total amount of energy at any time after the commencement of the present order of things, and has thus been diminishing from age to age Hypotheses assuming equability of sun and storm for a million years cannot be wholly true I think we may say, with much probability that the consolidation of the earth's crust cannot have taken place less than twenty, nor more than 400 million years ago. I conclude that Leibnitz's

epoch of the 'consistentior status' was probably between these dates," (*N. P.* pp. 712-716).

We read also in *The Unseen Universe* as follows, p. 91 :—
 "Heat is the communist of our universe, and will no doubt bring the system to an end. The sun is the furnace, or source of high-temperature heat to our system, as the stars to other systems. The energy essential to our existence is derived from the heat the sun radiates, and represents a very small part of it. But while the sun supplies us with energy, he himself is getting colder, and must ultimately, by radiation into space, part with the life-sustaining power he now possesses. In each case of collision, there will be the conversion of visible energy into heat and a partial and temporary restoration of the power of the sun. At length, however, the process will have come to an end, and he will be extinguished ; until, after long ages, his black mass is brought into contact with that of his nearest neighbour."

The idea is then pursued further, as follows :—

"After unimaginable ages these two stars, the Sun and Sirius, having each long since devoured his attendants, and exhausted their heat energy by radiation into space, may be imagined travelling towards each other with accelerated motion. They will at last approach each other with great velocity, and finally form one system. The two will rush together and form one mass, the orbital energy being converted into heat, and the matter probably evaporated and changed into a gaseous, nebulous condition. Ages pass away, and the large double mass ultimately shares the same fate that long since overtook the single masses that compose it. It gives out its light and heat into space, and becomes dark, until it comes to form one of the constituents of a still more stupendous collision. By a process of this kind the primordial potential energy is gradually converted into light and heat, and then ultimately dissipated into space."

Such is the doctrine of the Dissipation of Energy, as held by the three eminent physicists and mathematicians, Professors Sir W. Thomson, Tait, and Balfour Stewart. Mr. Spencer, again, has seven chapters on the kindred subject of Evolution, and defines it in these words :—"A change from incoherent homogeneity to coherent heterogeneity, accompanying the dissipation of motion, and the integration of matter." This is plainly, in abstract terms, the same process just described, by which suns, with their planets, are formed out of nebula, then the planets fall into the suns, and the suns in long succession into each other. A strange inversion of the natural

meaning of the word, evolution, when it is made to denote the tendency of an inert nebula to roll itself up into one mighty central mass !

Let us now take Professor Haeckel's account of the nebular, or as he calls it, Kant's cosmological gas theory. It reads as follows :—

“Kant's cosmogony maintains that the whole universe, inconceivable ages ago, consisted of a gaseous chaos. All the substances found at present deposited on the earth, and other bodies, originally constituted one single homogeneous mass, equally filling up the space of the universe, which, in consequence of an extremely high degree of temperature, was in an exceedingly thin gaseous or nebulous state. The millions of bodies which at present form the different solar systems did not then exist. They originated in consequence of a universal rotation, during which a number of masses acquired a greater density than the remaining mass, and these acted as central points of attraction. There arose a separation of the primary nebula into a number of rotating nebulous spheres. While the centripetal force attracted the rotating particles nearer and nearer to the central point of the nucleus, the centrifugal force always tended to separate the peripheral particles farther from it. . . . As these simple processes repeated themselves over and over again, there arose the different solar systems, the planets revolving round their suns, and the satellites, or moons, round the planets.”

Such is the outline given of Kant's, more usually called Laplace's, theory. The merit is claimed for it that it is “purely monistic, and entirely excludes every supernatural process, and pre-arranged and conscious action of a personal Creator.” But its high excellence as an atheistic theory is not without its shadow. Some weak points, Professor Haeckel observes, still remain, which prevent our placing in it unconditional confidence, and these are stated as follows :—

“The theory furnishes no starting-point at all in explanation of the impulse which caused the first rotary motion in the gas-filled universe. In seeking for such an impulse, we are involuntarily led to think of a first beginning. But we can as little imagine a first beginning of the motion of the universe as of its final end. The universe is unlimited and immeasurable, both in space and time. It is eternal, and it is infinite. Nor can we imagine a beginning or an end to the eternal motion, in which all the particles of matter are always engaged. The great laws of the conservation of force and of matter admit of no other supposition. The universe is a connected

chain of phenomena of motion, necessitating a continual change of form. Every form as a temporary result is perishable, and of limited duration; but in this change matter and the motion inseparable from it remain eternal and indestructible."

The Nebular Theory, then, as understood by Professor Haeckel, implies that matter is infinite both in quantity and in its past duration; that it has been in motion from all eternity, and can never rest; that the universe has no beginning and no end; that this view is required by those grand discoveries of modern physics, the conservation of matter and of force; that the nebula, vast ages ago, was intensely hot, and has since gradually grown cooler, while severing into distinct masses, and acquiring a rotatory motion.

All these principles are exactly reversed by the authors of the *Unseen Universe*, who are first-class mathematicians. They hold, as the result of the dissipation of energy, that the universe had a beginning, and must have an end; that it is like a candle which has some time been lighted, and cannot burn on for ever; that this doctrine, instead of being opposed to the conservation of force and matter, is the natural sequel and complement of those theories; and finally, that all the heat of the sun and stars, instead of being due to the high temperature of the nebula, is wholly the creation and result of its latter condensation. So (p. 125) we read that "as the particles condensed or came together, the potential energy was gradually transmuted into the energy of heat and of visible motion."

In Mr. Spencer we meet with a third form of the Nebular Theory, and Physical Evolution. The theism of the authors of the *Unseen Universe*, who affirm a beginning and an end, and the monism or atheism of Professor Haeckel, which wholly denies both, is pronounced alike unphilosophical. That question belongs to the class of which nothing can be known. For the rest, he holds the indestructibility of force, and the continuity or eternity of motion, as a great *a priori* truth. But he holds, side by side with it, the Dissipation of Energy, or a process "which must go on bringing things ever nearer to complete rest." If equilibration, he asks, must end in complete rest, what is the fate towards which all things tend? "If the sun is losing its force at a rate which must tell in millions of years, and men and society are dependent on a supply that is gradually coming to an end, are we not manifestly progressing towards omnipresent death? That such a state must be the outcome of the processes everywhere

going on seems beyond a doubt." But a further suggestion is made, that, when the last collision of suns and systems occurs, there must ensue a diffusion that undoes the previous concentration. So that a period, inconceivably vast, of evolution, that is, condensation, may be followed by a paroxysm of dissolution, that is, of re-expansion into nebula once more. Thus the mighty pendulum of the universe may swing on backwards and forwards for ever.

Now on these three forms of the nebular theory, linked closely with the doctrine of evolution, and the conservation of energy, two questions must arise. Do these witnesses agree? Are they not in plain contradiction to each other? And next, are they, where they agree, certain truths of science, or imperfect and perhaps erroneous conjectures, on subjects where all the data are not at present exhaustively known? Has this doctrine of an incessant, purposeless oscillation from nebulous mist into suns and starry systems, and from these back to mist again, dark, dreary, and hopeless, on its moral side, any claim whatever to be reckoned a true and just exposition of the known laws of physical change? I believe firmly the exact reverse. I hold it to be as baseless in physics as it is full of darkness and gloom to all the deeper wants and aspirations of the human heart. It degrades that inscrutable Power, which it refuses to name, and of which it affirms that we can know nothing, into a drivelling idiot, engaged for ever "in dropping buckets into empty wells, and growing old in drawing nothing up"; who goes on, like a convict under his sentence, turning for ever and ever, to no profit, the vast tread-wheel of the universe.

I pass by the question of beginning or no beginning, in which the author of *The Natural History of Creation* contradicts flatly, not only the very first word of Divine Revelation, but the clear voice of sound reason. Be it so, that matter is unlimited in quantity, and in past duration. What result must follow? The doctrines of the conservation of force and matter, instead of being confirmed, will be turned into unmeaning sounds. For the essence of these laws is that the amount of matter or force is always the same. But there can be no measurement of that which is infinite and unmeasurable. If the laws are true, the quantity of matter must be finite, and the quantity of energy must be finite and measurable also.

Again, if motion is essential to matter, and it has always been moving, the logical ground of the nebular theory is destroyed. Motion is the effect of force. In the present

state of things forces and motions co-exist. A simpler state, then, would be one in which there are forces tending to produce motion, but no actual movement. If all motion is due to a past exercise of force, we can go back in thought to a time when there were no motions, but forces only. This is the true ground of reason for a nebular theory. Such a state must certainly have been one of wide diffusion of matter, as well as of perfect rest. But if matter has been in motion from all eternity, no one stage of this incessant change can be more simple than another. There would, then, be no reason for accepting a primitive nebula, unless we could prove by strict reasoning that such was actually the state of things long ago. That attractive forces, beginning from a state of rest, would lead to rotatory motion, such as those we observe in the heavens, is the only real basis of any nebular theory.

Next, the assumption that the first state of the nebula was one of intense heat is flatly opposed to the real principles of modern science. It belongs to the exploded hypothesis that caloric is a distinct substance, and not merely atomic motion. The universe, in a state of extreme diffusion, would resemble the highest and rarest parts of our atmosphere, and only be much rarer still. The feature of those regions is not intense heat but extreme cold. The true conception of the primitive nebula is that of a system at perfect rest, but with forces that can generate motion. Now heat is really atomic motion, and hence the primitive temperature must have been an absolute zero of cold. Such, accordingly, is the doctrine laid down in the *Unseen Universe*, that heat results from potential energy transformed in the process of condensation.

Every single point in this atheistic nebular theory involves a direct logical contradiction. First, if the universe be full of matter, there could be no motion, for no mass or particle could find any unoccupied place into which to move. There could be no attractive force, for how could parts draw nearer to each other, when every spot between was perfectly full? There could be no rotation in a homogeneous mass, since there will be just as much reason for turning one way as another. There could have been no primitive heat, since heat is motion, and there could be no change of place in a plenum, when no particle has any place not already filled, into which it could remove. There could be no condensation for the same reason.

The nebular theory, in its only reasonable form, requires these postulates; a system of material atoms, finite, however vast, and therefore capable alike of motion and of increase; a beginning, that is, a primitive state of perfect rest, in which

there are forces, but no motion, and therefore not a high temperature, but a perfect zero of cold; a finite past duration, since if we went further back, the later motions must reappear, only with their directions reversed, and the whole ground of the theory would be swept away. And above all, we need a Creative Will, to determine the number and the place of all the atoms, and the laws of attraction and repulsion that must guide and determine all their later movements. For the grand aphorism of Newton must remain for ever firm and sure, however sciolists strive against it. "Blind necessity, which is always the same everywhere, could never produce this beautiful variety of things."

It is folly to derive a state of motion from one of rest, if motion has been eternal, or to describe an original state, if there never was an origin. The nebular theory, in the hands of the atheist, shares the fate of the corpse of Priam—

*Jacet ingens litore truncus,
Avulsumque humeris caput, et sine nomine corpus.*

Evolution, again, in Mr. Spencer's work, is only an obscure synonym for the process of cooling. A heated body contracts and condenses when it cools, and this, in more learned phrase, is the integration of matter. It parts with some of its heat to the cooler bodies around it, and this is the dissipation of motion. Incoherent gases, by cooling, become imperfectly coherent fluids; and these, when cooled further, coherent solids. A sea of aqueous vapour, or a bowl of water, to sense, is wholly homogeneous; but ice-crystals are more or less sensibly heterogeneous. Thus mere cooling combines all the characters of evolution in Mr. Spencer's definition.

But can this be really the grand secret of nature, the key to a new and improved system of physical science? Is this the discovery which is to throw that of Newton into the shade, and absorb into itself all mental philosophy and Christian faith? A primitive nebula, intensely heated at first, has gone on cooling for almost infinite ages! If true, this would be grotesquely inadequate as a theory of all physical change. For this demands, not loose phrases or metaphysical verbiage, but distinct laws of force, like the law of gravitation; and of these the theory offers no trace. But it is not true. It is rather the direct opposite of the truth. The primitive nebula, on the only hypothesis which gives us a right to assume its existence at all, cannot have been intensely hot, but at an absolute zero of cold. Heat is atomic motion. And all motion, in a true

nebular theory, can only result from attractive forces in a nebula at rest, and from its later condensation. The cooling, which Mr. Spencer mistakes for the whole process, and calls evolution, is only a secondary result of the condensation, or the heating process which directly results from attractive forces, and which must have gone before. Evolution is not simple cooling. Heating by attraction and pressure, and later cooling of the central parts of each mass by transfer of motion towards the surface, are successive stages in the progressive development of cosmical change.

V. Modern theories of Solar Heat, and the Dissipation of Energy, are the next doctrines that I shall briefly examine. Two main views on the former have been lately proposed. The first is that of Mayer, accepted for a time by Sir W. Thomson, but since abandoned. It assumes that the sun is hammered into a white heat by the continued impact of falling meteors. But this view belongs now to a past lunation of science. The present favourite is the doctrine developed by Helmholtz, adopted by Sir W. Thomson, and embodied by Mr. Spencer among the latest improvements of his own system. He writes of it in these words:—

“Professor Helmholtz estimates that since the time when the matter of the solar system extended to the orbit of Neptune, there has been evolved 454 times the amount of heat which the sun has yet in store. He makes an approximate estimate of the rate at which the remainder is being diffused, showing that a diminution of his diameter by one ten-thousandth would produce heat at the present rate for two thousand years; and that thus, at the present rate, his diameter would diminish one-twentieth in the next million years. . . . No uncertainty in the data, and consequent error in the inferred rate at which the sun expends his reserve of force, militates against the proposition that this reserve of force *is* being expended, and must in time be exhausted.”

This same doctrine, of the ceaseless dissipation of the solar energy, and indeed of that of the whole universe, is also expounded by Professor Stewart in these words:—

“While you with the greatest ease transform work into heat, you can by no method in your power transform all the heat back into work. The process is not a reversible one. The consequence is that the mechanical energy of the universe is every day more and more changed into heat. Now, if this process goes on, and always in one direction, there can be no doubt about the issue. The mechanical energy of the universe will be more and more transformed into universally-diffused

heat, until the universe will no longer be a fit abode for living things. The conclusion is a startling one. We are led to look to a beginning, in which the particles of matter were in a diffuse, chaotic state, but endowed with the power of gravitation; and to an end, in which the whole universe will be one equally-heated, inert mass, from which everything like life, motion, and beauty will have utterly gone away."

Here two questions arise. Is this new doctrine of the ceaseless dissipation of energy true and sound? Is either theory of solar heat, which has been connected with it, a settled fact of science, or a guess in the dark, against which there are strong and weighty reasons? In spite of the great names which have espoused this theory, I believe that its baselessness admits of strict demonstration. Its true place is not even among the uncertainties, but the mistakes and errors of science.

And, first, how can the conservation of energy and its ceaseless dissipation agree together? If the total amount is always the same, it cannot undergo a process of constant diminution. The reply is, that it is not annihilated, but goes off into infinite space. This is plainly impossible in any other sense than that the universe expands without limit. There can be no energy anywhere, without matter or ether to which it belongs. Abstract qualities cannot exist alone. There can be no kinetic energy, or motion, without something that moves. There can be no potential energy, which is a function of distances, without particles or masses to which these distances appertain. The only reasonable sense of the phrase, dissipation of energy, is that the system occupies a wider space than before. But perhaps the outmost parts, in receding, cease to have any practical connection with all the rest. This is just as impossible as an absolute loss. The law of gravitation alone forbids it, and links every part of matter indissolubly with all the rest.

Again, the radiant heat and light, which cause the dissipation, are only one part of the total result of a previous condensation. This enters into the very essence of the nebular theory. That this heat and light should cause a dissipation or expansion of the system, far beyond the original bulk or space of the primitive nebula, is really the doctrine that part of a thing may be greater than the whole.

Next, what can become of the lost energy? Professor Stewart makes answer: "We can only reply that, as far as we can judge from our present knowledge, the radiant energy not absorbed must be traversing space at the rate of 188,000 miles a second."

Now what does this answer imply? The ether is conceived to extend far beyond the system of which it is an essential part, and that with unabated elasticity. If there is no restraint at the boundary, it must have gone on expanding, from the date of the first nebula, through countless ages. However great the original elasticity, it must have become insensible in amount millions of years ago. The first word in a true record of man's creation, in this view, would not and could not be—Let there be light! but rather, Let there be eternal stagnation and midnight darkness.

To account for the high elasticity of the ether, after ages have passed, we must either assume a solid limit or boundary of the stellar universe, such as Milton describes, or else that the ether thins and is less elastic at the outside, like the highest strata of the earth's atmosphere, till its repulsion is balanced by its affinity for the matter which adjoins it. In either case there could be no dissipation of energy. It would be restored, either by rebound from the solid wall of the system, or on the other view, by change into potential energy at the elastic boundary of the universe.

But the energy, though its amount be unchanged, may perhaps become degraded and inferior in kind. Working energy may grow idle and worthless. As unequal temperature, it can do much work. As equalized temperature, its working power is gone. The great waste-heap goes on accumulating, as posterity may learn some day to their cost. The universe will then become "an equally-heated, inert mass, from which all life, motion, and beauty have utterly gone away."

Heat is atomic motion. Equal diffusion of heat cannot, then, be the same with absolute rest. If the heat of our solar system were shared equally among the sun, planets, and satellites, we should not be frozen to death with absolute cold. On the contrary, we should plainly be burned up with a fiery conflagration. The temperature of our globe would become much higher than the heat of melted iron.

In the view of science energy is only of two kinds. The nebular theory implies that it was once mainly potential, or the energy of distance, and that motion, the other kind of energy, has replaced the first, as the nebula condensed. The effect is surely not more noble than the cause, the child than its parent. If one part of the motion engendered, that is, the heat, is retransformed into the other kind, the change can be no degradation. The working power cannot be lost. It is rather restored, and only passes beyond our human control. It provides for a renewal of work in some other form. Even in our farms,

manure and sewage are utilized, and turned into sources of increased fertility. Man's range of power is limited, and *our* great sewage problem is still unsolved. But the powers of nature have a far wider range. In spite of desponding theories, we may be perfectly sure that there is no real waste-heap in God's glorious universe.

The main fault of the doctrine lies here. Matter and ether need three laws to determine their mutual action. The action of matter on matter is known, the law of gravitation. Out of this law, applied to a vast, diffused, finite system of matter, the nebular theory has grown. It accounts, by the working of that law on such a nebula, for many leading phenomena of our solar system. The action, again, of ether on ether, though its law is not known, must be self-repulsive, in order to explain its nearly equal diffusion. If it condensed into patches, the transmission of light would cease. Out of this law grows the doctrine of dissipation. Heat, or atomic motion, if impressed on the ether, must be transmitted in all directions with the speed of light. The limit to which this action tends is complete equality. Hot bodies must grow cool, and cool bodies be heated, till the balance is restored. But in this reasoning the third law, also unknown, but certainly attractive, the mutual action of matter and ether, is left out of sight and forgotten. Yet it is one most essential element in the problem. Without some law of this kind, the atomic heat could not affect the ambient ether at all, and there could be no radiation.

The doctrine that the total amount of heat never changes, and that its transmission is in proportion to difference of temperature, cannot be absolutely true. It is only a relic of the now exploded theory, that caloric is a distinct and peculiar substance.

When light and heat travel from an incandescent body through space, the most palpable result is to heat the solid bodies within its range. So far there is a simple transfer of heat, and nearly in the ratio of the excess of temperature. But is this the sole effect? Does no part exercise a repellent power, and become reconverted into increased distance or dilatation? The answer should have been plain to the eye of science from the first. Within a few months it has received a striking experimental confirmation. What means the rotation of the blackened discs in that new-invented instrument, the radiometer? Surely, that one effect of radiant heat and light is direct repulsion, by which the bodies on which it falls must be driven a little further from the source of that radiation.

This is not the whole truth. Clouds, it is known, tend to

disappear under the light of the full moon. So it is clear that some part of the energy in the sun's light and heat will be spent in rarefying any nebulous patches, thicker than the rest, in the thin and rare matter of the planetary spaces through which it travels.

Again, by the laws of mechanics, some part, and probably the main part, must be spent in creating ethereal currents. Disturbed ether will have a greater mutual repulsion than ether undisturbed. The motion, in mechanical effect, will be equivalent to an increased density. That the repulsive action may be equal everywhere, the ether will be thinned where the disturbance is greatest, and become denser in all other parts of the system.

These three changes limit and modify the doctrine of the equal diffusion of heat, and should have been clear to students of physics, as soon as the Baconian view of heat was re-established. I have expressed them at the close of my work on Matter and Ether, published fourteen years ago. One of them has now, within a few months, been made patent to the senses of all men. They disprove that doctrine of the ceaseless dissipation of energy, which we find in so many recent works of science, and replace it by a doctrine essentially different,—its ceaseless circulation.

The view of Mayer, that solar heat is kept up mainly by the dropping in of meteors, is now abandoned by its late adherents. It has died an early death. The suggested cause is too irregular, fitful, and uncertain, to account for the grand fact of ceaseless solar radiation. And there is this further objection, that the consequent increase of the central mass must have shortened the year by one or two hours in the course of the last four thousand years.

The theory of Helmholtz is now in vogue, which would supply the constant waste in radiation from the further contraction of the solar mass, and not its increase. But this, I believe, admits of almost as plain a disproof as the other. For what result must follow? The heat and light would then be greatest when the contraction is most rapid, that is, in the earliest stages of condensation. But all the known facts and known analogies point the opposite way. The more nebulous a star, the smaller and dimmer its light. The most luminous, like Sirius, are those which appear to have most distinctly a fully-condensed central body, like our sun. If the radiant energy were lost in the depths of space as soon as generated, how could the light and heat of the sun have ever reached their present amount?

The true key to the problem will be found, I believe, in a strict application of dynamical reasoning to a vast dual system of matter and ether. It is confirmed by the double analogy of air and ocean currents on the surface of our globe. Radiant light and heat cannot be lost. If part travels out to other systems, the celestial exchanges cannot be all on one side. Our imports must surely balance, or nearly balance our exports. A small part only is arrested by the planets and satellites, and supplies their light and heat. A smaller portion may be spent in repelling them from the sun, so as to counteract the effect of resistance, or in dilating nebulous matter in the equatorial zone of our system. But the main part, travelling out as ethereal motion, will transform itself at every step of the vast journey into ethereal condensation. There must plainly be an excess of motion in the parts of our system bordering on the ecliptic and the sun's equatorial plane. There the ether will be thinned. As the heated water of the tropics flows north and south on the surface, and returns condensed and cooled in an undercurrent to the tropics again, so in this vaster and wider system. In the region of the outmost planets, and even beyond them, the ether must move in a steady, invisible current to the polar regions of the great celestial sphere, which are not disturbed by the immense rotatory action of the central mass. It will return to the sun, not as light and heat, but as ethereal compression, in the latent energy arising from an excess of density, and will then by the rotation be transformed into sensible light and heat once more. Such a circuit results demonstrably from the laws of physics, even so far as they are actually known. It answers to the double analogy in the currents of the air and the ocean. Instead of a waste-heap growing larger and larger, till all life, motion, and beauty are buried under the vast accumulation of a motion that will not move, and energy that lies idle and powerless, it reveals a grand scheme of circulation, akin to the systole and diastole of the human heart. The sun might thus, without a miracle, dispense light and heat, undiminished, and perhaps even increased by further condensation, for millions of years or ages still to come.

VI. Again, the doctrine that the earth consists of a thin crust, formed by cooling, on the surface of a sphere liquid with heat, was long accepted as an axiom of physics, and was current in all scientific manuals. A rude shock was first given to it by some papers of Mr. Hopkins, in which he showed that the phenomena of nutation required this solid crust to have at least the thickness of many hundred miles. And now its reversal and rejection have become more complete.

The earth's rigidity has been submitted to mathematical analysis by Sir W. Thomson. And he writes that this investigation "suffices to disprove the hypothesis, hitherto so prevalent, that we live on a mere shell of solid substance, enclosing a fluid mass of melted rocks or metals; and proves that the earth, as a whole, is much more rigid than any of the rocks which constitute its upper crust." Thus a scientific doctrine, not long ago received as a certain truth, has been entirely reversed and set aside by the further progress of science.

Another theory lately advanced is doomed, I suspect, to a similar fate. I mean the view first propounded, I think, by Mr. Croll, and adopted by Mr. Geikie in his *Great Ice Age*, and many others, that the supposed long ice-period of geologists can be explained by changes in the earth's eccentricity. This would amount, by his calculation, to $10\frac{1}{2}$ millions of miles, about 210,000 years ago. Now the precession of the equinoxes, once in twenty thousand years, will place the winter solstice of the northern hemisphere in the aphelion. The combined effect of the two causes, when the winter half of the year was so much longer, exceeding the summer half more than twenty-six days, is thought enough to explain a long ice-period in the northern hemisphere.

But in this hypothesis almost everything is precarious and uncertain. It is doubtful whether we can at all depend on the calculations of the past amount of the eccentricity. Elements wholly neglected might completely alter the reckoning for a time so long ago. The heating power of the sun, when one-fifth below the mean at the aphelion, would be one-fifth above it in the perihelion. The swiftness and the nearness exactly compensate each other; so that the amount of heat falling on the earth within one degree or minute of longitude is the same in every part of the orbit. Thus for the whole year the total heat which falls on the earth can be scarcely at all affected by the eccentricity, and even the ratio, for either hemisphere, of the total heat received in the summer and the winter half-year, from equinox to equinox, will mainly depend on the eccentricity, but on the inclination of the axis alone. While variations of the eccentricity could thus have only a slight and secondary effect in a period of many successive years, other causes might have a far greater effect, on which no exact data can be given, such as the proportions of land and sea, the varying transparency of the earth's atmosphere, or changes in the absolute heating power of the sun.

A change of views once widely received is also in progress

with reference to the distances of the stars and nebulae, and the structure of the stellar universe. Sir W. Herschel, in his earlier papers, assumed a near equality in the absolute size of the stars, and accounted for their unequal light by unequal distance alone. Hence enormous estimates of the remoteness of the smaller stars and the nebulae, reaching to sixty or a hundred thousand years of the journey of light. But since difference of apparent brightness may arise either from real diversity of size or from greater distance, the reasonable course, till deciding evidence is obtained, is to share the effect equally between the two causes. On this view the high estimates of thirty, sixty, or a hundred thousand years of light, will reduce themselves to others of 300, 420, and 550 years. Herschel's own discovery of binary and multiple stars did much to set aside the basis of his earlier speculations. The Magellanic clouds yielded further evidence against them. All recent discovery has tended in the same line, to prove that physical relations exist between stars very unequal in size, or stars and nebulae. The spectroscope is fast completing the same revolution in our view of the stellar universe. And Mr. Proctor has shown in another way that "the brilliancy of stars is no satisfactory criterion of their proximity."

The uncertainties and errors on which I have dwelt belong to physics, and its most advanced and certain portion, astronomy. The same nebulous character must apply still more to geology, where the data are far more complex; and most of all to physiology, and the sciences that deal with life and living creatures. Here the growth of conjectures, claiming the name of science, and falsely so called, has been surprising and prodigious. A whole school of physiologists have arisen, who can persuade themselves, and try to force their own conviction on others, that the many thousand existing or extinct species of animals have been developed out of each other, by gradual change, through intermediate forms a thousandfold more numerous. And yet of these millions of sub-species, bridging over the ten thousand intervals of known species, no single specimen now survives, or has been found in the immense number of the actual fossils of geology. Such a view is more like madness reduced to method than the sober and deliberate verdict of reasonable men. But it relieves those who hold it from a bugbear which alarms and repels them, the need of any special acts of creation by an intelligent Author and Maker of the universe.

Now even in astronomy, where there is the largest nucleus of solid truth, how much remains nebulous and obscure! The

law of gravitation has been proved, and more than proved, by the researches of the last two hundred years. But there cluster around it, even now, some of the wildest fancies that ever entered the mind of man. Matter certainly exists; though this is denied by some philosophers, and others balance the error by asserting that nothing exists beside it. But the views of its true nature are so diverse as almost to bring into doubt the very fact they seek to explain. Ether also exists; though here the doubters have more excuse, and are more numerous. But the contrast and variety in opinions as to its precise nature are greater still. Conservation of energy is a truth, inductively proved within certain limits, and in reference to lifeless matter and ether in all their forms. But some affirm it to be the first of *à priori* truths, far more certain than the Being of God. And they extend it to all living things; which involves the singular doctrine that men and animals must like or dislike all things in a strictly equal degree, whenever they are at the same distance. Others retain in words this creed of the conservation of energy, but replace it really by the counter-doctrine of its ceaseless dissipation and loss. The concussion theory of solar heat has been taken up and abandoned within the last twenty years. The contraction theory is now in vogue, but cannot fail to share the fate of its short-lived predecessor. The molten nucleus theory of the earth's structure has reigned for two or three generations, and is now finally disproved. The astro-glacial theory, born only the other day, has no stamina of life, and will probably die to-morrow. The teaching of the elder Herschel on the distribution of the stars is being fast superseded, through the reasoning of his no less eminent son on the Magellanic clouds, and by other still later discoveries. The words of Cato in Addison apply even to this clearest part of this scientific landscape :

A wide, unbounded prospect lies before me,
But shadows, clouds, and darkness rest upon it.

As a general rule, those speak most boastfully of the achievements of modern science who understand them the least; and those impute credulity to Christian believers most freely, who are practising it themselves in a more aggravated form. They will not believe the Scriptures to be really the word of God, though confirmed by miracles and prophecies, and the experience of tens of thousands, who have found them to bring moral strength, and deep and lasting peace to their inmost souls. But they can accept with implicit faith guesses

not twenty years old on the supposed state of the earth or sun myriads of years ago, and believe in hundreds of thousands of years of man's existence on the sole evidence of a few cores or scrapers or flakes of flint, assumed to bear marks of human work, and found in strata of indeterminate age; because this opinion is now current, for a few years past, in some scientific circles. They are part of that unthinking multitude, whom Cowper has described—

Too weak to bear
The insupportable fatigue of thought;
And therefore swallowing, without pause or choice,
The total grist unsifted, husks and all.

Thus not only uncertain guesses, but, in more cases than one, palpable errors and self-contradictions have been enshrined in their new Pantheon as certain and axiomatic truths.

“Many shall run to and fro, and knowledge shall be increased.” This voice of God to Daniel, spoken two thousand four hundred years ago, was chosen by Lord Bacon for the motto of his great work, and has been signally verified in our own days. Railways, steamboats, electric telegraphs, bear witness to the new powers man has acquired, the swift running to and fro of multitudes, and his mastery over the earth on which he dwells. Mountains have been tunnelled, the depths of ocean sounded, the rays of sunlight and starlight analyzed, and isthmuses traversed by the fleets of the world. Eclipses and transits, predicted to a second, show the perfect knowledge he has gained of the heavenly motions. The spectroscope is bringing hourly within our reach, in the depths of the firmament, much that until of late was thought inaccessible. The change is in progress still. And what is the revealed purpose and issue of this growth of natural science? God is enlarging the base and pedestal, on which to rear a glorious building of moral and spiritual truth. The knowledge of nature is linked inseparably with the knowledge of man. Man cannot be known aright without the knowledge of his Creator and Sovereign. This threefold cord can be neither untwisted nor broken. It is of God's own framing, and cannot be sundered by the hands of men.

It has been said poetically of the ocean, that “his great bright eye most silently up to the moon is cast.” With still more truth it may be affirmed—all Nature looks upward and points upward to the throne of God. Creation is a vast storehouse of types of heavenly truth, and is full of secret

prophecies of the good things to come. The heavens and earth can never be measured and weighed aright, without leading to the knowledge of Him who "telletth the number of the stars, and calleth them all by their names"; who metes the ocean as in the palm of his hand, and weighs the mountains in scales, and the hills in a balance. Life can never be studied aright, or its true nature and laws discerned, apart from Him who is the Lord and the Giver of Life, who breathed it into man's nostrils in the hour of his birth, and whom truly to know is life eternal. As a general rule, the chief discoverers in Natural Science have been Christians of a modest, reverent, and religious tone of mind. Copernicus, Kepler, Bacon, Boyle, Pascal, Newton; and in the past and present century, Euler, Cavendish, Cuvier, Brewster, Sedgwick, Whewell, Faraday, have all combined ardour in physical research with a spirit of reverence for Christian truth. They have entered into Bacon's prayer, that no unlocking of the secrets of nature may cause blindness to the higher mysteries and messages of the word of God; and the axiom of Newton, that the object of physics is to trace phenomena up to their causes, climbing to those more and more simple and general, "till we come to the First Cause, which is certainly not mechanical."

For myself, I can see no cause whatever for alarm to the Christian in the growth of what calls itself scientific disbelief. The divorce of physics from Christian faith and piety may be permitted for a moment, but it can never last. There is no science, but the extreme of folly, in the Atheist creed, that trillions of atoms were their own creators, that each chose for itself, in the moment of its birth, where it should pitch its ever-moving tent, and whether it should be an atom of matter or one of ether, and endued itself further with the promise and potency of every form of life that exists in the depths of ocean, on earth, or in heaven. I have no faith even in the desponding Theism which holds that the sun is a spendthrift and a prodigal, wasting nearly all its light and heat in riotous living, losing it in empty space, and is thus doomed justly, after a few millions of years, to utter bankruptcy, and eternal, midnight darkness. But of one thing we may be sure without the shadow of a doubt. The Sun of Righteousness, in His deep compassion and love, once suffered eclipse for a moment. But that hour of brief darkness is past, and can never return. He must reign, till all be subdued unto Him in heaven and in the earth. He must and will shine, and shine on for ever. The chiefs and leaders of science then only

occupy their true place, and fulfil aright their appointed office, when they copy the heavenly elders, cast down their meaner chaplets and coronets before the throne of the Most High, and take up with heart and voice that celestial song of praise—"Thou art worthy, O Lord, to receive honour, and glory, and power; for Thou hast created all things, and for Thy pleasure they are, and were created."

Since these remarks were penned, I have seen in the *Revue des Deux Mondes*, of May 15, the following note to an able article on recent solar discoveries :—

"The apparent analogy of this double belt of spots, which extends on one side and another of the solar equator, with the terrestrial zone of the trade winds has led Sir J. Herschel and M. Spoeren to suppose the existence of winds of the same kind at the surface of the sun. But the theory of solar trade winds wants any serious foundation, for one does not see what could produce on the atmosphere of the sun a circulation like that which is the cause of terrestrial winds.—"La Constitution de Soleil," note 2, p. 445.

The view here set aside, because the writer "does not see" any serious ground for it, is precisely the same which I have affirmed, to result from the laws of dynamics, applied to a joint system of matter and self-repulsive ether; and which has thus the sanction of two of the foremost names in general astronomy and spectroscopy, from direct observation of the solar phenomena alone.

Mr. S. D. WADDY, M.P.—I have the honour of being allowed to move, "That our best thanks be presented to the Rev. Professor Birks for the Annual Address now delivered, and also to those who have read papers during the session." (Hear, hear.) I apprehend that this resolution divides itself into, from one point of view, two very distinct, and yet, from another point of view, two very intimately connected parts. The resolution, first of all, deals with the special address which we have just heard; and I cannot help thinking that it has also to do with the annual addresses of bygone years, and also with the steady, regular rank-and-file of the papers that have been delivered during the whole year. With regard to the address we have just heard, I hope I have too much common sense and good taste to say anything at all in the presence of the rev. Professor, for I am sure that if I thought it necessary to say anything in its behalf that would be its deepest condemnation. (Hear.) I do not and I should not for one moment think of degrading the address we have just heard by saying anything whatever in its praise; but I do think it right to point out that, in my opinion, science, and Christian science in particular, has much to be thankful for in the annual addresses, which from year to year it has been our privilege to listen to and to read. (Hear, hear.) I have been thinking this over, and I have been

looking at the character of those addresses, and I confess that my self-congratulation, I was almost about to say, has been somewhat saddened by the recollection that some of those mighty minds (for it is legitimate to say so now that those to whom I refer are gone) will no longer help to guide those of us who do not understand as thoroughly as they did some of the sublimer mysteries of science. From the very christening of this society we have been very much favoured indeed with regard to our annual addresses. I do not know whether I should be strictly logical if I were to talk of the *Scientia Scientiarum*, whose authorship no one knew, although everybody could guess it, or of that magnificent inaugural address without a title, to which we all listened with so much profit and pleasure when it was delivered by Mr. Mitchell, who has since gone to his reward. From that time to the present it has been shown and understood that the attitude of this society has entirely changed. When we began—I may say this now—we were somewhat of a feeble flock. We then thought that if we could hold our own on the defensive principle that was as much as we could do. It is amusing now to see how at first the inaugural and the annual addresses partook of a defensive character. Take the *Scientia Scientiarum* of Mr. Reddie, the inaugural address of Mr. Mitchell, the next address by Mr. Reddie, and then come to the period when Mr. Brooke launched out and gave us the first lecture on physical science. It was not till 1869 that we felt ourselves so thoroughly established and well grounded that we might at last fairly make a deliberate attack on the enemy's territory; and then Dr. Thornton came out with "The Credulity of Scepticism." Since then the tendencies of our addresses has been more on the side of the offensive than the defensive; for Dr. Irons turned round with his paper on the "Darwinian Theory," Professor Kirk let them have one on the "Origin of the Moral Sense," and Dr. Boulbee was down upon them with his essay on "The Moral and Social Anarchy of Modern Unbelief." Dr. Thornton was hard upon them with "The Varying Tactics of Scepticism," and the Radcliffe Observer was by no means more merciful with "Modern Philosophic Scepticism Examined." And I do not think they will find more pity and mercy in the address we have heard to-night on "The Uncertainties of Modern Physical Science." (Hear, hear.) Now, I will be bold to say that if we were to take these lectures as they are, and put them together in a volume we should have such a body of science—earnest Christian science, or scientific divinity, I do not know which would be the best way to put it—as has never before been issued; and if this society had existed for no other purpose than that of giving these annual addresses to the world, it would have wrought to a very noble and a very good purpose. (Hear, hear.) But our thanks are not only due to Professor Birks for the annual address delivered to-night, of which I will say no more than that it is extremely well worthy to rank with those which have gone before, but they are also claimed for those who have read the papers we have heard during the session. I will not read out to you the names or titles of those papers; it is sufficient to say that there is no one who has heard them,

or who has regularly attended this large constituency to which I belong, who will doubt that they are papers exhibiting an extreme amount of learning which is of great value to the Christian world. It was one of our great and fundamental conditions—I remember it well in the frequent conversations I had with Mr. Reddie, who has gone from us—that whatever we did we should be strong in our science. (Hear, hear.) At first we were looked down upon by the world of science: it was considered that we were mere sciolists, and to a great extent, pretenders; but I say that these papers are sufficient to show that we are competent to take the place we claim, and well worthy to be understood as exponents of questions of modern science, more especially of those that bear upon the great truths of Holy Scripture. (Hear, hear.) I say that science owes a great deal, and that Christianity owes a great deal to those who have delivered these papers during the past year; and I have therefore great pleasure in moving the resolution that has been entrusted to me. (Cheers.)

Mr. C. BROOKE, F.R.S., V.P.—I have much pleasure in seconding the motion. I am sure that we must all feel exceedingly grateful for the very able and conclusive manner in which the Address we have just heard exposes the contradictions and inconsistencies of those who seek to ignore the Creator, and to place the things He has created in His place. (Hear, hear.)

The resolution was put and carried unanimously.

Rev. R. THORNTON, D.D., V.P.—The object with which I rise will, I think, be deemed sufficient excuse for my detaining you a minute or two at this late hour. I am about to ask you to give the vote of thanks which we owe to our noble President for presiding this evening. (Cheers.) In doing this it will not be necessary for me to launch out into a long speech. I am sure, however, that you all agree with me in feeling that we are fortunate in having for our President one who is never wanting when anything that is benevolent or religious can be helped by his patronage and assistance. It is now ten years since he kindly consented to become our President. We had some difficulty in finding any one to accept that office, and he himself rather shrank from it, declaring, with his well-known modesty, that as he was not a scientific man he did not consider himself a proper person to be at the head of a scientific institute. But we felt that, however modest the opinion he might entertain of his science, there could be no doubt about his religion, and therefore we called upon him, as a Christian man, to come and help us, and the result is that we still have him here. (Cheers.) There can be no doubt about the willingness of all who are here to return their thanks to our President for having taken the chair on this occasion, and I move, therefore, that we beg him to accept the expression of our satisfaction at being able to see him here this evening. (Cheers.)

Rev. Prebendary IRONS, D.D.—I am sure, my Lord, that you do not need this vote of thanks, but I am equally sure that we should be doing an injustice to our own feelings if we were to separate without rendering it to you with all our hearts. (Hear, hear.) I have often had the pleasure of

being present when your Lordship has presided. I believe that almost on the first occasion when your Lordship did so I was one of the audience, and very grateful we were that you had the courage to stand forward in defence of that which is dearer to you than life—the truth of the Gospel of our Lord and Saviour—at a time when there was little of worldly success to expect, and when our future as an institute was extremely uncertain. (Hear, hear.) But, my Lord, you did not wait until we were successful before you condescended to preside over us; but more than that, we know that when the Institute began to be prosperous, then it was that you expressed your willingness to yield your chair to some one whom you so gracefully believed would more fitly occupy it. But we could not consent to that. We urgently requested you to remain where you were. We felt, and we still feel, that if you had retired we should have sustained a loss which could not easily, if at all, have been supplied; and now, while we thank you for your services to us, I trust that you will believe we are all aware that we cannot do so in anything like an adequate manner. You have presided over this Institute so equitably while you have been among us, and with so much geniality and forbearance, that those who at times may have feared you could scarcely have sympathized with their course of argument, must have admired your equanimity, and the fairness with which you have administered the duties of your office (hear, hear): on more than one occasion I have seen this. It would be wrong on my part, after Dr. Thornton's observation that we ought not to detain you with long speeches, to prolong these observations, but I could not have done justice to my own feelings if I had supposed the audience could be at all impatient of this vote of thanks. Not one has left the room since it began to be proposed, the general rule being that the people are all going out of the door as the vote of thanks is being moved. It is not so, however, to-night; and I trust that you will be aware, from the unanimity and silence which prevails amongst us, that we are most hearty and sincere in giving you our deepest thanks for all your care and attention to the interests of this Institute. As you cannot put this motion yourself, I will put it for the meeting to signify in its own way the expression of the hearty thanks of this Institute for your Lordship's conduct of our proceedings in the office of President.

The vote was accorded amid general cheering.

The PRESIDENT.—First, let me thank you all very sincerely for the manner in which this vote of thanks has been proposed and received, and then let me assure you that in the rest I have to say my words shall be “wary and few.” I know the jeopardy in which I stand, and the slippery position I hold, and I shall take care not to lose myself in any scientific discourse. But I will say that if ever before I doubted the necessity for the existence of such a society as this, that doubt would have been removed by the address we have just heard. I do not know what we non-professional men would do, we who are engaged in the busy activities of life—I do not know how we should be able to turn to the right or the left, how we should help being lost

in a maze, when we hear all the varieties of knowledge, and of the deepest learning, opinions and counter-opinions, difficulties and antagonisms, such as have been brought out to-night by Professor Birks in his powerful and masterly address, if we had not such societies as this to put the truth before the large proportion of people who must otherwise sink down, either through unqualified infidelity or absolute ignorance. (Hear, hear.) This society was not founded to establish either one opinion or another. It was not started for the purpose of setting up the Bible against Science. THE OBJECT OF THE SOCIETY WAS, THAT SCIENCE SHOULD HAVE FAIR PLAY, THAT THE TRUTH SHOULD BE TOLD ON ALL SIDES, and that we might get rid of the despotism of certain scientific men. (Hear, hear.) Because it is perfectly well known that men of science, with all their sublime and mighty notions, are as despotic as the weakest of the human race, and they are exercising their despotic sway to a remarkable extent over a very large number of rising young men, who are either fascinated by what they have read and discovered, or are crushed by the authority of a few great names. (Hear, hear.) It was in order, as I have said, that Science should have fair play that this Institute was established, and the blessing of God has so rested upon it that it has at last taken a hold in public estimation, which I believe it will retain as long as the Royal Academy, or any of the other societies or institutions that now exist; and I trust that by the blessing of God it will surpass them all. (Hear, hear.) In spite of what has fallen from Dr. Irons and others, I must say that I still hold myself to be the wrong man in the right place; and I must also add, that now you have grown to such large proportions, you do require in your President some one with more authority of declaration than I am. I should be glad to see some such man occupying the chair which I, by your kindness, have occupied so long. (No, no.) All that I can say, in conclusion, is that I feel very much like a hen that has hatched an eagle, which is now soaring aloft beyond my reach.

[The Annual Meeting being concluded the members, associates, and their friends assembled in the Museum, where refreshments were served.]

ORDINARY MEETING, 17th JANUARY, 1876.

H. CADMAN JONES, ESQ., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following election was announced :—

ASSOCIATE :—E. Beacham, Esq.

Also the presentation of the following Works to the Library :—

“Proceedings of the Royal Geographical Society,” Part 1, Vol. XX.

From the Society.

“Molecules and Atoms.” By J. G. McVicar, D.D. *The Author.*

“The London Quarterly Review.” *A. McArthur, Esq. M.P.*

The following paper was then read by the author :—

ON THE SCIENTIFIC CONCLUSIONS AND THEOLOGICAL INFERENCES OF A WORK ENTITLED
“THE UNSEEN UNIVERSE, OR PHYSICAL SPECULATIONS ON A FUTURE STATE.”—By the Rev.
PREBENDARY IRONS, D.D., Bampton Lecturer for 1870,
Rector of St. Mary Woolnoth, London.

OUTLINE OF THE ARGUMENT, &c.

1. Reception of the Book by the Public:
2. Unworthy in many quarters.
3. Its great plainness ; and the method to be adopted respecting it.
4. Seven-fold division of the volume.

PART I. OF THE EXAMINATION.

CHAPTER I.

The general belief in Immortality. (*Subject.*)

5. History of Religion till the Birth of Christ, illustrating this.

TABLE OF CONTENTS OF THE “UNSEEN UNIVERSE.”

CHAPTER I.—INTRODUCTORY SKETCH.

Object of the Book. Two classes of speculators. Why doubters of immortality have lately increased.

6. *Consensus* as to an "Unseen Universe."
7. The Christian Teaching as to the Future Life--influenced by belief as to Christ's Person.
8. Mahomet's views of the Future.
9. Mediæval Controversies as to the Resurrection, &c.
10. Swedenborg, and others, here so far supplement Christianity.
11. Swedenborg's line adopted by the Authors of this Book.

CHAPTER II.

12. Position taken. Physical Axioms. A God and His Law postulated.
13. Finite Beings are all "conditioned" under the Physical Laws; but Consciousness is no result of those conditions.—(Memory, and Activity of Finite Agents).
14. Principle of CONTINUITY.
15. Examples.—Yet "Interferences" not impossible.
16. Christianity; considered as an interference; and the Doctrine of abrupt "Creation"—as not inconsistent with Continuity.
17. "Immortality" regarded as belonging to this Principle of Continuity. (La Place—Sir W. Thomson).—Three hypotheses as to Immortality.

Belief of the Ancient Egyptians:—Separation between priests and people. The abode of the dead. Transmigration of souls. Embalming of the body.

Belief of the Ancient Hebrews:—Position of Moses. His task. Belief of the Jews in an unseen world. Their belief in a future state. Their belief in a resurrection.

Belief of the Ancient Greeks and Romans:—Unsubstantial nature of Elysium. Transmigration introduced. Rise of the Epicurean school. Uncertainty of philosophic opinion.

Belief of the Eastern Aryans:—The Rig-Veda. It inculcates immortality. Double source of corruption. Zoroastrian reformation and tenets. Reformation of Buddha. Meaning of Nirvāna. Observations on ancient beliefs.

Belief of the Disciples of Christ:—The resurrection of Christ. Future state taught by Christ. Perishable nature of that which is seen. The Christian Heaven and Hell. General opinion regarding the person of Christ. General opinion regarding the position of Christ.

Spread of the Christian religion. Rise of Mohammed. Materialistic conceptions of the dark ages. Extreme scientific school. Points of similarity between this school and Christians. Varieties of opinions among Christians. Believers in a new revelation. Swedenborg and his doctrines. Remarks on Swedenborg. Modern spiritualists.

CHAPTER II.—POSITION TAKEN BY THE AUTHORS.—PHYSICAL AXIOMS.

Class of readers to whom the Authors appeal.

Position assumed by the Authors:—Laws of the universe defined. Embodiment of

CHAPTER III.

18. Matter, and Energy ; distinguished. Conservation of Matter.
 19. Energy, Kinetic and Potential. Conservation of Energy. Transformation of Energy.
 20. Heat, an Energy. Dissipation of Energy. The Visible Universe will therefore end. Hence no Immortality in the Visible Universe.

CHAPTER IV.

21. What is Matter? (1) Atomic theory. (2) Central Force. (3) Non-atomic. (4) Vortex-atoms.
 22. Le Sage. Luminiferous Ether. (The nature of Matter really unknown.)

some sort essential. Materialistic position described. Unjustifiable assumptions of materialists. Intimacy of connection between mind and matter.

Essential requisites for continued existence.—An organ of memory. Possibility of action in the present.

Principle of continuity.—Illustrated by reference to astronomy. Breach of the principle illustrated. Extension to other faculties of man.

Application of this principle to Christian miracles.—Erroneous position of old divines. Such opposed to the genius of Christianity. New method of explanation.

Application of this principle to the doctrines of the extreme scientific school.—The visible universe will probably come to an end in transformable energy. It must have been developed out of the invisible.

THE UNIVERSE :—Similar errors committed by the extreme schools of theology and science.

Application of this principle to Immortality.—Three conceivable suppositions. These reduced to two. Future course of our argument. The problem may be profitably discussed.

CHAPTER III.—THE PRESENT PHYSICAL UNIVERSE.

Definition of the term "Physical Universe." It contains something else besides matter or stuff. Grounds of our belief in an external universe. These in accordance with our definition of the laws of the universe (Art. 54). Meaning of conservation. Use and abuse of the term "Force." Conservation of *Momentum*. Conservation of *Moment of Momentum*. Conservation of *Vis Viva*. Definition of energy. Newton's second interpretation of his Third Law. Friction changes work into heat. Historical sketch of the theory of energy. Transformability of energy constitutes its use. Case where energy is useless.

Historical Sketch of Second Law of Thermodynamics.—Carnot's perfect heat-engine. Sir W. Thomson's definition of absolute temperature. Melting point of ice lowered by pressure. Sir W. Thomson's rectification of Carnot's reasoning. Professor J. Clerk-Maxwell's demons. Degradation of energy.

Future of the physical universe. Past of the physical universe.

CHAPTER IV.—MATTER AND ETHER.

Inquiry regarding structure and material of the universe.

CHAPTER V.

23. Development of Matter. (1) Chemical. (2) Formal. (3) Life. (4) Species
 24. Development of Species ; (and concerning Hybrids).

CHAPTER VI.

25. Immortality in the Visible Universe not being attainable for us ; may
 Intelligent beings be hereafter developed in it to a higher life ?
 26. No intelligence here superior to man. (Metaphysics avoided.)
 27. Hence this question is negatived.

Various hypotheses regarding matter :—(1.) Greek notion of the *Atom*. Speculations of Lucretius. (2.) Theory of Boscovitch (centres of force). (3.) Theory of infinite divisibility. (4.) Vortex-atom theory. Remarks on these theories.

Relative quantity of matter associated with energy.

Universal gravitation :—Is a weak force. Two ways of accounting for it. Le Sage's hypothesis.

The Ethereal medium :—Its principal properties apparently incongruous. Analogy of Professor Stokes. Distortion and displacement of ether. Inferior limit of its density. Its supposed imperfect transparency. Remarks on ether.

Remarks on the speculations of this chapter. Modification of the vortex-ring hypothesis. Possible disappearance of the visible universe.

CHAPTER V.—DEVELOPMENT.

Nature of inquiry stated.

Chemical development :—Changes in lists of elementary substances. Prout's speculations. Experiments of M. Stas. Family groups. Mr. Lockyer's speculations.

Globe development :—Hypothesis of Kant and Laplace. Tendency to aggregation of mass. Process cannot have been going on for ever. Peculiarity of products developed inorganically.

Life development :—Morphological and physiological species. Species regarded physiologically. Position of a certain class of theologians. Tendency to minor variations. Artificial selection. Natural selection. Unproved point in the Darwinian hypothesis. Remarks of Mr. Darwin. Development of the Darwinian hypothesis. Mr. Wallace's views. Professor Huxley's remarks. Position assumed by the authors.

CHAPTER VI.—SPECULATIONS AS TO THE POSSIBILITY OF SUPERIOR INTELLIGENCES IN THE VISIBLE UNIVERSE.

Position of life in the present physical universe. Two kinds of equilibrium. Two kinds of machines or material systems. Two respects in which a living being resembles a machine. A living being resembles a delicately constructed machine. The delicacy is due to chemical instability. Delicacy of construction derived from the sun's rays. Delicacy of construction in atmospheric changes. Worship of powers of nature—mediæval superstitions. Theory which attributes a soul to

CHAPTER VII.

28. What is the Unseen Universe? It existed before and will exist after the Visible. Luminiferous Ether a bridge between the two worlds.
29. Spiritual Bodies.
30. Alternative: that the preceding Unseen Universe either had life or had it not. The Principle of Continuity shuts out the Unconditioned.
31. Conditioned God, the only God we know. The Holy Ghost, conditioned, develops the subjective life of the Universe.
32. But what is life? (Considerations as to Energy:—and the vortex-atoms.—Sir William Thomson and Helmholtz).
33. But are Energy and Matter distinct creations? Both come from the Unseen Universe, which is eternal, according to the Law of Continuity.
34. Miracles are no more breaks of Continuity than Creation was.
35. The Principle of Continuity holds if we allow an invisible essentially connected with the visible Universe.
36. Conservation of moral results in the Invisible. The Law of Continuity implies the Eternity of the whole Universe.

the universe. Real point at issue stated. Man presents the highest order of the present visible universe. The same idea pervades the Old Testament. And it likewise pervades the New Testament.

CHAPTER VII.—THE UNSEEN UNIVERSE.

- Decadence of the visible universe. Its arrangements apparently wasteful. Explanation of this. Memory of the universe. Connection between seen and unseen. Physical explanation of a future state. Dr. Thomas Young's conception of the unseen.
- Objections to the proposed theory of a future state replied to:*—Religious. Theological. Scientific. Quasi-Scientific.
- Miracles and the Resurrection of Christ:*—Objections of extreme school stated. Development has produced the visible universe. Its atoms resemble manufactured articles. Development through intelligence. Idea clothed in concrete form. Christian theory of the development of the universe. Life development—Biogenesis. Life comes from the unseen universe. Christian theory of life development. Position of life in the universe discussed. Meteoric hypothesis implies Discontinuity. Discussion of the notion that all matter is in some simple sense alive. Life, as well as matter, comes to us from the unseen universe. Position reviewed. Miracles possible without breach of continuity.
- Peculiar communication with the unseen in the case of Christ. Apparent breaks are concealed avenues leading to the unseen. Probable nature of present connection between seen and unseen. Angelic intelligences. Remarks on God's providential government. Our argument may be very much detached from all conceptions of the Divine essence. Christian conceptions of Heaven. Two ideas in all Christian hymns. Possible glimpse into the conditions of the future life. Darker side of the future. Plato on the markings of the soul. Christian Gehenna. Mediæval idea of Hell. The *process* in the Gehenna of the New Testa-

PART II. OF THE EXAMINATION.

37. Continuity no newly discovered law. Continuity of the Absolute.
38. Continuity of the Phenomenal. A Principle of Continuity in both.
39. The Visible and Invisible world are, however, supposed to be of the same substance.
40. How Continuity is a law.
41. Force precedes phenomena
42. Logical inferences from the facts of Science.
43. The true argument is one of analogy.
44. The Theological inferences erroneous.
45. A "Trinity" resembling Swedenborg's.
46. Rationality limited by the phenomenal is inconceivable.
47. Neglect of the *à priori*, by our authors.
48. Of Heaven and Hell.
49. The doctrines intensified by Predestinarianism ;
50. And by forgetfulness of what a moral world *is*.
51. Perdition and Eternal Punishment are moral facts.
52. Four theories of Future Punishment.
53. How the three former theories clash with moral life.
54. The "new Heavens and new Earth," wherein dwelleth righteousness.

APPENDIX.

55. Professor Clifford's criticisms.
56. His minimizing the desire of immortality is an oversight.
57. His exposing the various and insecure conclusions as to the "Loss of Energy."
58. His criticisms as to the imperfect fluid.
59. Question as to the existence of something which is not Matter.
60. His criticism as to "Second Ether" and its contents, and Human Consciousness.
61. His doubts as to the unity of Consciousness.
62. His doubts as to the final agency of heat.

ment apparently an enduring one. Personality of the Evil One asserted by Scripture. Brief statement of the results of this discussion. The scientific conclusion is directly against the opponents of Christianity. Criticism invited from leaders of scientific thought or of religious inquiry.

63. Points are made by Professor Clifford. But important work has been done by the writers of *The Unseen Universe*.
64. But the Law of Continuity is imperfectly stated by the authors.
65. And the scientific theories are at least incomplete: and inadequate for the conclusion.
66. Theory of Miracles.
67. Dr. Mozley and Dr. Mansell, unsatisfactory.
68. "Metaphysics."
69. Conclusion: (as to causation and power).
70. "

1. THE Book recently published, entitled "The Unseen Universe," is a defence, on the ground of the "Principle of Continuity," (p. 209) of the possibility of a Physical Immortality for man. It has been received, as Professor Clifford observes, with strange eagerness by some religious persons, who evidently betray their need of scientific assurance that faith in a future life is not quite impossible. But we may notice, on the other hand, that there are men of science who on this occasion have shown an unbalanced temper, and who regard the eminent authors of this religious and scientific volume with feelings of scarcely-veiled resentment, or even with the *animus* betrayed at times by conspirators in assailing those who turn "king's evidence." Such excitement on either side is scarcely creditable, if indeed it be not childish. That must be a feeble faith in a future which is suspended, as supposed, on verdicts of physical science; and that a very faint love of truth which is angry at an honest statement of facts.

Fortnightly Review, June 1, 1875.
See also "Appendix" to this paper.

The reception of this book by the public.

2. But this either "religious" or "scientific" flutter which has been stirred by "The Unseen Universe," is by no means the only phenomenon to be observed in connection with its appearance. Some of the readers of the book assume a mental attitude, even less to be admired than Professor Clifford's, or his theological friends', and, as if they were yet more forgetful of what is due both to truth and faith, declare themselves profoundly "grateful" to the distinguished authors for openly saying what (it must be presumed) those writers know or believe to be scientifically true. The Senior Wrangler, and others of perhaps equal fame, to whom the work has been popularly

Unworthy in many quarters. assigned, will be little flattered by such adherents ; any more than by others who have tenderly welcomed them as hopeful converts to the true faith.

Not a few readers have, further, discovered with some *naïveté*, that the whole scientific statement takes them by surprise, and, with a mingled ingenuousness and knowingness scarcely compatible, advise religious people at once "to look into the subject," as it is really "worth attention." Perhaps, however, the most offensive coterie of "critics" is that which would jocosely treat the book as a kind of enigma, and smile at its "subtilities," and pretend they "cannot understand," while, taking it as half-religious and half-sceptical, they distantly applaud.

3. But, notwithstanding the various ways in which it has been received, it is no fault of the writers. If ever book were plainly written, this is the book. Its great plainness, and the method to be adopted respecting it. If the unworthy religious reception of it in some quarters wrung from the authors at last, in the "Third Preface," the bitter and scarcely consistent words (p. vii.), that they "do not covet the title of theologians of any kind," the so-called "theologians" have chiefly themselves to blame; though, on the other hand, the authors, (p. xv.) in their first Preface, and elsewhere (p. 61, &c.) complained beforehand of "the orthodox," in the too usual fashion. Or again, if Professor Clifford's attack, from a scientific point of view, has subjected him to some deserved rebuke, he might have prevented it by dealing logically, instead of jauntily, with the subject, and remembering, as our authors say (p. 42), "that men of science must be perfectly recipient, though guarded, in the interests of truth." A book like this eminently demands fair treatment. The upright course to adopt in reference to any competent work submitted to analysis is (at least for the sake of those who read rapidly and loosely), to give such a description of its contents as the authors themselves would allow to be just; and then apply our best attention and method in testing the religious or scientific conclusions, so far as we question them. Such, at least, is the twofold course which (without assuming deep scientific or religious knowledge in all our readers), we are about to adopt in this address.

The seven-fold division of the volume. 4. The book is in seven chapters, and the attempt to condense it into an hour's reading, and at all comment on it, will perhaps need forbearance on the part of some whose attention we yet would claim.

PART I.

CHAPTER I.

THE First Chapter at once announces the Religious object of the writers. They are going to compare certain facts of historical, religious, and moral experience, with the most recent or accepted ascertainments of physical Science; and especially to trace certain consequences of its all pervading "Principle of Continuity," too little observed (p. xvi.).

The thesis of their first chapter is that "the great mass of mankind have always believed, in some fashion, in the Immortality of the Soul." The general belief in Immortality.

This general but undefined belief (pp. 1, 2) is disturbed by an active, intelligent, and virtuous minority, said to be now on the increase. It is worth while inquiring, say our authors, why some scientific men, who swell this minority, seem prone at times (p. 2) to deny that immortality, which is so naturally received by mankind at large that we can hardly conceive of society going on at all without some such belief. Is there anything in Science, or in its admitted conclusions, which leads to a denial of human Immortality?—Our authors think not (p. 2).

5. The facts both religious and scientific, and the broad religious fact in the first place, must here be looked at. The expectation of a Future Life, whether popularly or philosophically expressed—(and this seems insufficiently distinguished),—is an unquestionable phenomenon of human experience. A brief historical *resumé* will suffice to show this. Our authors, therefore, in very simple outline, put rapidly before us the old Religions from the earliest times, all, of course, implying a future life or unseen world of some kind. The history of religion till the birth of Christ. Those of the Egyptians, the Hebrews, the Greeks, and the Romans; those also of the Hindoos in their many varieties, are glanced at; those of the Persians, too, and others allied with them.

According to some, it would seem that Future Existence is regarded as shadowy; and, according to others, it is substantial. A third class of opinion—(pp. 4, &c., to pp. 22, &c.)—stands in doubt as to *man's* personal share in the assumed future. If, *i.e.*, a future world there be, yet still some other unseen beings may inhabit it, such as "angels," which are believed by almost all, though invisible to us, to exist as agents both of

good and evil. Theories of their relation to man are at times met with; and expectations of judgment to come are often connected with them. A doctrine also of man's ultimate personal annihilation in a remote future is (somewhat inconsistently perhaps), prevalent in certain civilizations, and, still more, a belief in transmigration of souls, which is apparently regarded by our writers with more favour.—(p. 23).

6. As to some "Unseen Universe," there thus has been almost a *consensus* of belief. People who had been doubtful of their own attainment of life hereafter, still had held that there were "immortals," who even might communicate with earth.

In fact, this particular expectation of some Divine communication from the Unseen was very keen, and widely spread among civilized nations at the time of the birth of Christ (p. 24). At this point, then, our authors leave the pre-Christian ages; and they pursue their subject into Christian times, in the following way:—

The coming and the teaching of the great Christian Master marks an epoch in the history of belief in a Future Life. His followers connected His alleged Resurrection from the dead with man's rising hereafter to a bodily future of a much more definite kind than had hitherto been professed by any philosophy. Yet the future "bodiliness" which was thus taught did not altogether reproduce that which we recognize in the present life. It was termed a "spiritual bodiliness,"* and was not unlike that which was attributed by the Jews "to angels." Christ's descriptions of it † meant to be such, no doubt, as the national and local traditions would assimilate. Heaven, or the immediate "paradise" of souls at least, was "Abraham's bosom"; and "Hades" was a "place of torment" ‡ (Βάσανος) for some, and "repose" (παράκλησις) for others. Gehenna was so called, as if a "valley of Hinnom,"—the place outside Jerusalem for putrefaction and fires, with rites of lamentation.§

7. No doubt the value of this teaching would depend on the person and authority of the teacher; and here new inquiries arise, since a great difference of opinion prevailed, even among Christ's own followers, as to His Person and His exact position. (This our authors slightly describe, p. 28.) Apparently during His life, His own relation to the Universe and its laws, so far as commonly known at this time, was similar to ours:

* 1 Cor. xv. 44.

† St. Mark xii. 25.

‡ St. Luke xvi. *ad fin.*

§ St. Matt. v. 29; viii. 12.

yet that it was not altogether the same, His followers before long began to perceive. As there was very soon a variety of opinion, so, as time went on, it continued, wherever His teaching became known, whether among the cultivated or uncultivated. And this diversity was specially influential on the idea of the kind of hereafter which was looked for by Christ's disciples (p. 31). The educated might naturally be affected (some ardently, some more dimly) by the elevated hope of "being for ever with their Divine Lord," and being "like Him as He is"; while others would be awed into a yet distincter faith of a certain kind, by the possibilities set before them of a perdition of the most fearful and explicit description, which was assigned to unbelief in Christ.

The belief was much influenced by the ideas entertained as to Christ's person.

A somewhat undefined, but sublime, view of the Christian future (in connection with an advancing definitiveness of expression as to the Person of Christ), was thus generally prevalent in the world for three or four centuries,—say up to the times of Constantine, and perhaps in the age that followed; but a preciser doctrine as to our hereafter seemed henceforth to take hold more and more distinctly on the Western mind, in proportion as the unsettlement of earthly civilization unhinged men, and the fall of the Roman empire became imminent. But, meanwhile, the East had, in this matter, a new destiny before it.

Course of thought in the West.

8. Another religious system, involving a different doctrine of the future life, rose suddenly in the seventh century, and swept over the whole sphere of Oriental Christianity (p. 32). The prophet of Arabia, borrowing from the most realistic forms of natural faith, gave a bodily glow to his heaven and hell, exceeding in distinctness all that had been thus far accepted. Heaven to Mahomet was a "paradise" of intense earthly delights, and hell was delineated for the unbelievers in all the imagery of physical terror typified by the old Jewish "Gehenna"; of which, in less detail, early Christianity had made use.

Mahomet and his views of the future life.

Subsequent to the rise of Mahometanism, the physical developments of the hereafter became much more distinct among Christians, though accompanied by some speculations of an alleviating character. The certain Future Judgment of souls, and therefore the personal sameness of men at that judgment, now gave new prominence to the somewhat undeveloped thought of Bodily Resurrection.

(See the *Church of All Ages*, p. 373. Hayes, London, 1876.)

9. This, of course, had eventually to encounter the strongest

The Mediaeval controversies as to the Resurrection life.

Scientific opposition. To "buttress up the falling edifice" of a literal Resurrection of the same body, great efforts were made, and many theories resorted to. Some asserted that the sameness of the future man (p. 33) was entirely dependent on the immortality of his soul. Others, denying that the soul was naturally immortal, regarded the immortality as a gift conferred hereafter by the Creator. (This at a later age among ourselves, was Priestley's idea.) Few, however, could persuade themselves that the future life depended on a miracle to be thus wrought in every case to qualify each of us for immortal existence. Then returned, of course, a still growing indistinctness of conception, which induced in some an abandonment of all real faith in that human future, which nevertheless mankind are known to aspire to.

But disturbance in the belief as to the Resurrection of the Body (p. 35) was accompanied by the re-opening of many other fundamental questions which ensued. The Being Himself; and the existence of other immortals there; such as the good and bad "angels" already referred to. The divergences of thought seemed, however, to be ultimately determined by the growing, though seemingly dangerous, recognition of "invariable law" as pervading the whole Universe (p. 36).

10. To reconcile the invariableness of Law with some real Theism, and still more with the Moral government of the world, was the next effort of thoughtful persons. The latter difficulty was not worked out. The Scriptures were explained in allegorical senses, so as to meet some of the Theistic difficulties. Still, the admission of a Deity who was to be nothing but the administrator of rigid law, proved to be irreconcilable with all Religion. And, further, it was plain that it would not be worth while to admit or deny an "Unseen world," into which, omitting all "Religion," we might just mechanically pass on hereafter. All the Christian ideas of prayer, duty, and future rewards would thus become impossible. (Even the Moral idea of *Right* would seem excluded.)

Amidst the manifold difficulties as to the very elements of the Christian belief in a Future Life, which thus had sprung up, some persons from time to time arose, pretending to have "received new and *supplementary* revelations" on the subject.

Swedenborg and others thought to supplement the Christian Revelation.

Passing over all others, our authors choose Swedenborg, as one

whose views "merit fuller treatment." They describe his system, not in its scientific character—(though he "foreshadowed, if he did not anticipate, many of the scientific doctrines of the present day"),—but in its "mode of viewing the spiritual world," if not the moral (pp. 38 and 43).

According to Swedenborg (pp. 38 and 43), "Man, considered in himself, is nothing but a beast." His distinction from the beast is that "the Lord dwells in his will and understanding, and never leaves him." At his birth man puts on his body, and at his death he puts it off, "retaining only the purer *substances* of nature," his faculties and functions. "The natural world corresponds to the spiritual collectively, and in all its parts" (p. 39).

As to God the Father, the teaching of Swedenborg is very explicit. "He is invisible, and, being invisible, can neither be thought of nor loved" (p. 40). Apparently we have to do with Christ alone, as representing the Father.

Swedenborg also believed in particular Providence, and in Purgatory, in the sense of an intermediate state, whence souls are drafted off to heaven or hell (p. 40; comp. p. 30). The spiritual world is related to the natural throughout, as cause and effect.

11. This, say our authors "is the system of a profound thinker." "It is one thing however" (they add) "to admit the beauty, the philosophical completeness, and even the possible truth of many of his statements; and another to believe that he actually conversed with the inhabitants of another world in the way he said." "There is no reason to suppose Swedenborg's speculations to be anything else than the product of his own mind" (p. 41). In relation, however, to the doctrine of a future life, or invisible or spiritual world, Swedenborg's position (p. 43) is "that that world is not absolutely distinct from the visible universe, and absolutely unconnected with it, as is frequently thought to be the case, but rather is a Universe which has some bond of union with the present." With this view of the doctrine of the Unseen Universe, as taught by Swedenborg, our authors conclude their historical epitome as to the belief in Immortality. They add, that a line of argument similar to Swedenborg's in this respect (p. 43), is to be developed in the following chapters of their book.

12. We pass on then to the Second Chapter.

CHAPTER II.

Leaving the Religious speculations awhile, we have before us now a purely physical investigation. Our authors write for students of Science generally, and first state the position they take, their "Physical Axioms."

The existence of a God is self-evident.

(But compare this with p. 169, where the "Creator" is the absolute One, or so "looked on.")

And laws of the world fixed by its governor.

They "assume as absolutely self-evident the existence of a Deity, who is the Creator and Upholder of all things." "Every phenomenon," says H. Spencer, whom (3rd edit.) they quote, "is the manifestation of some power." (Darwin would add, "of a lower power into a higher?") "The laws of the Universe are those laws according to which the beings in the Universe are conditioned by its Governor, as regards time, place, and sensation" (p. 47).—(The statement is made afterwards, that the "conditioned cannot proceed from the unconditioned." Comp. pp. 169, 173, 174.—The Eternal Father is not Creator?)

13. We cannot conceive of purely finite beings existing in the Universe without some sort of embodiment. "Materialists agree with us" (p. 48) in disbelieving in disembodied spirits (p. 53).

Finite beings are conditioned under those laws.

But here they may ask, whether this necessity of conceiving some "embodiment" does not show that there is a "reality about matter which there is not about mind"? Say, finite consciousness *e.g.* may be distinct from matter; but may it not be the result of the position of a certain number of material particles, brought about by different "forces" and ending when that position ends? The answer is, that we have nothing to justify us in so concluding. To say, "that the brain consists of particles of phosphorus, carbon, &c., such as we know them in the common state" (p. 50), and that when the particles of the brain have, in consequence of the

Consciousness is not a known result of physical conditions.

operation of physical forces, a certain position and motion, then consciousness follows," exceeds all that we are warranted in affirming. We are unable to identify consciousness with its known physical conditions.

Nor may we assume that consciousness, however produced, is less permanent than matter; because the latent possibility of consciousness remains behind. The connection

Need of Memory and Activity, for continuous conscious being.

between mind and matter is granted to be most intimate; but we are in profound ignorance of its exact nature. How intimate the connection is, the physical facts of Memory may teach us. For memory is a requisite "organ" of continued conscious existence

(p. 52). By it we retain a hold on the past; as truly as by an inner life we have also latent capacity of action in the present.

14. Bearing in mind these preliminaries, the authors proceed to consider the "Principle of Continuity," as now scientifically accepted.—At first sight, we suppose, it might seem nearly equivalent to the Scripture saying, "all things continue" (LXX. διαμένει, and 2 Pet. iii. 4) "to this day, according to Thine ordinance, for all things serve Thee." Things in this sense doubtless hold on without a break. But it means, with our authors, more than this. Not only is it true in point of *fact*, (so that we, with the Psalmist, may acknowledge the upholding power of God), but it is implied that there is a pervading *necessity* for this—a necessity not merely such as all causation demands, (a connection of phenomena with preceding *power*—see p. 48—which introduces another idea), but a holding on of a *physical* kind. By virtue of this Continuity, the Universe is but one whole, and if we catch the thread at any point, it is a clue to sure science throughout.

The Principle of Continuity.

It is the holding on of a physical law.

A Continuity of necessity, not of causation, is implied.

15. This law or principle of Continuity is illustrated by familiar astronomical examples (pp. 53–59). It is shown, too, that this law does not necessarily imply an easy progress, or an always smooth level road, but is consistent with temporary difficulties (p. 60). "It does not preclude the occurrence of strange, abrupt, unforeseen events in the history of the Universe, but only of such events as must finally and for ever put to confusion the intelligent beings who regard them." God does not give us rationality in order so to thwart it. The idea, then, that the Law of Continuity interferes with God's Governing is erroneous; though the law certainly forbids some theories of His miraculous and perhaps other interventions. Such supposed Divine interferences as would subvert natural order, the Law of Continuity no doubt resists: and the law itself is such as will work on till it works itself out, even, (as some say), till the Universe itself comes to an end;—(though, we suppose, even then the law would remain a principle condition of all possible rationality)?

Examples.

It does not preclude all interference, but only such as is destructive of natural law.

Our authors, however, are not of those who admit that the whole Universe of things will come thus to an end (p. 64). It may be true of the transformable energies of the *visible* Universe, or even of *matter itself*; but it seems "monstrous to suppose" (3rd edit.) that universal nothingness will ever be arrived at by the Law of Continuity working itself out. "The principle of Continuity upon which all such arguments are based, demanding a continuance of the

The Universe as a whole is Eternal.

Universe itself, we are forced to believe that there is something beyond the visible." From this it would appear that the Universe, taking it as a whole, (and not simply the "visible Universe"), is eternal; St. Paul, as our authors think, asserting much the same in the words, "the things that are seen are (*πρόσκαιρα*) temporal, and the things that are not seen are (*αἰώνια*) eternal."* "If the visible Universe were all that exists," then the first abrupt manifestation of it was as truly a break of Continuity as its final overthrow. But abrupt-seeming beginnings need not be breaches of Continuity, if we consider the whole eternal Universe.

16. To illustrate this position let us not fear to take certain facts of Christianity. Apply what has been said to the marvellous life of Christ Himself. "What Christ accomplished was not in defiance of law, but in fulfilment of it; and that He was able to do so much, was simply due to the fact that His position with reference to the Universe was different from that of any other man."—"Babbage's machine," *e.g.*, having long worked according to a particular method of procedure, suddenly manifested a breach in its method, and then resumed, having been so made as to keep to, its original law. To suggest as possible that Christ's life may have (p. 62) occupied some such position, (by Divine arrangement), and therefore in no way interfere with the Law of Continuity, which goes on as before, may be better than to suppose "a break"; still they regard Babbage's explanation as altogether incomplete.

In what sense real "Creation" is admitted in a Universe so Continuous and Eternal, we are scarcely informed; (comp. p. 167). "Creation" seems an ambiguous term, covering simply the general idea of manifestation: a really "abrupt beginning" of the Visible Universe, or *de novo* Creation, is, as our authors say, against the principle of Continuity. Creation is not simply "pushed back,"—but pushed back for ever.—(But is not "this intellectual confusion"?)

It may sound strange, "that it is the duty of the man of science to push back, (as our authors express it), the Great First Cause in time as far as possible" (p. 65); but science demands that "the part this Great First Cause has to play" must be so pushed back. This is not, they say, an attempt to "drive the Creator out of the field altogether." It is only regarding the Universe as an "illimitable avenue leading up to God." "The extreme scientific school" seem to limit the Principle of Con-

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Christ's
marvellous
life and the
Law of Con-
tinuity.

(See *ante*,
section 7, and
p. 30 of our
authors.)

How far
Creation con-
sists with this
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tinuity to the visible Universe; our authors carry it physically into the invisible; even though existence (p. 47) may there be conditioned differently (p. 66).

17. Extending the principle of physical Continuity beyond the visible, into the entire invisible and eternal Universe, which is both antecedent and subsequent to the visible, we have a glimpse of that physical "immortality" of which (Ch. I. *in fin.*) we are said to be in quest.

Immortality may be conceived in three ways; either as (1) within the Visible Universe; or (2) as beyond it, and continuously connected with it, as Swedenborg says; or (3) as beyond it, and unconnected with it. The last hypothesis must be at once dismissed (p. 67), if we maintain that the principle of Continuity holds throughout the Universe eternally. Existence would on the *third* hypothesis have no physical connection hereafter with existence now. The *first* hypothesis also is impossible, because there can be no "immortality" pertaining to a world which is to come to an end, as this visible world will. This way of disposing of the first hypothesis must not, however, be taken for granted too hastily; and our authors discuss, (before proceeding to the *second* or remaining view, that immortality may be found in a world connected with this, but beyond it), the position they thus far had assumed, that "this present visible Universe will become effete" (p. 68);—which is essential to this part of the argument.

The conclusion of our authors' second chapter is thus arrived at. They have not—it will be observed—yet explained precisely what they mean by the "Visible or Physical Universe," nor the term "Creation." As to the latter, they incline to La Place's view,—that the solar system was "condensed into its present state from a chaotic mass of nebulous material"; and to Sir William Thomson's, that there were "primordial atoms of the Visible Universe *some-how produced* in a pre-existing perfect fluid,"—if that prove to be "tenable" (p. 65); (so far as we are able to judge.)

The Eternity of the whole Universe, as based on the Law of Continuity by our authors, is not to be confounded with the theological belief that God was never without some action, or that he "ever worketh," or ceaseth, as he may please—no one work having been Eternal, but only Himself. According to our authors, the whole Universe is *per se*, eternally continuous; each transition being what is but termed a "Creation,"—for if we do not misapprehend their meaning, a creation out of nothing is denied;—"Creation" itself "belongs to Eternity" (pp. 118 and 138):

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How Immortality belongs to the Principle of Continuity.

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La Place's theory.

Sir William Thomson's.

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CHAPTER III.

18. The testimony of science as to the Physical Universe, and its Laws (p. 69), its beginning, and end, (as bearing, too, on the *first* hypothesis of Immortality), has now to engage us.

Within the last generation "there has gradually dawned on the minds of scientific men the conviction that there is something beyond Matter or stuff in the physical Universe" (p. 70). They used indeed to talk of light, heat, and electricity as "imponderables," but that was only an evasive term. Something that is not Matter "has objective, though not substantial existence." As to Matter, experience of the most varied kind shows us its real existence external to us (p. 71). We find it amenable to our control, except that we can neither increase nor diminish its quantity. This fact we may call "the *Conservation of Matter*" (p. 72). The same experience, however, which teaches us this Conservation of Matter, teaches us also the Conservation of something else which is not Matter, and which equally has objective reality (p. 73).

This is explained by illustrations as to the "*Conservation of Momentum*," "*Conservation of Moment of Momentum*," and "*Conservation of Vis viva*," or "Energy." Newton's third law of motion is, that *action and reaction are equal and opposite* (p. 74). It follows from Newton's first interpretation of this law, that the *momentum* of any system of bodies is not altered by their mutual action. The sum of the *momenta* generated by the mutual action of the system is zero. The same appears as to the Conservation of *moment of momentum*, when we deal with quantities of the order of the moments of forces about an axis.

So again of *Vis viva*, or the Energy, or power of doing its work, which any body contains. It is independent of the direction in which it is moving, and is proportional to the square of the velocity, so that a *double velocity will give a fourfold energy* (p. 76).

Experiments in dynamics further assure us that there are two forms of Energy, which change into each other. These are known as the Kinetic and the Potential.

19. The Conservation of Energy being as real as the Conservation of Matter (pp. 82 and 92), we have to regard it in

reference to both forms of energy.—Visible kinetic energy as that of a cannon-ball shot upwards) is changed, as it rises, into visible potential energy; and as the ball descends, its energy is again changed into the kinetic. The ball strikes the earth, and again the visible kinetic energy is changed into a *kinetic energy of invisible motion*, called "*Heat*." Whenever visible kinetic energy is suddenly impeded, it changes into "*heat*" (p. 80). Energy of every kind is found to have great powers of transmutation; and Sir W. R. Groves's instructive "Correlation of Forces" brings together many varieties of cases. (And see p. 106.) Life, so far as it is physical, depends on transformation of energy (p. 81). In any system of bodies there are various kinetic and potential energies, the sum of which remains for ever unaltered. Hence "Energy," even when invisible, has as much claim to be regarded as objective reality, as "Matter" itself. The difference between them is that energy is a very Proteus in change, while matter is always the same. The only real things in the physical, or, so-called visible Universe, (for it is not all really visible), being "matter" and "energy,"—matter being passive,—*all* physical changes are merely transformations of energy, "each change representing a kind of creation and annihilation" (p. 81).

Energy is conserved as truly as Matter.

Suddenly impeded Energy changes into Heat, which is invisible Motion.

But are all "Energies" equally transformable?

It is of the utmost importance, however, here to know—whether all forms of "energy are equally susceptible of transformation?" If any one form be less transformable than others (p. 82), though the whole quantity of energy may remain, it will become less and less available (p. 82). Now this is the case with heat.

20. The investigation of the transformation of this form of energy—Heat—into work, has taught us the dynamical theory of heat; and also the principle of the "Dissipation of Energy"; and it has been shown that only a *portion* of the heat can, (even under the most favourable conditions), be transformed into useful work (p. 83). Some invisible finite agencies, (playfully called "demons" by Sir W. Thomson), may here have something to do (pp. 127 and 148); for while it is possible to change mechanical energy into heat (p. 90)—only a portion can be retransformed; and that too would be more and more "dissipated" on repeating the process. Heat not, in fact, being wholly "conserved,"—or not in an available form,—will bring the system of the Universe ultimately to an end. This point is carefully elaborated by our authors. "Conservation of

Heat is an Energy which is not as transformable as other kinetic energies.

Energy" therefore, says Professor Clifford, is a term, only very nearly approximate to the facts (p. 91), (*Fortnightly*, p. 789).

The sun (p. 91) supplies us with energy, but himself grows cooler, and after long ages will be extinguished. *The visible Universe is a vast heat-engine*, and the tendency of heat is towards equalization. If the present physical laws remain long enough in operation, there will be, at immense intervals, mighty catastrophes, due to the crashing together of defunct suns, the smashing of the greater part of each into nebulous dust surrounding the remainder, which will form an intensely-heated nucleus. Long, long in the future eternal rest will come.

Heat is partly dissipated, and so the Universe will be dissipated at last.

The Visible Universe is a vast heat-engine.

Such scientifically being the *necessary* future—"that the now visible Universe will become effete,"—what, let us ask, is the necessary past? (p. 67).

There was a time when the visible Universe was nothing but gravitating matter and potential energy.

Immortality impossible in in such a Visible Universe as this.

Within such a Universe, of which we see the *beginning* in the past, and the *sure end* in the future, we find that, of course, "Immortality" is impossible.

We must, therefore, dismiss the first hypothesis, (see § 17), that Immortality is transference to any other part of the *visible* Universe (p. 93).

There remains only the alternative theory (see p. 43), that the Immortality we seek may be transference to some Invisible Universe connected with, but no part of, this visible system; which accords with Swedenborg's view—"the line of thought we are now developing,"—that our bodies will at death be entirely put aside, and our powers and energies be transferred to an unseen part of the Universe, in some way connected with the present; the *available* energy of the Visible Universe being appropriated by the Invisible" (p. 118).—[Of the unavailable energy, account is not yet taken.]

Hence we shall not rise hereafter in our bodies (as Swedenborg, indeed, had also seen).

CHAPTER IV.

21. We have considered the Conservation of Matter, and Energy. We have now to examine, in our Fourth Chapter, what is "Matter"? or rather, what is that wonderful form of "Matter" which is the vehicle of all the "Energy" we receive from the sun, and the vehicle of all

What is Matter?

our information as to the Visible Universe, so far as we know anything of it? (p. 97).

The doctrine of Lucretius is here described and dismissed; partly as metaphysical, (which our authors may take to mean speculative or fanciful—that we suppose is the vulgar notion), and partly as superseded (p. 102).

Atomic theory of Lucretius.

The doctrine of Boscovitch is next stated, and it is said that it was somewhat supported by Faraday. This wholly denied the Lucretian atom, and all atoms, getting rid of *substance* in favour of central force, “residing in *nothing*, but related to everything” (p. 102). This our authors also dismiss as an “over refinement of speculation”; for it does not provide for “inertia,” at all.

Central force theory of Boscovitch (residing in nothing).

A third speculation as to the intimate nature of Matter, would regard it as non-atomic, but infinitely divisible, or the utter *reverse* of atomic. This is scarcely reconcilable, however, with “gravitation-attraction,” and might at length dispense with molecular forces and chemical affinities. Our authors think it involves too great a scientific confusion.

Non-atomic theory.

Then there is the vortex-atom theory of Sir W. Thomson, which supposed matter to be the rotating portions of a perfect fluid filling all space. On this theory our authors see difficulties to arise; and they do not make up their minds (p. 104).

Vortex-atom theory of Sir W. Thomson.

22. They say they cannot conceal, that their ideas of what Matter is, (though unmetaphysical), “are hazy” (pp. 104 and 105). Helmholtz’s investigations rather incline them to vortex-atoms. But the “perfect fluid theory” would imply Creation to impart the rotatory motion in it; and so “may only shift the difficulty a little farther back.” And it does not account for the *inertia* of matter, any more than the other three theories;—(or it may “refine away the whole idea of matter”)—which the mind seems to require!

There is an attempt to account for inertia, and for gravitation, in the theory of Le Sage, (partly adopted with modifications by Sir Wm. Thomson), as to infinitely small corpuscles, ultra-mundane or from the unseen world, filling space (p. 164); but this theory would modify the present doctrine of kinetic and potential energy, on which we have proceeded (p. 110); as the third theory also clashed with gravitation; and the second with inertia.

Theory of Le Sage.

An effort has been made to connect gravitation with that luminiferous ether, (which is a great refinement on gross matter), which is the hypothetical

Of gravitation and luminiferous ether.

explanation of certain phenomena of electricity and magnetism (p. 109); but this has failed. For what shall we think as to the luminiferous ether itself? (p. 111). Is it perfectly transparent? or does it absorb light at all, and then redistribute it? Is it subject to gravity? Beyond the fact of its *existence*—(a fact inferred by us from the phenomena of the passage of radiant energy from one body to another),—we know nothing. These hypotheses no doubt tend in every case to suggest an invisible Universe (p. 117), into which “Matter” itself may die out; but it would be an invisible Universe not conditioned like the visible; and so we should be even driven to the Unconditioned, break with “continuity,” approach the Great First Cause, and defeat our hypothesis (p. 119).—Thus no conclusion, then, is arrived at.

From this hesitating account of Matter, as so nearly nothing, yet the vehicle of everything, we proceed to Chapter V. None of the theories as to matter account for Inertia (p. 107), nor, except hypothetically, for gravitation (p. 109).

CHAPTER V.

23. The Visible Universe, in both Matter and Energy, has in some way (p. 65), perhaps rudely, *been Developed out of the “invisible”* (p. 120). The question is, How does it work? How further “develop,”—in Matter, Form, and even Life?

First: Heat, we observe, is a perpetual cause of change. Hence material development. The “elements,” so-called, may be dissolved (p. 123), if a high enough heat be found. Even the atomic constituents of a single molecule (p. 124) may by some heat, beyond what we possess, be separated.—(There are higher degrees of temperature, we know, in some of the stars and in the sun, than on our earth.)—And, secondly, just as high temperature drives water into steam, and steam into oxygen and hydrogen; so carbonate of lime is decomposed into lime and carbonic acid gas, and the original particles of the Universe, separate from one another, being endowed with the force of gravitation, are possessed of potential energy, which is transmuted (p. 125) into heat and motion. Thus a more complicated development arises; not only chemical, as above intimated (p. 128), but formal or massed together; and, as in Kant’s and La Place’s theories of the development of the solar system, it may be globular. It must be observed, however, that the potential energy, after being converted into heat, is ultimately

Nothing is really known of the intimate nature of Matter.

Development that may be (1) Chemical;

or, (2) Formal i.e. mass development.

dissipated into space, for a large portion of the heat never returns. But this is a remote result. Meanwhile (p. 127) the Visible Universe is thus developed by the inorganic agencies which we call "forces," (not unlike the monads of Leibnitz)—acting perhaps, on certain "instructions"? (pp. 88, 90, 148, &c.)

Lastly, life-development is different from both "chemical" and "globe" development; and this has next to be considered. Here, also (p. 128), our authors' views demand a physical development rather than any supernatural evolution out of unconditioned Power.

The world, by its organic changes, *became* fit for what is called "life" (p. 132). "Accordingly life *appears*." First in a low form; eventually in the moral, intellectual, conscious agent (pp. 129, 130).—The theory of the first process of life-development is not, however, drawn out.

The development and the gradual elevation are stated by our authors as facts.* The atoms have "come together"; chemical substances result, the substances gather themselves "into worlds of various sizes." Beyond this, explanation is not given. Then comes rude life; this culminates in man.

24. The authors thus, in fact, possessed of the first Life-development, dwell with more detail on the development of Species; and their remarks are interesting and to the point.

They quote a well-worded passage from Professor Huxley (p. 134), showing that varieties of living beings may arise "spontaneously," or from *unknown causes*, and may be also perpetuated by artificial selection. Next, it is observed, that such varieties, when they do arise, have a power at times of more strongly producing themselves, and occasionally imply natural selection, as Darwin and Wallace show. And the "stronger" may displace the previous type (p. 135).

The sterility of hybrids is not, they remind us, to be too hastily assumed. There may be gradations from sterility to fertility. Give nature time enough, and it is suggested, that a process of transmutation may be arrived at. Even man might be developed from a pri-

(Well called "hybrids," as injurious or insults to nature, ὑβρις.)

* How the movement all started, we do not here see; and this gap in the theory we are unable to fill. If it was meant that some latent power, as Dr. Tyndall says, might have been in "matter" (which contained it as its vehicle) and was waiting to be exerted when the kinetic and potential energy had done their work of action and re-action, this seems the place where it should have been more fully explained. Just to say that, at last, life "appeared," is puzzling. "Inorganic agencies" are hinted in p. 127; but more than hinted in p. 90, and atoms are "endowed with Force"! p. 128.

mordial germ; so at least Mr. Darwin thinks;—while Mr. Wallace, on the other hand, sees in the production of man the unquestionable intervention of an external will. Our authors say, that though a pure act of Creation is inadmissible, yet Life without a living antecedent is equally inadmissible. And it is Life that we need. They can only say however that Life “*appears*.”

CHAPTER VI.

25. We begin afresh at Chapter VI.—Our authors’ examination of the physical or seen Universe came to the conclusion, as we saw, that it offered no sphere for Immortality. It is finite, as has been fully shown,¹ both in the past and the future. It might have had, and seems to have had, self-developing powers or forces to some extent (p. 140), and they may be even *greater than we yet know*; but they also will and must of themselves, according to the great physical principle of the Dissipation of Energy, come to an end. Yet as that end, and the

If this Visible Universe has no place in it for immortals, yet may it not have a place for a higher Future life than we now have? in which we may be of higher intelligence.

end of the whole Visible Universe, is almost inconceivably remote, it is not without interest to inquire—whether Future Life for the existence of intelligences, (a life coming short indeed of immortality, but immensely enduring),—whether a Future of higher intelligence into which we may at death develop,—and a Future in a rank of being connected with the

Visible Universe,—may be, possibly, expected? And perhaps a prospect, after that, of a hope of transference to life in the Unseen Universe itself?

26. First then, can there be in the present Visible Universe any intelligences superior to man?

This question is approached by a series of observations showing that there are two kinds of organized machines; the action of one being *calculable*, and the action of the other not calculable; the solar system, or a watch, being an example of the former, and a rifle charged for human use being an example of the latter. The action of the latter kind of organized machines (p. 150) cannot be calculated; for it depends on delicate processes, some of which however may even be directed, not only by men, but also by intelligent agencies, such as “*angels*,” (as some

This Visible Universe can only have machines calculable or incalculable.

Ideas as to Heaven, Hell, and Angels.

would say), acting from beyond this visible physical Universe. If such agents exist, as they may, they evidently, however, do not *belong* to this visible*

Universe; for men, or beings analogous to man, are the

* “Visible” seems used here in its vulgar sense?

highest order of living beings actually connected with the present world, as far as we know. Nor is the reason of this conclusion difficult to understand (p. 151). It does not depend on Darwin's hypothesis, or on any opposite hypothesis. It rests on the fact, that while there is much delicacy of construction in the cosmical processes, we cannot *identify* that organization with Life.

27. The matter of life is the same in all animals, so far as that the body of one animal is food for another. It is inharmonious to conceive of two living systems in one Visible Universe. On this ground also we dismiss the notion of a superior order of living beings to be developed *in the present physical Universe*; and we also reject the idea that such unseen intelligences direct the delicate cosmical processes around us.

If there be anything else acting on the present Universe, it is not of it.

The Scriptures seem to be in accordance with this decision of science, as to the superiority of man (Ps. viii. 3). In the Old Testament, man is said to be "made little less than divine,"—"a little while lower than the angels"; and in the New Testament, that he shall "put off mortality," and enter into "incorruption," and "life eternal"; *i.e.* the "unseen."

The Psalms.

S. Paul.

Man is at the head of the visible Universe. If angels exist, and even minister to man, they still do not belong to the physical or visible Universe. That this is no Future sphere for any higher beings than men, seems naturally to follow.

CHAPTER VII.

28. What then, finally, have we to say of the "Unseen World" —(p. 156), having found that the present Visible Universe is good for nothing in the way of Immortality? and that it may come to an end from exhaustion (p. 155).

What is the Unseen World?

The Law of Continuity assures us that the Visible Universe had a beginning, and therefore an Unseen Universe preceded it. That Unseen Universe (we shall further note) could not have been "changed into the present." It exists now independently, and will exist when this Visible Universe reaches its inevitable end, and becomes effete as surely as will each individual.

It existed before, it exists with, and will exist after this.

"Through its means we came into existence," and it is connected with us now (p. 158). Indeed "the energy of the present system must be looked on as derived from the Unseen," and the Unseen is capable of acting on the present. It is

The luminiferous ether may be a medium between the two worlds.

quite possible that the luminiferous ether may be even a medium between the Seen and the Unseen Universe. When energy leaves its present home ("matter") it is carried from the visible into the invisible; and when from ether into matter it is born from the invisible to the visible. Ether *may be* a medium (*plus* the invisible order of things) of the passage to a Future life. But this is a speculation.

Our mental constitution connects us with both worlds. We have seen that thought affects the substance of the visible world, and produces a material organ of memory (p. 159); and thought may simultaneously communicate with the unseen Universe, while it is linked with the visible.

Swedenborg's hypothesis.

29. Suppose we thus possess even but the rudiments of a frame connecting us with the Unseen Universe—in other words a spiritual body; each thought of ours, here partly stored in our physical memory, may also be registered (and even more fully) in our "spiritual body," to take up the associations of the past.

A spiritual body is now ours.

Our active energy after death may have the materials also of former life to work on.

Things not physically remembered may be so in the spiritual body.

Dr. Young. Dr. Young says, in a beautiful and comprehensive passage: "Immaterial substances are not contradicted by anything in physical philosophy (p. 160). Analogies even lead us towards them. The electrical fluid may be essentially *different from common matter* (in the usual sense of the term); the general medium of light and heat equally so. They seem but semi-material in any case! So also the immediate *agents* in attraction and gravitation (p. 161). Spiritual worlds, unseen for ever by human eyes, may co-exist with the physical and not touch," being unrelated to space.

30. The authors next proceed (p. 166) to reply to objections (and with much success),—both theological objections and scientific. They maintain the idea, however, of spiritual bodies as rudimentally existing now. They are not a Divine creation to take place at the Resurrection (p. 167).

Then, finally, the objection has to be met as to the Christian assertion of the Resurrection of Christ, which assures a future life, (and so the whole miracle of our Revelation also). In considering this, they treat at length the whole problem of the Universe, viewing it from its past.

Alternative: that the preceding Unseen Universe either had life, or had it not.

This argument extends to p. 202.

The Visible Universe must have been developed through either living or dead *præcedentia*, (for admit the Principle of

Continuity and the doctrine of pure Creation out of nothing is inadmissible). The atoms of the Visible Universe bear, when we come to examine them, all the look of "manufactured articles" (p. 168). Life proceeds only from life; and there is a uniformity of atomic structure. And so the Visible Universe being what we thus find it, we naturally conclude that it was first developed out of the living though unseen, and not from the dead.

The present bears the look of manufacture, and was developed out of the former; therefore the former had life.

For is not a dead Universe preceding the present inconceivable? Does it satisfy the *Principle of Continuity*? That principle rather demands an *endless development of the conditioned*, and never a proceeding from the conditioned to the unconditioned, for that would bring us at once to an intellectual barrier. We must think the Great Whole to be infinite in energy, and that it will last from eternity to eternity (p. 172).

The Principle of Continuity shuts out the unconditioned.

The need of the case seems then actually to demand an intelligent agency in such a Universe. This infinitely energetic developing Agency is in some sense in relation with the conditioned, and so is Himself "conditioned." And this is precisely a want met, our authors conceive, by their view of the Christian dispensation.

The Conditioned Universe is eternal.

It demands a conditioned mind.

The belief of the vast majority of Christ's followers, they imagine, has always been—not that the Godhead, Father, Son, and Spirit, is unconditioned, or in equal and perfect relation with the Absolute, but that the essence of unapproached Deity, is the Father and Absolute—"Whom no man hath seen or can see",—while "the only Begotten Son, who is in the bosom of the Father, has *always* been 'conditioned,' " and so has been able to communicate with us. All things were developed "by the only Begotten," who is of "One substance with the Father" (p. 174), "Who is the image of the Invisible God—the First-born of every creature,"—always Himself "conditioned."

The Gnostic position of Swedenborg.

31. The Christian and Jewish records, they think, all confirm this view; which science itself, on the very *Principle of Continuity*, requires. "Christ represents that conditioned, but infinitely powerful *developing* Agent, which the Universe leads up to." He is the developer of various Universes (p. 175), and Himself becomes the type and pattern of each order, and the *Representative* of Deity. He in this sense "creates," and He will judge. Possibly, other conditioned beings, as angels, *co-operated* with Him in this

The Incarnate God, the only God we shall ever know.

He represents the impersonal, created, and objective Universe.

“Creation.” He is conditioned, and only from a conditioned living thing can any conditioned living thing proceed.—This is the *Principle of Continuity*.

It is not distinctly said (though it must be implied) that the Eternal Conditioned Son *is* also Unconditioned (p. 177), or else that the Eternal Father, the Unconditioned, is also Conditioned; for how else could He communicate with the Son, or the Son with Him? (This is nearly Philo’s view).*

They say that science forbids our passing over from the conditioned to the unconditioned.† Is there no communion between the Divine Father and the Son? The Son of God in the previous world, in some way, *became* conditioned, and (as conditioned) was “Creator of *Energy*”; energy having “the Protean power of passing from one change to another.” The Holy Ghost also must have been conditioned; and so He may be Giver of *Life*. The Son thus developed the “energy” or objective element; the Holy Ghost developed the *Life*, which is the subjective element of the Universe.

32. But what is the position of *Life* in the Universe? It seems an antecedent. We find that the forces and qualities of the Visible Universe cannot create life. Life always proceeds from life. It proceeds originally then from the invisible to the visible. It may denote (whatever it be in itself) “a peculiarity of material structure” (p. 180), which may be molecular (p. 182); but it must not be supposed to imply *Will* (p. 182).

Reaching the visible, it rises amidst the lowest material of the Universe (p. 180). The molecules themselves have there been already developed as vortex-rings (p. 171). The vortex-rings are from a finer and more subtle something which we “may yet agree to call the Invisible Universe.”—The visible Universe goes on into the invisible—nor can we say where the one ends and the other begins.

Life, however, when we thus possess it, does not create energy any more than energy creates life. What then does it do in the Universe?

An illustration has been suggested from mechanics, which our authors decline (p. 181). A force, acting at right angles to the direction in which a body is moving, deflects it, without exerting any power or energy. Such, *e.g.*, may be the action of man’s will. It may add nothing to the torrent, but turns circumstances to the

* See also Renan’s *Dialogues*; and Soullier’s *Logos*.

† But see St. Matthew xi. 27.

right or left. May not life be like this? But the reply is, that the supposition of *will* interfering in this way to change the direction of atoms, is scientifically unsatisfactory, and is not sufficient. Professor Huxley also thinks it quite inadmissible. And the hypothesis, if true, does not get rid of the difficulty as to the *operation* of Life.

Life, whatever its nature, has its seat in a region inaccessible to inquiry. It exists as surely as the Deity exists (p. 186); that is, we cannot rid ourselves of either, though we have driven each, as to origin and operation, as far back as possible into the Unseen.

Sir W. Thomson attempted an explanation of the origin of the material world, by "vortex-rings," and explained gravitation by introducing ultra-mundane corpuscles; we may add to this, probably his and Helmholtz's theory, that a germ of life may have been brought to our world by meteors. But even in that case the difficulty as to what Life is and *does*, remains. The "meteor," say, brought the germ of life; but whence arose the germ? (p. 186). We know not. "The mystery of life lies in the structural depths of the Universe," as the mystery of God lies in the durational depths of the same Universe.

Extension of the theory of vortex-atoms.

Sir William Thomson and Helmholtz.

33. For in the first place the Visible Universe is not eternal; and the Invisible Universe is necessarily eternal, in the past as well as in the future; and the visible always latently existed in it. Life and Matter both come from the invisible world. The Visible Universe was, in fact, in material existence, in a nebulous form, before it was fit, on the meteoric hypothesis, for the reception of life, which, therefore, was subsequent; and if so, energy and matter were "created" at one time, and life created at a later time! This implies two separate acts, both anterior to the Visible Universe as it is (p. 187). But the Principle of Continuity is only observed by maintaining life as well as matter to come from the Unseen Universe, where it was previously existing fully conditioned (p. 188).

Are Energy and Matter distinct creations?

The Principle of Continuity is thus vindicated; and by virtue of the Conservation of energy, and the law of Biogenesis, we find there must be a conditioned intelligence in the Universe, whose function is to develop energy; and another conditioned agent, whose function separately is to develop life.

Both come from the Unseen Universe, which is eternal, according to the Law of Continuity.

This is said by our authors (p. 189), to coincide with the Christian doctrine; and they allege, in further proof of it, the support of Swedenborg. In stating their views, however, of Christian doctrine, it is added, "Christians allow much liberty."

* See also p. 89 as to the "demons" of science.

34. The principles thus enunciated enable us to deal with the difficulty of Miracles: for if the Invisible Universe could develop the visible, it may with no difficulty deal with it by additional developments from time to time. Indeed, miracles depend only for their possibility, on the existence in the Invisible of more powerful agents (p. 190). When the Invisible does not interfere, the Visible goes on as usual (p. 191).

The fact that some interference was effected by Christ, which is the next point to be thought of, is clear enough by His having for so many ages arrested the attention of the world.

If Miracles are breaks of Continuity, so was Creation, or the abrupt beginning of the material Universe. So, indeed, is the beginning of all Life. But these apparent breaks are avenues leading up to the Unseen.

And further, there may be action of the Invisible World on mind, as well as on matter, and yet no real break at all; and if so, it may be that the Unseen may so work on man's *mind* as to show him that he *should* live for the Unseen, and so attain his most perfect life (p. 192).—(But is there no *will* in such a mind?)

The Christian Scriptures recognize this influence of the invisible world on the visible, by their doctrine of angels (p. 193), and may intimate the reversibility of this influence by their doctrine of prayer. The doctrine of the Holy Spirit's influencing the souls of believers is also an example of the invisible world touching the visible (p. 194).

The doctrine of a particular Providence is stated both by Swedenborg and by Scripture, and may meet some objections as to the stern course of nature felt by Mill and others. To reconcile this with general laws may not seem easy, yet there may be some administration from the Invisible, of those general laws in reference to special ends, as hinted in a beautiful passage of Tennyson. The admission of an invisible world, structurally *connected* with the visible, thus opens the way at once to Religion; and also to a doctrine of God "*analogous* to the Trinity," and leading up to the conception of the Infinite and Eternal One,—even though He cannot be known or loved!

35. But the doctrine of Immortality, at which we have thus arrived (p. 198), is independent of all conceptions as to the Divine Essence. "In brief, we merely take the Universe as it is, and adopting the principle of Continuity insist on an endless chain of events (all fully conditioned), how-

Miracles are breaks of continuity only as Creation was.

Angels may be agents of this Invisible.

The Holy Ghost's influence.

Special Providence as influencing the Visible.

The principle of Continuity holds, if we allow an invisible essentially connected with the visible Universe.

ever far we go either backwards or forwards. This leads us at once to the conception of an invisible Universe, and to see that such immortality is possible without a break of continuity" (p. 199).

The only physical proof, however, in favour of this immortality, is that Christ rose from the dead. Now, if an intelligent agent, resident in the Invisible, could produce the Visible Universe out of the pre-existing matter of the Invisible (p. 202), why could it not accomplish also Christ's Resurrection to a future life, without break of continuity?

Christ is a physical proof to us.

Has not the human mind also some sort of presentiment as to such a future? a presentiment, a kind of glimpse, as if of memory? (p. 157). We have said that there are facts almost implying that the Universe has a memory; and sacred utterances in hymns and devout inspirations (p. 201) assure us that individual minds in an exalted state may realize things of the past, and in them shadows of a future. Nothing is really lost; the past is always present (p. 202). Not only in the Invisible may things past be seen by memory, but possibly things present, which in the Visible would be remote, may not be so elsewhere.

And we have mental glimpses.

Place and distance may be *different* in the Invisible Universe (p. 203),—(and unrelated to the vortex-rings, and perfect fluid?)

36. This has also a solemn aspect, when we think of it, *morally*. For the memories of the Universe being never lost, but all conserved in the Invisible; are they all good and pure? Far from it. And "nothing will be covered, nothing hid, nothing secret," is an awful saying of Christ's (p. 203). A terrible record of "deeds done in the body" shall be unfolded when the "books are opened." Many a man will be like a parchment written within and without. (Even the heathen, as in Plato's *Gorgias*, foresaw it.) A veil is drawn in Scripture over the fate of the lost, when the man comes forth in his spiritual body, and without "the wedding garment"! (p. 205).

Moral conservation of results in the Invisible.

Plato's *Gorgias*, p. 204.

The principle of Continuity forbids our setting all this aside, as merely figurative. The existence of evil is not limited to the present. The matter of the whole Visible Universe is of a piece with that which we recognize here (p. 206). *Accident*, pain, death, evil, we may be sure, are possible in all the Visible Universe, even in other worlds than ours. That dark thread which is known as "evil" is deeply woven into that garment of God which we call the Universe.

To sum up all: Our authors regard the whole Universe as *Eternal*; not the *very things*, but a *state of things*, even in the Invisible, like the present physical Universe; therefore also evil

(Comp. p. 205.) is *Eternal* (p. 207) (*i.e.* from everlasting to everlasting!) They cannot imagine a Universe without a Hell—Gehenna. Still, they admit that a moral development hereafter seems possibly hinted at in the New Testament, after which “the last enemy shall be destroyed.”

Impossible physical fires. The Law of Continuity implies the Eternity of the whole Universe. The Law of Continuity is the great scientific principle which has guided all this inquiry (p. 209). The whole Universe is of a piece. The result is, to find no impenetrable barrier to the intellectual development of the individual. Death is no such barrier; continuity applies throughout.

The nebulous beginning of the Visible Universe and its fiery termination were known to the early Christians as truly as to us (p. 209). They also, with us, looked for immortality. Science, truly developed, is the most efficient supporter of Christianity. On physical principles, the Universal and Eternal Law of Continuity may be maintained, and we here show a ground on which Science and Religion may meet together (p. 211),—as on a luminiferous “bridge” between the so-called visible and the invisible!

PART II.

37. The authors of this interesting work have now spoken. It remains that we express ourselves as critics. Of course the supposition of “Continuity” has always been acted on by those who have acted at all in the Visible Universe; and it is here represented too much as a discovery. A strange surprise it would be, if at any time intelligent beings had been found going on acting, without expecting connected results—results warranted only on what has now gravely acquired the name of a “Law of Continuity.” All philosophy, all experience, and all belief in causation have always taken this for granted.

Continuity no newly discovered law.

On one point—in the *Analysis of Human Responsibility*,*—some years ago it was shown, that the simplest idea of Being—even of the Eternal Self-existent Being—or of the absolute in Truth, Reason, or Good, contained a “Principle of Continuity” of its own.

Continuity, *in se*, is not ideally the same as sequence. The Absolute, e.g. is independent of sequence, yet it always “continues to be.” Even in our own finite sphere, our mind reckons on Reason having been † *always Reason*, and the Absolute always absolute. Nor can we conceive of pure Reason as other than *Reason always*. It is not more Reason now, than when our consciousness of it began. And the Infinite and Eternally Conscious Being must thus be conceived as “continuing,” yet with no essential limitations of sequence; for then He would not be absolute. Action also, which varies, implies “continuance,” even in God, though “pure act” is not His entire essence; for that includes the conscious absolute.

38. But “Continuity,” as explained by our authors, is something more than the necessary postulate of all intelligence and all act. It is extended from the Intellectual sphere, where of course it is inevitable, to the Phenomenal, where it is partial and imperfect, and the term thus acquires ambiguity. Phenomena are taken to be internally continuous *in the same necessary sense* as conscious intelligence and its acts must be; and the *nexus* is assumed.

We must examine this somewhat further:—

The doctrine of causation is based on our perception as to a certain holding together of acts and origin, or starting-point. But do we not introduce another idea altogether when we apply to mechanical sequences the same term as we use in the case of an apparently self-acting origin or “cause”? It is quite true that there is a *kind* of continuity, or contact rather, in all physical action and re-action in the Visible Universe. But even there, there is a kind of *vis* in “continuity” beyond what “contact” implies. Still more, forces wholly acting out of the “Unseen Universe” (as, by the admission of our authors, originating causes do), have a *vis* which mere “continuity” by no means explains. Probably phenomena within the seen Universe have continuity only in the sense of apparent contact. Agencies, then, active from the Unseen, wherever we place them, or conceive them to act, (like the “monads” of Leibnitz,) are

* See *Transactions*, vol. x.

† See the *Analysis of Human Responsibility*.

different from machines which have simple contact ; (mechanism in motion itself needs an agent).

It is pure assumption, if we at once *suppose* that there is mechanical contact in the case of agency from that unseen world of which, by the hypothesis, we *know nothing*. The Visible Universe, and the necessary inferences from it, may oblige us here to assert contiguity of some kind. But the beginnings of life and conscious action lie, it is admitted, in the *Invisible*, and no argument can possibly conduct us to the conclusion, that the Visible World, which we have ascertained, and the Invisible World, we have not ascertained, are subject to the same law of touch.

Our authors are so mechanical as to speak of "bridges" between the Invisible and the Visible ; and it is at those bridges, as they are termed, that the weak points of this "scientific" statement of Continuity will be found. Perhaps, too, in considering the transmission of force, unknown "bridges" are necessary to connect transitions, even within the phenomenal.

39. The argument of the work before us so depends on these "bridges," that the authors ultimately and logically deny, in express terms, all real distinction between the "stuff" of the world of sense, and of the worlds or universes beyond sense. This, in truth, (as making "will," which acts from the unseen, a "stuff" entirely subject to mechanical laws), would be a denial of all responsible Causation. Denying the distinction between the substance of the Seen and the Unseen, it also denies that there are really two kinds of worlds ; and the argument becomes logomachy, and is found in plain self-contradiction. "Invisible" has here no definition except the vulgar one, of that which lies beyond our actual sight. This, however, is the case of much which our authors would call the *visible* Universe. If *all* must be mechanical, there is no power of alternative action in any conscious agent or "cause," and religion ceases, instead of finding life from such an argument. Even a *wish* for immortality is nothing then but an attraction of what we must call a mechanical kind !

Thus also, the prospect itself of immortality, on any such theory of eternal and mechanical continuity, is fundamentally changed from that of a promise, a hope, an aspiration for the individual, to that of a physical, or transphysical certainty of a consecutive order of perpetual transitions, in which Personality, (which is, now supposed for all of us), need not, perhaps could not, survive. To know that after the present life we, and all other existences, necessarily pass into another and differently conditioned Uni-

See Appendix.

The Visible and Invisible world are, however, supposed to be of the same substance.

And the idea of immortality is changed.

verse, and when that also is ended, as it will end, then pass on into another, a thinner and remoter Universe, still differently conditioned, and so on, and on, and *ad infinitum*, is at least different from the personal hope and expectation, of the Christian that after this life, he personally shall be "for ever with the Lord." To call the two ideas by one name, "Immortality," is at least misleading, though necessary to our authors' scheme.

40. But to continue the examination. No chain, we know, is stronger than its weakest link. The force of our authors' argument must be tested at the junction between the visible and invisible. With their admirable power of exposition they have set lucidly before us this "Law of Continuity" pervading the Visible Universe. Rightly, the unvaried uniformity of Nature suggests to us that it is no accident. It is not simply recognized then, as a fact, or series of facts, which might be otherwise. We could not imagine the absence of continuity in this Visible Universe. But what does this mean? Simply, that if we mark any fact, we look for something previous to *account for it*.

The Principle of Continuity, as we have said, is *essential* also to what has, till lately, been known as the "Law of Causation." Now if we were asked for the distinct difference between the Law of Continuity, as viewed by science, and the Law of Causation, as regarded by philosophy, (the Principle of Continuity being common to both), we should say, that it lies in a different approach to the facts. "Continuity" is palpably seen as we look on the phenomena on this side; "Causation" is a rational view of the same facts, regarded from the stand-point of the invisible. The facts may be the same, but they are viewed from opposite directions. The vast series of visible phenomena are observed in the materialistic philosophy all trooping up from the Unseen, with "forces" behind them all hidden from sight. If looked at *from* behind by a higher philosophy, the series is just as "continuous;" but the "forces" are detected, in their independent vitality, setting all in motion with no preceding continuity to be physically discerned.

41. Each event in the phenomenal Universe is preceded by a force *in full activity*, and the materialist recognizes both, viz. the *inert* event, and the force *in activity*. But what the latent force is, prior to its action at first, and at every point, is the subject of ultimate inquiry to every thinker who aspires to be more than a mere observer, or random collector of facts. The phenomena being the same, the "Law of Continuity" may be a phrase to express "the how," but the "Law of Causation" the "why." But these are not so shown to be the same.

How Continuity is a Law.

Difference of view in Continuity and Causation.

The first action of a force precedes "visible" continuity, and may even in some sense touch the visible. It springs from *the Unseen*, no doubt, but it explains not its previous being, or latent power. The latent *potentia*, in the language of Aquinas, has escaped into act. It is as much a proof of a Universe out of which it emerges, as of the world into which it breaks, giving "no account of its matters." It then begins perhaps a continuous series of activities and phenomena which it dominates very largely; but it would deny itself, if it did not repudiate preceding mechanical "continuity."

Force precedes phenomena.
 So far as experience goes, latent, originate force from the unseen is, by its very hypothesis, something beyond mere contact. It even, at times, seems to defy it. How often, and at what points, "force" acts, whether communicating itself, or repeating intermittently its own action, or else being supplemented by inferior subtle agencies—"demons," as our authors suggest, (as Philo also),—no analysis informs us. We have but to choose between various *hypotheses*, as indeed our authors confess in their ingenuous quotation from Dr. Young.

We are ignorant of its nature.
 The physical Universe is shut up within the statement that it *has* an end, and *had* a beginning. That is the sum of facts which the law of physical continuity can explain. The logical inference from that statement is, that the beginning of the physical Universe was not continuous, at least according to the phenomenal use of the term.

42. First, that the Visible Universe did not begin *from* nothing (even though it came out of nothing), is fully admitted by all; next, that it proceeded from an invisible order of things, or beings, or a Being anterior to the chain of phenomenal continuity, is affirmed even by the authors. But if such Being were *anterior* to all phenomenal continuity, he is no part of the continuous order.

Logical inferences from the facts of Science.
 That continuous order "begins." We have no reason whatever suggested for supposing that at the expiry of the world's lease of present physical continuity, there will be a renewal on similar terms; nor that the old anterior Force will act again. Neither can we reason back, and say that the Law of Continuity of the present physical universe started, (with all the action of forces, and then energies), as a continuation from a previously expired Universe; for we do not know that. Nor yet that the forces of the Invisible Universe necessarily hold on parallel with this, retaining their own separate life, as well as everywhere continuing distinct *impetus* in our phenomenal direction.

Our authors disclaim metaphysics, but for all that they must not decline to think. To stretch the present Law of Continuity

pertaining to things seen, back into an unknown region of the Unseen, if not a physical contradiction, is a logical *non-sequitur* which the human mind refuses. Here is their dilemma. To deny the distinct *beginning* of the Physical Universe is to remove the alleged scientific conclusion as to its end. When science ascertains that the Physical Universe will really *end*, it unequivocally infers its real beginning. But both end and beginning must be *real*. A Universe that eternally holds on from "thin matter" into "gross matter," and at length "continues" from the gross matter back to the thin, of course had no actual beginning, and will have no end; but is, as they elsewhere are obliged to say, "Eternal."

43. A powerful and even irresistible argument for the "Unseen Universe," and a Creator, does, however, arise from the principle of present Continuity, by way analogy, as between two worlds. It reminds us of Butler's argument. The present *began*, and began out of nothing, but not The argument is one of analogy. *from* nothing. Some Being, or originating Power, preceding the phenomenal, is the only hypothesis possible, and that is in harmony with the experience we have of "Continuity." But if the present be physically linked to the past, there is no argument for an analogous "Continuity," as implied in Causation. Physical Continuity, if eternal, denies a beginning, denies Creation.

Now, the "Principle of Continuity," (as we actually see it working itself out, and never left quite to itself), asks for "Causation" always, at every point; it even suggests it, as lying at the beginning of every movement, while remaining beyond analysis.

The argument lies deep in human thought, and is there secure. We have seen that it is the *need of causation*, and not the fact of sequence, which obliged the faith in Continuity as a *principle* of origination. From being a principle it became as a law,—but a phenomenal law within the *termini* of the phenomena, *à parte ante* and *ad partem post*. It is a "*principle*" before the phenomenal, and a law within the phenomenal. That law may suggest much, as probable in the realm of thought; but it has no phenomenal holding on the pre-phenomenal. Life's first secret is *admitted* to be beyond the phenomenal and its known laws.

44. The logical conclusion, then, of our authors' argument is almost the reverse of what they deduce. The Law of Continuity does not throw the least light on life, or on "Forces." It does not show that the Unseen Universe is conditioned; nor its "Creator" conditioned. These scientific and theological inferences of our authors, we, therefore, are quite unable to adopt: they are illogical. They appear to be Swedenborg's in the main;

they avowedly proceed on his theory, and may seek to carry out his principles. The unconditioned and unknowable God, our authors say, holds the place as of the Divine Father in the Christian Trinity. The "conditioned" God, who alone communicates with the Universe, is to them a Christ, who always must have been conditioned "Energy," or He could not, as Philo said, have made the worlds. He, it is said, was eternally "conditioned!"

45. But, completing the outline of this supposed orthodoxy, they continue: "Life" and "Energy" are not the same; "Life can never create energy, nor energy life"; so they say there must be another Being, viz. the Holy all-pervading Spirit, the "Giver of Life"; and thus they obtain a "Trinity," partly resembling Swedenborg's perhaps, but not that known to the Christian Church.

The Eternal Father, "Whom to know," we think, is "life eternal," (and Whom we do "know by faith," even now), is placed, as they observe, "as far off as possible," at the remote end of an "illimitable avenue" of duly conditioned Universes. Unto Him the Son, as conditioned, seems to have no access. But the Son, the real Creator, was *always* God "conditioned" as an "Energy" forming the worlds. The Spirit is the "Life-giving" conditioned Being, Who co-operates with the Creator of matter, or Son;—unless, possibly, "matter" be eternal, and only "energy" were created, or developed.

Few Christians—believers that the Incarnation began at the "Conception by the Holy Ghost"—will accept this account of their faith, if nakedly put before them.

46. The foundation of the position of these gifted and respected writers, and, from our Christian point of view, their fundamental error, is their ignoring the "unconditioned." They fail to see that "the conditioned," *ex vi termini*, implies the unconditioned, and that some relation between them is demanded by the fact of rationality. Rationality, limited by the phenomenal, is inconceivable. Various beings are variously conditioned, no doubt; and conscious finite beings are aware of this, and compare these varieties and their differentiations. The conditioned finite conscious being is always comparing what he thinks, says, and does, with some exterior standard, which ultimately is absolute and unconditioned; and that, whether in physics, or morals, or thought.

Finite rationality, and finite moral agency, cannot be even imagined apart from the "true always," that is the absolute, or unconditioned. To stop short, as our authors, on approaching the "unconditioned," and regard it as an impassable

“barrier” instead of a necessity, seems to us, we say not irrational, but actually impossible. For, (as Anselm or Descartes would teach), we conceive of the Unconditioned even when we perversely refuse true relation to it, or communion with it. Or, (as Herbert Spencer says, when affirming consciousness of the Absolute), “Strike out the term *unconditioned* and the argument becomes nonsense,”—“an elaborate suicide.” Our authors “strike it out.”

H. Spencer.
First Principles,
p. 88.

Not having given their great logical powers to any, the least, consideration of the *à priori*, our authors not only establish nothing, but do not even suggest possibilities.

47. The Reasonable, the Right, the absolute Good,—they have avoided as “metaphysical”—and yet religion is their object! Even their so-called “immortality” is (by their physical exposition of the “Law of Continuity,”) really chained to the phenomenal, and dissociated, as far as appears, from personal life, and from all prephenomenal “forces,” as well as from essential Reality.

Neglect of
the *a priori*.

Immortality, interpreted as a mere law of physical continuance, would, according to our authors, be a holding on from the past, into existence in the present, and hereafter in the future. We are even told of Universes distinct from each other, often keeping parallel at times, or at least co-existing, and so admitted to be not dependent throughout on one rule of Continuity. They have “luminiferous bridges” from world to world, but the connexion partly goes over the “bridges,” and partly runs on side by side. Contiguous Universes,—“continuous” here and there, *per accidens*, but essentially holding apart, except at the semi-invisible “bridges” thus existed as we look backward and backward in eternity, and will exist forward and forward for ever! Thus, instead of teaching us man’s desired Personal Immortality, this evades it altogether, ties us to such conditioned Universes before and behind, terminable and yet not terminable, at least thinning out till we lose the identity of self, which is to reappear, if at all, after the “crash of worlds,”—having worked to some ether-bridge;—or else we lose our real self, our “Ego,” hopelessly, in world after world for ever!

Really to rest on such a Future would need a fanaticism of “Science” (!) as well as a singular “Faith,” at which we pause to take breath.

48. The “Heaven” and “Hell,” however, of these writers come on us with surprise, clashing as they do with their previous theories of thinner matter. Nor do they less strangely stand in contrast also with the solemn realities contemplated by our faith as Christians. (Here, con-

Of Heaven
and Hell.

fusedly, they again believe, however, they are using the principle of Continuity.) Heaven is, to them, what the Emperor Hadrian's verses represent. But we ask, does that represent the Christian hope? Hell to them, is the Gehenna of "Eternal evil." But the former is very constantly attenuated, the latter very fearfully palpable; the former evanescent, the latter essential.—Is that the Christian belief?—Is "Eternal evil" *thinkable*,—*i.e. ab eterno*?

49. But this subject of Heaven and Hell is scarcely suitable, we must own, to be here fully entered on. It is sure, indeed, to occupy the mind of the next generation to an extent hitherto unknown, and that, (together with our authors having dwelt on it), may justify this brief notice, though it may be but brief. It is to be feared the mental and ethical feebleness of a physical-science age just beginning to feel after first principles of thought and being, will but gradually be aroused to a knowledge of subjects of higher reality, as pre-supposed by the phenomenal, and giving it all the reality it has.* But we must not delay, or altogether hold back on that account.

What Christianity means by the future, of which it gives warning and threatening, cannot remain always as indefinite as now. What, according to our Religion, is Salvation? and what Perdition? will surely be inquired; and that before long. Christian doctrine on this subject cannot be passed by in silence in an argument for Immortality. If physical science had to delineate an immortality, it ought to have even gone further than our authors into the Personal significance of the Future to which we are physically, if not morally, tending.

The weight and solemnity of the reference to heaven and hell are enhanced by the popular theory as to eternal physical pleasures for the "saved," and torture in reserve for all failures in Probation. A terrible passage involving this teaching, in an article in the *Fortnightly Review*, by a writer so clear-headed as Professor Clifford, simply shows that he has identified Christianity with a thoughtless and uneducated Predestinarianism, and has not learnt our Theology at all. He only knows of a theory which has perverted every article of our faith which it has touched, and furnished rough-and-ready grounds for popular infidelity, in classes of people learning but the alphabet of thought, and stumbling over its first letters.†

* See extracts from *The Church of All Ages*. Hayes : London.

† See extracts as to Eternal Punishment in Mr. White's *Life in Christ*, pp. 63—73. See also *The Bible and its Interpreters*, pp. 96—107.

50. Christians will (after long forbearance) have in the coming generation to refute superstitions, which yet linger (not in Œcumenical Councils, but) in the indistinct conceptions and justly aroused fears of the Œcumenical *conscience* of the populace, in Christendom and Heathendom alike. The Beatific vision of true saints must yet fill our hearts, and stir our longings for the true heaven. The "Continuity of vengeance" on each soul of man by eternal physical torture, "visions of hell"—(taught whether by Luis of Granada or by John Bunyan), must be openly and finally shown to be, at least beyond the definite teaching of our Revelation, both under the Old Testament and the New.

What God will do with the moral failures of His Creation is a moral inquiry deeply overshadowed by clouds which stir all our anxieties. The thought of it must be preceded by a view of *what a Moral world is?* And forgetfulness of what a moral world is. and what Probation must be? even if we would as much as know our own meaning.

As our authors have no ethical decisions very clearly announced, we must be content at present to muse as to the possible connection between Responsibility and a thinly physical hereafter which is inevitable for all. We wait for their further views in the realm of thought and morals. We point out, that their theology is even more "hazy" than their theory of matter. But while in science they speak as masters, in theology they have yet to become learners. Their theories, at all events, as to Heaven and its Beatitudes, or as to the world of the lost, are not such as Christianity has taught us. Simply in reply, we say, that we think we know that God is our Father—that He is "not far from every one of us," and that "in His presence is fulness of joy" to all who "draw nigh to Him." If we "arise and go to our Father," it is our view that He receives us, clothed in our immortality, to His mansions of joy hereafter. No Physical continuity here will ultimately hold us back from Him. It is God that man's "heart thirsts for," as St. Augustine, echoing the Psalmist, expresses it. It would change our whole religion to put God for ever "afar off." The longing for immortality itself would be gone. It would be a shock, that (to use an expressive phrase), "would break the heart" of the world, to never "know the Father." It would change everything to the Christian, were it to be discovered that Heaven would not be the "Vision of God" for the "pure in heart."

51. Heaven, as Christ taught it, is nearer than our authors

would put it. And, on the other hand, as to the final lot of the *lost*, we plainly affirm (and we know no more) that Retribution will be *morally* complete. The bodily details of demoralizing infliction, which some delight to dwell on, are, we affirm, no part of the Revelation as such.

The "Perdition," and the "Eternal Punishment," are facts—moral facts; but not physically set forth to us by authority. Conscience, after all, is the darkest Revealer of the certainty of the irreparable future of a Probation that has finally failed. The rise and close—the origin and the end of evil, belong to the fact of Moral Agency.

In making a moral world, God had the possibility of its failures as well as triumphs to deal with. But "Eternal evil," as professed by our authors, is, thank God, no necessary part of our faith as children of immortality. As moral philosophers, and as professing the Christianity of 1800 years, we are compelled to reject our authors' view of the essential eternity of evil, when they say—with fearful consistency,—that evil is woven into the *essential* texture of the garments with which the Eternal God, (our Father,) has clothed Himself. On *their* theory it is!

52. There are four doctrines, we may state, variously held, as to the Punishment of sin hereafter. First, that the sinner will be destroyed, *i.e.* annihilated; secondly, that there will, after a time of vengeance, be "Restitution of all things"; thirdly, that there will be eternal, physical or sensible torture; and lastly, Everlasting Punishment of a *final* kind, but adjusted to Moral Agency. —On these theories this is not the place to enlarge. The conclusions expressed by our authors seem distinct from all these. We are free to accept the last of the four.

Nor need we speculate on the modes and conditions of Immortality; for it is probably useless. Certainly the immortality which our authors truly say was longed for always by all men, was not what they describe. No one, we may safely say, ever longed to be an eternal molecule in a luminiferous ether more and more refined. "We," according to His promise, "look for new Heavens and a new earth, wherein dwelleth righteousness,"—seems an entirely different idea. Such a future at any time contemplated by us has an elevating influence on both mind and heart. It recognizes our Personality, but provides for it a real sphere in the life to come. It sets before us the vision of changes which even Physical Science must own may contain a sought-for solution; and yet it has a Moral

Four theories of Future Punishment.

and Intellectual "Continuity," altogether in contrast with what we call physical. Not that we, (any more than the ante-Nicene fathers), argue immortality from the intellectual nature of the "soul." That is far too precarious; but immortality certainly follows from man's having a *moral* nature in essential relation with the Absolute and Right—his having real probation in that nature—to be morally and fully accomplished. Men must, we repeat, think out a *Moral world*, and all it means.

53. Every form and degree of Necessitarianism (even mechanical continuity if it were universal) logically denies moral probation, and reduces it to a name. In the same way (to refer to the four theories above named) "Annihilation" denies a moral world; it is a mechanical end of an ethical creation. So does "Restitution." So does mere "Physical torture." "Eternal punishment," *morally* divided "to every man of what sort he is," is truth, and it is both philosophical and Christian. Of these four theories: the first is Gnostic; the second "Origenistic"; the third Mahometan; the fourth is Christian.

Probation is not conceivable throughout, except on the basis of a *permanent* future to be dealt with. It would demoralize almost all men to put them on a supposed moral trial, with "annihilation" as an alternative. If, again, according to some, (like our authors), the belief of the migration of souls to other conditioned existence, ^{How the three theories clash.} might assist the thought of a penal future and its uses; yet the notion of "restitution," (so often mingled with this idea of migration), would clash with the entire conception of purely moral, that is, real Personal Probation.

Nor could the argument either for or against the *natural* immortality of the soul, or the resurrection of the body, interfere with the expectation of a Personal future. It could not avert the conclusion that our Self is indestructible, a conclusion deducible from Moral grounds, even if there were no other. The recognition of the future of man is wholly moral in the Christian teaching. And with this we may now dismiss our authors' dreary theory of Physical Immortality, or Mechanical Continuity; on which we may, however, add something in our Appendix.

54. In contrast with all our authors' Eschatology, I may be permitted to refer to the 21st and 22nd chapters of the Book of the Revelation of St. John. The idea of the new "Creation" is to be best found in that imagery. In that transcendental picture, as we look on it, we are set thinking, wondering, and longing. It tells of the "Tabernacle of God with man," whom

He loves; the "New Jerusalem" with its "walls and gates"; the "nations of the saved"; "the kings of the earth bringing homage and offerings thither"; the "Tree of Life in the midst," whose leaves of perpetual freshness shall be for the "healing of the nations."

APPENDIX TO AN EXAMINATION OF THE BOOK
ENTITLED "THE UNSEEN UNIVERSE."

55. PROFESSOR CLIFFORD (*Fortnightly Review*, June 1, 1875) concedes, that the writers of *The Unseen Universe*, with whom he severely remonstrates, "speak from the standpoint of a wide and accurate knowledge of physical science, accurately and clearly expounded, as far as it was wanted" (p. 777), but he proceeds both jocosely and seriously to criticise them and their science. He says:—

"The Unseen Universe, which they defend, lies within the limits of those physical doctrines of continuity and conservation of energy which are regarded as the established truths of science." It is something which is to the luminiferous ether, what the luminiferous ether is to molecules. "It is of finer structure, and receives the energy which the ether loses by friction"—(just as the luminiferous ether receives the energy which the molecules lose).

As we notice the course of Professor Clifford's scientific objections to this work and its authors, we at once learn, perhaps, something as to the value of the religious inferences from the premisses when estimated by a physical science critic.

56. We linger not on the Professor's preliminary objection to the interpretation given in this book of the Immortality desired by man. If, as he supposes, it would satisfy all the historical facts of our immortal longings to say that man simply "shrinks from

Professor Clifford's criticisms.

His minimizing the desire of immortality is an oversight.

death," yet even that would imply that present existence is felt to be a good. But the Professor overlooks the fact, that there is in us a desire for the Future itself which would gladly reach *beyond* the present, even ignoring the present. This we pass at present, for we are free to acknowledge, and have already shown, that the immortality longed for by man is not that which is the outcome of physical speculations as to the "Unseen Universe." No one ever longed for that Hereafter which the book before us delineates. The survival of our Self in a quasi-perfect fluid (hitherto not met with) amidst vortex-rings, by means of a spiritual body (which we always have without knowing it),—an "*alter Ego*" of the present natural body,—is a breach of the law of physical continuity at once, in favour (as we understand it) of the Swedenborgian law of "correspondences."

The authors of this work are open much more painfully to a charge brought against them, that they "make their chief deity impersonal." Certainly, with them, God seems only personal so far as He is "conditioned," which the Eternal Father is not. Professor Clifford rather welcomes this position; and, indeed, we can hardly wonder at it, since he identifies the Christian Theology with the "awful wickedness which the popular legend (See *ante*, p. 38, § 49.) ascribes to its deity," described by the Professor in terms too uneducated and revolting to be worth quoting.

57. But now as to the "science." For the sake of reference, we will here keep as nearly as possible to Professor Clifford's order of criticism in his article.

Everything would seem to depend on the particular theory as to the "*loss of energy* in the luminiferous ether" adopted by the writers criticised. (Sir W. R. Grove, we remember disbelieves altogether both the "fluid" and "ether.") Even the "fact" itself, though "proved" by Struve, has been subsequently disproved" by Argelander. Even if we accept the "probable" account of the "fact" of ethereal friction preferred by our authors, there are two other accounts deemed by Professor Clifford "equally probable," which would interfere with the inferences so doubtfully drawn (p. 776, first paragraph, and p. 778, third paragraph).

58. Our authors do not quite adopt Thomson's theory of the vortex-rings in a *perfect* fluid; they find that they cannot proceed without an imperfect fluid, how slight soever the imperfection may be. And for this reason, viz., the supposed perfect fluid is, of course, absolutely incapable of friction; and our authors' theory

His views of
theology un-
informed.

(See *ante*, p. 38,
§ 49.)

His exposing
the various
and insecure
conclusions as
to the "Loss
of Energy."

His criticisms as to the imperfect fluid.

needs, at all events, a little friction. It is probable that molecules and ether are "of the same stuff." Molecules are coagulated ether; but Sir William Thomson's perfect fluid is not made of molecules at all. It is something which does not exist. How slight soever be the friction in the imperfect fluid, we are wholly unacquainted with the precise law of the action of molecules in it, so that we are not advanced one step. But probably wherever there is an atom there is an electric current. This hypothesis, if admitted, may at least explain many of the properties of atoms; and if we find that it will not ultimately explain all, we may yet say that an atom is a small electric current,—and something else besides. But after this, Professor Clifford admits (with a boldness worthy of imitation) that "these questions of physical speculation about a metaphysical question" (p. 778). We were beginning to think so. He even ventures to ask whether there is any object external to our minds, corresponding to what we call "molecules" and "ether"? Any how he has shown that the foundation of much of our authors' theory is but faintly probable "science" in too many respects to bear the weight of their theological conclusions.

59. The fact that matter, as a phenomenon, is not "to be increased or diminished," the Professor continues, "has nothing at all to say to the question about the existence of something which is not matter." This surely is honestly and bravely said (p. 778); and he adds that there is nothing to assure us, that the laws of motion and Conservation of Energy are "always and everywhere true." Surely the wonderful thing after this is, that Professor Clifford envies the writers of *The Unseen Universe* such foundations as they have chosen for their theology. "The right statement," he says, might be, that the Conservation of Energy was only a very near approximation to the fact. The doctrine of Dissipation surely shows this (p. 779).

60. But Professor Clifford does not allow the "Second Ether" of our authors to escape so well. A molecule travelling through the ether vibrates. Its energy of translation becomes energy of vibration. This molecular disturbance agitates the ether. This transfers part of the energy to a second ether, and so on. As there is no reason why vibratory motion should not be transferred into other kinds of ethereal motion; and no reason why it should not go to the making of atoms, (and of course, no reason why it should), the Professor "presents this speculation to anybody who wants the Universe to go

Question as to the existence of something which is not matter.

His criticism as to "Second Ether" and its contents, "Human Consciousness."

on for ever." But, it is rightly asked, are we really to *build* on this supposition the theory that in ether beyond ether there exists that "spiritual body" which receives our consciousness, when our natural body is dissolved, and links our past with an ethereal future, and so secures to us a Personal Immortality? The practical conclusion surely is large for such shadowy premisses to sustain (p. 790).

61. In this passage the Professor treats our Consciousness as a term expressing the unity and *simplicity* of what we call the Personal "Ego." In the next, he affirms its *complexity*; and thus at least contradicts our experience, if he does not destroy also the force of his previous *argumentum ad absurdum* as to the Spiritual body making its appearance in the "second ether." His reason for asserting this complexity is that consciousness accompanies its various organs. But that would seem (especially as consciousness actually outlives many of its instruments) to be rather a reason for its *unity*. His doubts as to the unity of consciousness. The individual has not many consciousnesses; but consciousness to each of us is one Self—it is our very own.

After this, however, the Professor leaves reason, and has nothing to do but to go off into banter; in which few would be so unwise as to follow him. He even suggests, with Von Hartmann, that while consciousness "cannot be left out in a fair estimate of the world, it may be the great mistake of the Universe, and not unsuitably left to the care of the *devil*!"—Is this sincere? Is this earnest writing?—Professor Clifford would not wish to be here judged as a scientific thinker. He can do better than that. Perhaps he would prefer our referring to his eloquent description of the course of life as unconscious,—which seems to be his *ultimatum*.

We will give him all the advantage of quoting his picture of what may be called the poetry of existence without consciousness.—"Consider a mountain rill. It runs down in the sunshine, and its water evaporates; yet it is fed by thousands of tiny tributaries, and the stream flows on. The water may be changed again and again, yet still there is the same stream, but at last even the weariest river

Winds somewhere safe to sea.

When that happens, no drop of the water is lost, but the stream is dead" (p. 791).

62. In a note at the close of Professor Clifford's criticism, which we must not omit, it is admitted (and endorsed apparently by the Editor) "that there was some initial distribution of Heat which *could not* His doubts as to the final agency of heat.

have resulted, according to known laws of the conduction of heat, from any previous distribution." According to this, Professor Clifford's science has no alternative theory to propose to that of the "Creation" of all things from nothing. And as to the "conclusion of all things" he is not prepared, on other grounds, to say whether it will come from heat at all? It may be, he says, from cold. The earth may fall into the sun, *after* it has cooled. (p. 793).

63. We accept much of Professor Clifford's criticism as just; but we must not therefore conclude that the work of the authors of *The Unseen Universe* is written in vain, even though so many links in their argument are in themselves weak, and gaps between some of them destroy all its continuity. The work itself gives a kind of landing, where we may take breath in the controversy as to "Life," which physical science has often carried on with philosophy and religion, with so much pretension. It has, not unfrequently, been difficult to fix the popular-science lecturer to anything but experiments and "imagination." But the undisputed confession of these clear and competent writers, and no less of their clear and competent critic, at least disposes for the present of "Abiogenesis." Life and force and energy are at last *admitted* to be (as theologians have always said) beyond physical science, and all its analysis. The sceptic must rehabilitate his old materialism as an instrument for rejecting Causation; and the fatalist must no more rely on "necessity," or on predestination, as at all accounting for the phenomena of Life or Responsibility. We are told, beyond dispute even among men of science, how far the physical Law of Continuity can go. It is a great gain. We have turned a corner in a tiresome controversial by-way, and are now in the open road. Our authors have set up a true landmark. For all hesitating and troubled minds tempted to mere Materialism, there is a real advance of position in the pages before us. Their open and unreserved rejection of Abiogenesis,—their feeling after an Ontology and Theology, as a kind of need of all ultimate thought,—their detection of the material boundary, and the *look beyond*: all these constitute this work as a definite gain to truth. Henceforth, the philosopher, and possibly the theologian, has facts to deal with and work to do, as to which Materialism is confessedly powerless. When the Materialist becomes anything more than mechanical he enters another region, a region where he meets

Points are made by Professor Clifford.

But important work has been done by the writers of *The Unseen Universe*.

with previous explorers and fellow-travellers—children of faith and thought, from whom he must own he may have something to learn. We now part, however, with Professor Clifford.

64. It is not to be disguised that there is much that is unsatisfactory in some vital parts of the Scientific statement given us.

That "Matter" may, according to one hypothesis, be *nothing*—the stuff of the whole Universe being all "matter" and energy,—is "hazy" indeed; (while by others we are told that matter contains the "potency of all things.") Then, as to Continuity. It is properly enough expressed as the natural expectation of all Rationality. But this implies much more, of course, than continuity of *form*. Our Rationality expects a continuity, including the idea of *Means and End*. This is too little noticed, by far; indeed not directly so at all in this controversy: it is slurred over. Take this away, and our Rationality is as much "confounded" as it would be by the denial of Continuity altogether.

But the Law of Continuity is imperfectly stated by the authors.

If the very confident tone of later science has, as our authors intimate, been unworthy, surely the acknowledgment should have been accompanied, in such an argument as theirs, by a little more hesitation as to conclusions deduced from such very indefinite premisses. Again, when physical law has been admitted entirely to fail to account for the production of life, is it at all right to resolve that physical Continuity *shall* be assumed as the condition of life? To resolve that physical, though attenuated, matter is the basis of the Invisible or Unseen Universe, which yet lies beyond all physical experience, is at least, we once more say, gratuitous.

Again, if all we know of the constituents of the Visible Universe be called molecules and ether; and if molecules be but coagulated atoms, and matter nothing, as Faraday inclined to say, but an imaginary centre of "relations," then (even though Professor Clifford's question be wholly set aside, "whether molecules and ether represent any object external to our minds"?) this ought to be some check to the very knowing-seeming way in which the motion of molecules is constantly talked of, as if men of "Science" understood all about it.

65. Or again: If "Ether" is thought to be coagulated "molecules," molecules to be coagulated "atoms," atoms (if anything) to be "electric currents," or to convey them; if "Perfect Fluid" is not made of molecules at all; (and so may be hard for the mind to distinguish from a perfect void); how are "matter" and the "fluid" related at all?

And the scientific theories are at least incomplete.

If space "were full of the perfect fluid," and if there were "vortex-rings," and if they once got into "the perfect fluid," some of the phenomena of matter, it is said, might be produced; (and if some, why not all?)—Can we say that all these closely-arranged hypotheses are true and solid science?

The theory of the "Conservation of Energy" is, we see, an "approximation to the facts." For there is also, a "Dissipation of Energy." A place then must be found for the "dissipated energy"; something of the kind is needed—give it a name, call it "luminiferous ether." Possibly then a luminiferous ether receives the lost energy of the molecules? But does the luminiferous ether, being material, lose its *own* energy by friction? Where then does its so lost energy go? Perhaps at length to another ether, and then another, and finally to an "Unseen Universe"?—Shall we add, "*Therefore it is so*"?

Surely reasonable people will think that conclusions, scientific or theological, from these disjunctive syllogisms, or, perhaps, sorites, should be modestly suggested at all events.

And inadequate for the conclusion.

In the Theological inferences of our authors we have found a hopeless confusion of the Phenomenal and the Absolute, such as leads to a doctrine of the "Eternally-conditioned Divine Sonship,"—a theory of Philo and of the Gnostics, which led Arius afterwards, not unnaturally, to assert that the Son was a Created Being. But this is a small part of the misconception of our Religion displayed by our authors; and this, I shall be reminded, is not the place to examine religious theories—theories I say, for they have many. Let us notice but one more; their view of Miracles and Power.

66. Our authors' half-avowed primary *conception* of a Miracle (as "an exception," p. 190), really seems to be that it is, on purely physical principles, a breach of Continuity. The modern view generally, indeed, is this, that a Miracle is something *unaccountable* on the ground of natural law; and that it takes place in consequence of a super-natural or extra-natural interference from the Unseen. In this way Paley uses it, when he takes a miracle as a proof of a Revelation. It is something from which we may infer the existence of a Higher Power at work in the invisible. Reason, he thinks, must be distrusted if it rejects "Revelation" as unreasonable; because reason infers a cause for a given miracle, said to be wrought as a proof of the Revelation. Such an argument has in reality little coherence; for it appeals to our inferential faculty, after it has refused and confounded it. It asks us to transfer our Rationality to a second

Theory of miracles.

sphere, when already baffled in its first. It also contains an assumption of fixed law in a phenomenal sense, (the sense of sequence), as a necessity in another order of being. It is, perhaps, a latent denial of a real and *distinct* Causation, under the semblance of asserting it. If "law" were a sufficient account of "agency," the argument might be good; but law does not account for agency at all. Law is nothing but an abstraction which represents "sequence"; until we superadd "agency," which is a different idea from law altogether, and introduces a cause.

67. Dr. Mozley is in the same snare as to the idea of a miracle; and so is Dr. Mansell. They assume, and so does Hume, (and so all the Scotch school), that our inferential power can be appealed to, after our Rationality has been set aside, and inference denied; which seems absurd. Now Divine Revelation, regarded as a "light from heaven above the brightness of the sun," is intelligible. But the idea that God first makes a communication "confounding the intellect," and then does something else that we cannot account for, in order to "prove" to our intellect that that communication is true,—is somewhat hard. Indeed, for God to work a miracle to prove something to us, or for God to act, and then to prove, *not by the act itself* but by something else, that He has acted, is at the least circuitous.

Miracles prove themselves; Revelation must prove itself; and Christ, in saying, "Except ye see signs and wonders ye will not believe," rebukes the thought that a high faith, as an inference, must come from seeing miracles; much less from proving historically that other people saw them 1800 years ago. Our Religion, says Origen, speaks for itself. Divine Authority addresses conscience. Our authors imagine that all except certain later theologians (p. 60) regard miracles as violations of the order of nature; if they will examine somewhat further, they will find a higher idea in St. Augustine, and in St. Thomas Aquinas, to whom I refer in another place. (*Bible and its Interpreters*, pp. 182 and 239., &c.)

68. A higher conception of Miracles than our authors' would lead to the much-dreaded "metaphysics," and border on a discussion as to the Absolute and the Phenomenal, and the Cause, conscious or not. Not that our authors can really escape metaphysics at last—(as Professor Clifford intimates, and they themselves half own). The innocent observer, who had always "spoken prose" without knowing it, may fairly represent the fact that every man is a metaphysician, if he only

tries to direct his thought *rightly*. His choice only lies between being a good metaphysician and a bad.

As to the more theological *discursus* of our authors we may now spare them, as they do not wish to be thought "theologians of any school whatever"—a wish which they perhaps succeed in gratifying. But we ask, what would they think of men who wrote about Science, and did not wish to be "Physicists of any school whatever"? Metaphysicians, however, they really are, directly they enunciate the simplest of their propositions. Would that they would continue their metaphysics, and think on!

69. Finally; the proposition connected with every view of miracles and causation, that every phenomenon implies a "power" (p. 47), seems to concede all that theology demands. But the proposition that every finite intelligence must have material "embodiment" (p. 47) equally concedes all that pure materialism needs. It is wonderful that the two propositions can be found in one page; for a finite intelligence we suppose is a "power," of which phenomena may be results, or to which phenomena may be known. To say that every finite intelligence connected with this universe has material embodiment is to assume at once the theory of Materialism, as that which alone is "conceivable" (p. 48). But our authors say they conceive of this "material embodiment" as essential for a finite intelligence, though they afterwards own, that they have no conception of matter itself—except of the most "hazy kind." According to one fairly accredited theory, it may be nothing but a point between relations, (p. 102), and in another view it must "probably come to an end"! In analyzing the embodiment of finite consciousness however, they admirably confute the materialists' theory of consciousness,—distinguishing between phosphorus in its common state, where it may be examined, and phosphorus in the brain, where it cannot be examined. Yet here also they are to us quite inconsistent, if they say that potential or latent consciousness requires "material embodiment"; and this is what their argument needs, unless that consciousness may exist in the unembodied, or (as they say) unconditioned finite intelligence. (Compare p. 52.)

The paralogsms which abound in our author's pages cannot be unfelt by themselves, when they contemplate and compare "powers," "forces," "energies," "*vis viva*," and "inorganic agencies" (p. 127), all so closely bordering on each other, and so imperfectly distinguished. This may of itself account for the quick instinct with which they avoid "metaphysics,"—in other words, persevering and exact *thinking*. Their entire miscon-

ception, too, as to the "absolute," as if without existence, though it must needs be at the foundation of all being, is remarkable.

70. They speak, for example, of no events taking place which would "finally, and for ever, put to confusion the *intelligent beings* who regard them" (p. 60);—not noticing the previous "absolute," thus implied. They rightly deprecate such *intellectual confusion* that "an *intelligent being* will for ever continue baffled in any attempt to explain phenomena, because they have no physical relation to anything that went before, or that followed after"—(p. 61); thus again assuming the absolute. They "have perfect trust that God will work in such a way as not to put *us* to permanent intellectual confusion" (p. 62). In all such expressions, which indeed give us their fundamental reason for the Law of Continuity, and are of constant occurrence, our authors do not seem to observe that they are admitting "intelligence," "intellectual" beings, "us,"—who are powers lying beyond the "material," powers who cannot with impunity be disregarded, but must be treated as having a voice in the expectation or order of things, and so are in relation with the absolute. These intelligences they say, have "the duty and privilege of grasping the meaning of all events that come before them"; (p. 63), and, they ask, "do not all terrestrial occurrences of whatever nature, form that material upon which *the intellect of man* is intended to work—that earth which man is commanded to subdue?—a command," they finely add, "equivalent to victory?"

Well then, why do our authors turn away so often from this more than material being, this power, force, (which Sir W. R. Grove says, "cannot be annihilated" (p. 16)—or, this intelligence, that *must* be respected, and is apparently ever watching, in permanence, the whole physical order of things, as a Superior? Why do they seem to assign to this distinct being, no more than, after all, a "conditioned," or semi-material continuity of being?—Is it that useful "dread of metaphysics?"

Whenever scientific men, or commercial men, or any men, turn away from what they call "metaphysics,"—or thinking out conclusions to their end,—they in truth are imagining, that "God has put us to permanent intellectual confusion."

*The Fourth Edition, Revised and Enlarged, of "THE UNSEEN
UNIVERSE."*

This Edition has just come to our hands ; and it is a duty to examine any points of difference, and place it side by side with "Edition III.," which we have hitherto used.

P.S.—71. We have read this new edition with considerable satisfaction. The course of the argument is exactly the same, but the sense of responsibility under which the writers (no longer anonymous) announce their views has given a maturity to some of their expressions, which anticipates objection, in some cases (p. 16), and imparts precision throughout. The anonymous editions take up far more the position of outsiders ; the present, with the more courageous and distinct moral avowals of its new "Introduction," throws a purer and clearer light on the meaning and intention of the work, as a check on the over-weening materialism of the day. A real check it certainly is ; nor—which is important—do its authors wish to insist on its theological inferences very rigidly, but, rather, acknowledging unfamiliarity with exact theological science, only indicate certain *directions* of Religious thought as not impossible, without speaking definitely. This was mentioned in the preface to the second edition, but it becomes felt in the fourth.

72. The more noticeable portions added to the argument in this fourth edition are those connected with the atomic theory. In the former editions we had such assertions as these, without anything sufficiently to relieve them : "The Visible Universe, after its production, is supposed to be left to . . . certain inorganic agencies, which we call forces, in virtue of which its development took place."—"As the various atoms approached each other, in virtue of the forces with which they were endowed, other and more complicated structures took the place of the perfectly simple primordial stuff" (pp. 127 and 128). This might seem to point too favourably to the theory of matter being alive. In the fourth edition, the authors distinctly attack that theory with vigour and success. Still we have to complain of obscurity in all this part of their statement (p. 104).

They mention, for example, Le Sage's theory, as if it might be not impossible, that forces which set in motion the

molecules of visible matter are derived from the Unseen Universe (p. 146), and yet they refer to Clerk-Maxwell's demons as "essentially finite intelligences," who, without spending work, could restore energy in the Visible Universe. These hypotheses seem to be quite incoherent. Our authors tell us that matter and life are both "developed from the unseen, in which they existed from eternity" (pp. 159 and 188, ed. 3); and then they think there is an intelligent agent who develops energy, and a similar intelligent agent who develops life; and, we suppose (though we are not precisely told), that, being eternal, they act simultaneously? (or, is "life" antecedent to "energy"?).—And as to "forces," which give rise to transmutations of energy (*edit.* 4, p. 199), they also "come from the unseen." Yet we are quite unable to reconcile with this the assertion that we "have no proof that force proper has objective existence"; and probably there is "no such thing as force, any more than there is any such thing as sound and light" (p. 104, *edit.* 4).

If this means that force is only a result of certain molecular conditions, there would seem to be the same objection to it that lies against the materialists' view of the rise of consciousness (p. 75). They say that there is no evidence for identifying life with organization; but is there any to identify original force, as such, with organization?

73. There is something, however, almost intolerable in the repeated assertions, in the last edition especially (clashing with Newton's second interpretation of the third Law of Motion) (p. 77, 3rd *edit.*), "that force is nothing," and yet may be represented as "an endowment" of something else, which may exist, and yet "without *doing anything*." Why suppose these "brute forces" at all—these "inorganic forces," or, these "endowments," or "demons"—whether Clerk-Maxwell's or Sir W. Thomson's, or Malebranche's, or Le Sage's, or Herbert Spencer's "power," or the old-fashioned imaginings reminding us of Celsus, or the Gnostics, as to similar *δυνάμεις* and *δαμόνια*. Herbert Spencer's are, we observe, tacitly withdrawn from the "fourth edition";—but why? (p. 72) There ought to have been a full explanation of the suppression of the statement that "every phenomenon implies a power"; and of some other suppressions (as p. 158).

Nor is the rough saying, that to speak of the "Persistency or Indestructibility of Force is unscientific," at all satisfactory or sufficient. Sir W. R. Groves, in the work referred to by our authors (*The Correlation of Forces*, p. 16), says that "force cannot be annihilated." Groves uses this term Force now partly inhibited and partly and capriciously used by our

authors), as meaning "an active principle, inseparable from *matter*, and supposed to induce its various changes" (p. 10). He speaks, not quite consistently indeed, of an "*ultimate generating power*" of such forces as belong to light, heat, electricity, magnetism, motion, and chemical affinity" (p. xiv). This however was not only his language when we heard him some ten years ago at Nottingham; but in his recent edition of his work. It did not pass as "unscientific" then. We were, and are, of course, far from adopting it.

74. The objective element of the Universe, according to our authors, is Energy (p. 176, *edit.* 3); and intelligence, and life, and force, are apparently regarded as non-objective. Whether matter be objective—though it is the vehicle of the energy, it is really hard to say. It becomes difficult too, to ascertain whether there are forms or energy which exist unassociated with matter. The universe of atoms, it is admitted, "certainly cannot have existed from eternity" (p. 9, *edit.* 4), for the atom has the look of a manufactured article; but the "primordial stuff" from which atoms are manufactured is eternal; and thus atoms are developments from the Unseen. What the molecular constitution of the Unseen Universe may be our authors do not say, beyond this—that the "same stuff" goes to the making of the "unseen and seen Universe" (p. xv, *edit.* 4, and § 262). To which section of the universes, Energy, or Life, may belong, must seem comparatively unimportant, if nothing exists but the same stuff.

75. One admission of our authors in this last edition is remarkable, and we wonder that they do not see how far it reaches, as a disturbing element. It is this. "In former editions we have given undue prominence to the argument for the Unseen, derived from the future degradation of the energy of the present visible universe." If the doctrine of the Dissipation of Energy be hesitatingly relied on, a startling number of our authors' inferences are seriously affected. On the other hand, if it be logically admitted, the doctrine of the Conservation of Energy must be re-stated. Our authors, however, are so much more capable of dealing with this matter than we are, that we will not dwell on it, in the present state of physical problems.

76. We will now conclude, by turning to the Theological suggestions of this work, which in the fourth edition are but little alleviated. Our interest in the whole volume has been a religious one, and must remain so. Its great value is, that it has driven Science to Philosophy, and will compel physicists to be thinkers, or to be shut up as hitherto, to "intellectual confusion."

The fundamental question for our authors to consider in

theology is—whether the Christian conscience has ever accepted their view, or Swedenborg's, as to the Eternal Father; viz that He is neither "known nor loved?"* Whether the passages quoted by them, as to "the Eternal" being unseen and unapproachable, have been ever understood as shutting out the vision of God from His saints?—The Christian schools no doubt affirm that God is not "*per se notum*"; but that "to know Thee the only true God," and "Jesus Christ Whom He sent" is eternal life; and that to "love God, whom we have not seen," is our future hope and joy. The Christian Church has never doubted this.—"The Spirit searcheth all things—yea, the deeps of God."

And now that such minds as those of these authors are seriously turned to religious philosophy and theology, we cannot but augur a clearness of eventual conclusions, of which, indeed, the present volume gives no sign; (simply because the authors have not hitherto been "theologians of any kind.") Our Lord's "Our Father which art in heaven" leads us at once to the Father. And does not our Lord's last action, which we are to continue "till He comes again," "show forth His death," to the Father in heaven, as well as to us on earth?

77. In true "access to the Father" by the Spirit (without which there is no "Grace of Christ, no Love of God, no Communion of the Holy Ghost," in the sense made known by the Incarnate), there is even direct knowledge of God by faith; and our authors seem to catch sight of this truth in a

* The idea is so ingeniously relied on by our authors, that the generality of Christians accept a mysterious Trinity in the Godhead, so as to make way for the hypothesis (based on a few texts), that the Divine FATHER can never be known, approached, or loved by us, that it seems right to point out the completeness of this misapprehension. In this country, probably, there is no sect or party of Christians to whom such a thought would be tolerable, except the Swedenborgians. In the Church of Rome it would be condemned as contrary to the foundations of the faith, the highest worship being always offered to the Father through the Son. In the Church of England, nearly every Collect in her Prayer-book, (and scarcely less her whole Litany,) and without doubt her Eucharist, is directed to the Almighty Father. Even the most isolated and independent of "Evangelical" followers of Scripture would aspire to be led into "the knowledge of God," and "the love of the Father"; while among those who are termed "broader" believers, the "Fatherhood of God," and our love towards the Father, are taught with emphasis. Indeed, Christ's rebuke of the unbelieving Jews that the "love of God was not in them," is apparently regarded by the Apostle who recorded the words, as equivalent to the "love of the FATHER is not in them." (Comp. St. John v. 37—42, and St. John iii. 1, and iv. 8—14.)

beautiful passage, in which they speak of some Christians, in devotional conditions, having at last actual glimpses of the Unseen (p. 255, &c.).

But the sections of this volume which call for most recognition are some in which the Law of Continuity is by means of memory carried on unto the moral future. This moral continuity implies so much more than is said of the identity of "the Ego" (referred to so unequivocally in the new Introduction), that it ought to be fully acknowledged. But it is here most specially that we should hope that our authors will hereafter fully think out the only logical conclusions, as to conscious intelligence, and a moral world.

79. Minds, indeed, too exclusively occupied in scientific pursuits are not only apt (as Sir William Hamilton said) to be disinclined to logical exertion, and to content themselves with symbols, but may even acquire an incapacity for philosophical ideas, and can persuade themselves to turn aside from all investigations of the grounds of thought which precede the conditioned; and they become involved in "hopeless intellectual confusion." They cannot conceive of a Contingency; although without such a conception not only the universe, but God Himself, must be regarded as necessarily and eternally fixed, as to every detail of act and being. If sometimes they seem to leave a space for the free action of an originating agent, they do so illogically; not seeing that one single contingency, really such, is sufficient to vindicate the conception of any number of contingencies, *i.e.* possible events which may or may not be, and cannot be known beforehand in *any of the modes of finite knowledge*, though included in the Infinite. To introduce the element of certainty into the knowledge of the future, is at once, *quoad hoc*, to make the knowledge finite, and affirm the thing known to be no real contingency. To say "that the choice of one being is not affected by the knowledge of another, is true; but it is an evasion, because both the knowledge and the choice are in *every detail*, from moment to moment, for ever fixed, if the hypothesis be admitted that there is no real contingency. No real "contingency" means materialistic necessity, *i.e.* no real *agency*; every seeming-agency being but a form of the latent energy of the whole necessary Universe. Now physical science itself is not satisfied with this. It asks for agency, it asks for "Life from the Unseen."

80. Since then, the Law of Continuity, as already pointed out, becomes mechanical, without the admission of something *more*, why should not that something have a name? Clearly it lies beyond the visible; but it has existence, and is not only

real, but is the most essential being, the *sine-quâ-non* of the universe. It precedes the conditioned,—it has no embodiment, any more than the Absolute has.

So, again, Consciousness may be, and often is, conditioned ; but it must be previously conceived of as unconditioned ; or else there is intellectual confusion again ; and that too in the case of finite consciousness. For the term “finite” cannot be said to “condition” the consciousness, in any other sense than that in which every act of the Eternal Himself is distinct as an act. And the same is to be said of Life, Force, and some kinds of Energy also, without some of which the Law of Continuity would describe mere sequences, and be a chain of sand ;—which, indeed, some of the recent arguments for Miracles would make it.

81. If indeed the “general belief of Christians,” which is somewhat relied on by our authors, be fairly consulted, it will be found that a true Law of Continuity, both morally and spiritually, is vital to us. According to the usual interpretations of Christendom, there is a law of corporate continuity pervading all the “new creation in Christ” ; and whatever may be said of Life, Forces, or Energies, or the transmutations of energies, or even “luminiferous bridges,” in the Natural order of things, may have its parallel (as P. Ventura says) in the order of Grace, and in the Hierarchy of the “Kingdom that cannot be moved.”

It will be an auspicious day for Theological Science in England, when such minds as our authors’ are vigorously turned to this whole subject, with the resolute conviction that we are not to be shut up to “hopeless intellectual confusion,” as to the highest problems of thought and being.—It is to this they now are challenged.*

The CHAIRMAN.—I am sure our thanks are due to Dr. Irons for his exceedingly interesting paper. After the reading of a communication from the authors of “The Unseen Universe,” it will be open for those present to offer remarks.

The HON. SECRETARY then read the following communication :—

“As the subject of discussion is one in which we take a great interest, we may be allowed to say that we are not quite sure the point of view of the authors of “The Unseen Universe” has been rendered sufficiently clear.

* On these subjects “Life,” “Power,” and “Force,” I would refer to Vol. VI. of the *Transactions of the Victoria Institute*, p. 304, and Vol. IX. p. 366 (in which Crystallization also is noticed). And I may further add, Vol. VII. p. 145,—where what is said on the human brain, and on the muscular and nervous systems, may be compared with our authors’ views of Physical Memory.

"It appears to us that scientific logic points to an unseen universe, and scientific analogy to the spirituality of the unseen.

"We have great difficulty in believing that science can do more, and think that with regard to any further knowledge of the spiritual side of the unseen we must rely upon the testimony that has reached us from this region—or in other words—Revelation.

"There is thus a species of testimony which is entirely above science, using the word in its usual acceptation. The only question is whether along with this testimony we have not certain references to a region of things which perhaps scientific thought can approach to, and whether the two statements are consistent with each other. This possibly is a point on which different minds will always differ—to our minds there is a strong consistency between what may be called these two accounts."*

MR. W. E. W. MORRISON.—I have read the book entitled "The Unseen Universe" with very great care; and I have also read Professor Clifford's article upon it in the *Fortnightly Review*. In the first place, with reference to Dr. Irons' analysis of the book, there was one point which he did not appear to me quite to grasp. In reference to a breach of continuity in the creation of matter from a perfect fluid, he accuses the author of adopting the theory of Sir William Thomson—the theory of vortex rings in a perfect fluid.

DR. IRONS.—No. I said they hesitated to adopt it.

MR. MORRISON.—Yes; but you say they do nearly adopt it, whereas they do not adopt it, but put it aside for a theory of their own. They say that we were developed out of an imperfect fluid which forms the unseen universe around us, and that that unseen universe is generated from another, still more refined, and so on, until we are led up finally to the Creator. But Dr. Irons does not lay sufficient stress upon one important fact, namely, that however far these writers go, their theory leaves a breach of continuity at the point where the highest universe in the ascending scale connects itself with the Creator, although they say that such a breach is unscientific. If, they say, the unseen universe is conditioned, the Creator cannot have formed it directly, because He is unconditioned, and such a thing would be a breach of continuity. Dr. Irons denies that the principle of continuity holds for ever, and that is really the vital question. If the believers in the scientific principle of continuity maintain that it is infinite, they never will find any position in which they can meet those who take the religious side. No one taking the religious side can accept any theory which denies the possibility of a breach of continuity. In treating of the miracles worked by Christ upon earth, the authors try to get over the fact that they are breaches of continuity, and they get hold of something like Malebranche's occasional

* "The authors of 'The Unseen Universe' do not homologate Dr. Irons statement of their purpose."

theory of the interposition of God. The Creator is able to anticipate certain points at which there will be apparent breaches, and in the form of the Second Person of the Trinity, He comes in and performs acts which are not really breaches of continuity, but which appear to be so. I do not know if I have grasped the meaning of the authors, but that is the only explanation I can arrive at as to their theory, when applied to miracles. It appears to me that there is another attempt to join the three Persons of the Trinity in their action, which results in bringing in things which are totally incongruous, namely, where the several functions of the Trinity are made to represent different phenomena of matter and energy. There is one point which I should particularly like to bring before the attention of the meeting, and that is with reference to the disposition of energy. The theory of the book is, that the whole visible universe, matter, æther, and all, must come to an end. There is a constant change from one kind of energy to another—kinetic and potential—but there is also a loss of energy which is laid on the shelf and cannot be used again. Now the writers of "The Unseen Universe" have taken up some experiments by Clark Maxwell, and they suggest the possibility of energy being renewed after it is apparently dead. I should liked to have had this discussed from a scientific point of view, because they do not appear to me to have proved their case. They represent Clark Maxwell, with reference to energy in atoms, setting to work by means of imaginary "demons" opening and shutting little doors in a firm partition whereby the atoms are compelled to work. But I object that these "demons" are actual external forces, for I maintain that the authors of the book, so far as their own theory leads them, must arrive at absolute deadness of energy, and I think the immortality they promise is nothing but annihilation. There was one point on which Dr. Irons was not altogether satisfactory to me. He objected to the Creator being put off for so many universes, on the sentimental ground that the Christian would never know his Father. Now, if you arrive at an unconditioned universe you arrive at intellectual deadness. To say that a Christian is to arrive at that, and is to go no further, is to offer him nothing better than Buddha's annihilation, but the authors of "The Unseen Universe" do offer at least a perpetual eternity of conditioned universes one above another, and I cannot myself imagine a more entire fulfilment of all the desires of Christians than that of perpetual growth from one state or condition to another and higher state. (Cheers.)

Rev. Dr. Rigg.—I have listened with great pleasure and satisfaction to the remarks made by the gentleman who addressed us last. One cannot help feeling, in reading the book entitled "The Unseen Universe," that we have in it a singular reproduction of very ancient theories and terms—that, in fact, it is a form of Platonism reproduced. You have the ideal world invisible, but from which the whole visible world has come forth into concrete form and existence, and that ideal world is the abode of the originals of all things—is the fountain and cause of all things—is the kingdom and realm of all that is good and beautiful—and holy and eternal. Therefore, I say, we

have here a singular reproduction of ancient Platonism, though no doubt with a certain Swedenborgian light and colouring. Positivism is but a confession—an ignominious, ignoble confession of incapacity in the direction of all the nobler and higher attributes of our being. We cannot be content with simply acknowledging and cataloguing and classifying the facts. If we are to go into the world of causation, we cannot help going more or less into the spheres which these speculations bring before our view; because we have to collate our conceptions of that invisible world of causation with the world of phenomena and of effects, with all the varied wealth of scientific fact which scientific discovery has brought before our view. That wherever science meanders we must more or less have around us a margin of the invisible causal region, which must correspond with the meanderings, infinite and everlasting, of that scientific world. I myself hold that there must be a sphere with which this invisible sphere is implicated and intermingled—that there must be an unseen universe essentially related to this visible universe, anterior to it, at least in our conception, and transcending it; and which belongs also to the everlasting existences which lie around it: and I cannot help thinking that in this invisible region—this unseen universe—there must be continually dwelling and living, powers and forces, which are more or less involved in the great drama of this life which we have to live, and those events that have here to be worked out. This is not unscientific, as I believe, but perfectly scientific, and if this be borne in mind, it leaves a sufficient margin for the solution—no, I will not say for the solution, but for the harmonizing with all else that we know of those great and difficult questions which are perpetually perplexing us.

The further discussion of Dr. Irons' paper was postponed, and the meeting was then adjourned.

ORDINARY MEETING, 3rd JULY, 1876.

THE REV. R. THORNTON, D.D., V.P., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBERS :—Rev. C. Bannatyne, M.A. ; J. Sime, Esq., M.A., F.R.S.L. ;
D. V. Steuart, Esq. ; Rev. Professor H. Wace, M.A.

ASSOCIATES :—The Right Rev. the Lord Bishop of Adelaide ; Rev. C. Churchill ; Rev. S. T. Gibson, B.D. ; Rev. R. Linton, B.A. ; A. D. Robertson, Esq. ; Rev. W. M. Sinclair, M.A. (life) ; Rev. W. H. B. Stocker, M.A. ; Rev. I. P. Thompson, D.D. (Berlin).

Also the presentation of the following Works for the Library ;

- “ Proceedings of the Royal Society,” No. 168. *From the Society.*
 “ Proceedings of the Royal Geographical Society,” Part IV. *Ditto.*
 “ Proceedings of the Geological Society,” Part 36. *Ditto.*
 “ Proceedings of the Society of Biblical Archæology,” Vol. IV. *Ditto.*
 “ Complete Catalogue of South Kensington Museum.” *From the Museum.*
 “ On the History of the Bible.” *From the Author.*
 “ Professor Tyndall and his Opponents.” By Dr. J. M. Winn. *Ditto.*
 “ La Terre de Basçan.” By A. Lombard. *Ditto.*

The CHAIRMAN then announced that the discussion on Dr. Irons' paper would be resumed.

Rev. Prebendary IRONS, D.D.—I am most anxious that, before this paper is finally entered on the Transactions of the Society, every word should be fairly and fully examined. When one is expressing the opinions of other men, it is very difficult to be always quite exact, and I shall be indebted to any one who will show that I am mistaken in any of the positions I have attributed to the authors, or if I have in any degree erred as to details. What I have to suggest is this,—that the matter has required some care. I have done my best to put before you an exact statement of the meaning of the book, and I took the more interest in doing so, because, from my own religious point of view, the conclusions arrived at were too serious for me to be silent respecting them ; and if they had really been deducible from the premises, then I should have had greatly to revise many of my own previous thoughts. I have, however, in expressing myself

upon the purely religious points, endeavoured to avoid to the best of my power anything that would unduly trench upon special opinions of others ; and yet I hope that I have succeeded in making known and in helping you to think out the problems of the book. (Hear, hear.) The subject itself is, no doubt, the principle and, ultimately, the law of Continuity. That continuity holds clearly in the visible universe no one doubts. I am not aware that any one has ever doubted whether there is a real connection in the unseen universe both before or after the existence of this visible world, as stated in the work now before us. These authors from, as Professor Clifford said, the standpoint of a very high scientific reputation, declare that there is reason for supposing that before this universe began, we had some previous universe, physically considered, made of the same stuff, although in a more attenuated form ; and that the passage from the one universe to the other was effected at certain points by what are called luminiferous bridges of æther. At this point you find that Professor Clifford, in the *Fortnightly Review*, takes up the matter.

Rev. J. J. COXHEAD.—I rise for the purpose of making some remarks upon this subject, for without doubt the book entitled "The Unseen Universe" expresses opinions of a special character, which probably many members of an Institute of this kind would not hold. As regards the general purpose of the book, others more able than myself may be desirous of expressing an opinion ; hence my remarks shall be brief. The first thing that struck me on reading the book was that it was one of those works of which we have great need in these days, if we do not wish our opinions on the most important subjects to exist in our minds in a very confused form. Most of us are believers in revelation and in the traditional creeds of Christianity. Most of us are believers in the immortality of the soul and in the reality of an unseen spiritual universe replete with life. But of late days a school of philosophers has sprung up of great importance as to their intellectual acquirements and the amount of knowledge they possess. I will not say that this school has thrown considerable doubt on these old traditions and beliefs, but it has nevertheless advanced facts which, unless they are to be refuted, will certainly throw considerable hesitation and diffidence into that sort of certitude which we have hitherto possessed. When we hear a man like the late Mr. Fowell Buxton, in the interesting thoughts he has left behind him, stating that there can be no doubt whatever that the souls and bodies of men are to be regarded as one whole, and that in our thoughts, the soul and the mind and the intellect of man cannot be distinguished from his physical constitution, it seems to me that if we are to preserve intact our own belief, such a position needs to be met and confuted. Of course you are all aware of those theories to which I allude, namely, that there is not a single thought that passes through the human mind, not a single emotion of our soul, not a single act of our will, in fact, no phenomenon whatever, by which we can relate our consciousness to ourselves, which does not de-

pend, as the propounders of these theories have advanced, on physiological conclusions—upon some action taking place in that physical organ which we call the brain. Therefore the obvious conclusion to be derived from this is, that all the phenomena of life and of the soul, all the highest emotions of our nature, all our greatest thoughts, are nothing more nor less than mere modifications of the structure of the brain, and that when the brain and the corresponding nervous structure have passed away, then, according to this school of philosophers, all that we have or are, will have ceased to be for ever. Now, I believe such opinions as these are held by a very important school of physiologists ; it seems to me to have been the purpose and the object of the writers of this book to show, not on moral or on religious grounds, but on physical grounds, by an appeal to the laws of nature, that there is not that reason which some have thought for supposing that the phenomena of life depend on anything to which we have been in the habit of attributing the name of “matter.” The writers of this book have, therefore, taken up this notion of matter ; and as far as they have been able to throw light on what “matter” is, they have endeavoured to show that there is nothing in that which we call “matter,” in consequence of which, through any change that may take place in the aggregations of matter which we term “the brain,” to lead us to conclude that the phenomena of life will necessarily cease. I do not think, that in an argument of this character, we are to expect accuracy or demonstration. If the writers of the book have succeeded in throwing the slightest possible doubt on the theory that the facts of the phenomena of life alone depend on the physiological action of the brain, they have gone very far indeed to establish the truth of those principles to which they refer, namely, the existence of a soul, and the existence of an unseen world. The fact is, as Bishop Butler has said, that we are not to expect demonstrative or mathematical accuracy in speculations of this sort ; and Butler has himself set us the example in his famous book, the “Analogy,” by bringing forth arguments which, no doubt in his day were thought very sound, as to what we may call the physical character of the soul, and the living element that exists within us. We are all aware that Bishop Butler, in one of the chapters of his book, which is now passed over in all examinations, speaks of the bulk of the living being ; and he shows, that unless we have reason to suppose that the bulk of the living being is greater than the elementary particles of matter of which the universe consists, then we have no ground for thinking that the event, which we call death, will result in the destruction of the living powers. Now, if Bishop Butler could use an argument of that sort, we ought to be grateful to physicists of the eminence of the writers of “The Unseen Universe,” if, in appealing to recognized principles of science, or, at all events, to the principles of science that are recognized by the highest authorities, they think that they are able to show that there is nothing in what we know concerning the powers of life and of conscience, why in the event of death, they should cease to exist. Therefore we should understand

how the writers of the book argue on the nature of atoms. No doubt it is a most abstruse subject upon which to argue. No doubt it is very easy to joke concerning the nature of atoms, and the primordial elements of which the universe consists ; but the fact is, that the whole force of the argument on the other side depends on certain preconceived notions as to the nature of atoms. Those who believe that the phenomena of life are simply physiological in their character, argue on preconceived notions as to the necessary nature of atoms. They contend that the powers of life reside in the atomic structure of the body, and that when the atomic structure of the body is broken, and when the atoms are scattered to the winds—or at all events those atoms which we think we can see, and which we believe are scattered to the winds—and have ceased to exist, then the soul, and the man, and the individual also cease to exist. But the writers of the book go deeper than this. They ask, what do we know about atoms ? and they go on to prove that, as far as we can tell, and as far as the highest authorities on these subjects lead us to believe, these atoms are not the primitive and primordial elements of which the universe consists, but that there is every reason to believe, that before the atoms there was another substance, out of which the atoms, through the aggregation of which the universe consists, were made to exist. If this be the case, the arguments of those philosophers who base their theory on the existence of atoms, is at once met. The fact of death taking place does not prove that the powers of life will cease to exist, because, by the very constitution of atoms there may be something in them which when the body ceases to exist causes to reside in them certain forces, which can never decay, and which will endure when the grosser and more palpable atoms have ceased to exist. Whether we consider that the universe has been developed out of vortices in an imperfect fluid, or from vortices in a perfect fluid, the argument remains the same : for if the vortices should cease, yet the fluid out of which the vortices have been generated, will still exist, so that if the visible universe cease to exist, yet the invisible universe will remain. And it seems to me that if this is shown, if any possible surmise is left in our minds that this may be the case, the argument of the materialists has received a great blow ; and we may be thankful to the writers of this book for bringing before us the only true method on which any true thought on this subject is possible. (Hear, hear.) It is impossible to hold in our minds propositions diametrically opposed to one another. We must have some bridge over which we can project these two ranges of our thoughts, namely, the ranges of our scientific thought, and of our religious thought ; and although I do not doubt that the writers of the book will be the first to acknowledge that they have not completely done that which they attempted to do, we may be thankful to them that they have done as much as they can, to show to us a method by which all the branches and spheres of thought on this subject may be brought into that complete unity, of which we know all truth consists. (Hear, hear.)

Rev. F. N. OXENHAM.—I suppose we shall all agree in thinking that the question now before us is one with which we ought to have the highest sympathy. The book we are considering endeavours to supply an additional ground for a reasonable faith in immortality, to those persons who feel that the grounds they at present possess are insufficient to their minds. I suppose we shall all of us have the heartiest sympathy with any effort that has this object in view. At the same time, it seems to me that we owe a great debt to Dr. Irons for having pointed out to us, that, with this admirable object in view, the writers of the book have not merely gone about their purpose in a wrong way, in which it is very difficult for us to follow with any satisfaction ; but that, further than this, admitting their premises and arguments, they land us in conclusions which, after all, fail to fulfil the object they have in view. I hope I may take this resumé of the book, which I understand Dr. Irons has submitted to the authors.

Dr. IRONS.—Allow me to explain. Professor Tait has written to me, and I have written to him in reply. He objects to certain phrases ; he finds no fault as far as I perceive with the current of my argument—none whatever, and I have written to assure him that every phrase that can be objected to, or that seems in any way not to represent his book, so far as it can be represented in so short a compass, shall be carefully revised before the paper is placed on the records of this Institute ; as it would not be worthy of this society to put upon record an unfair representation of a great book coming from such men. I am anxious that, now or hereafter, any person who will kindly suggest to me anything that will make the paper more exact will do so by communicating directly with me. My paper was written when the third edition of “The Unseen Universe” was just published. I bought the first and the third editions, but I am told that the book has gone through four or five editions. I am not aware that these contain anything new, but Professor Tait assures me that several points are modified in the later editions, especially with reference to the manner in which Christ’s miraculous appearance in this world took place. He thinks I shall alter what I have said on that point, and if so, and any one lends me the latest edition of the book, I shall be glad to see it ; but it is too much to expect that one should buy every edition of an author’s works. I assume that the different editions put forth are substantially the same in point of principle, and that, so far as the main argument is concerned, there can be no difference. Of course, I wish to be entirely exact as to the subject and the most revised thoughts of the authors, nor would I use one syllable which they do not acknowledge to be entirely just, as far as I can help it. Professor Tait objects to my prefatory outline of the argument, and wishes me to substitute for it his own table of contents. I have therefore placed the two side by side, for comparison : the notes are thus put together.

Mr. OXENHAM.—My only object in eliciting this explanation from Dr. Irons was, that as I had not read the last edition I was not sure whether

it might not be unfair to the authors to quote the earlier edition. I ventured to say just now that I thought we were indebted to Dr. Irons for pointing out, not merely the unsatisfactory method which these writers have adopted with an admirable purpose in view, but also the unsatisfactory conclusions to which they have led us. I was much struck, a little time ago, when talking about this book with a well-known very clear-headed scientific man ; he said that it was an hypothesis on an hypothesis ; the first hypothesis being, that the law of continuity observed in the existing universe stretched back to before the beginning of the existing universe, and the second being, that there must have been a previous universe in which that law could have prevailed ; and from these two hypotheses it was most reasonable to conclude that in the next change that takes place in this universe, the same law of continuity will reach on into the then succeeding universe. It seems to me, if I may venture to say so, having but small pretensions to scientific knowledge, that the writers of this book have fallen into this fundamental error,—that they have applied the principles of material science to a subject to which those principles are not really applicable, and having done so, they are not merely unsatisfactory in their method of proceeding, but they are also unsatisfactory in their conclusions. I was reminded, as I read page after page of what I may call an argument for material immateriality, of a somewhat grotesque objection, which I remember seeing some time ago—a mediæval one, of the time of Queen Elizabeth—an objection to the extreme irreligiousness of leaden coffins. It was said : suppose a person were accidentally buried alive ; if he were in a wooden coffin it would not be absolutely close, but if the coffin were of lead there would not be the smallest aperture, so closely would it be soldered together, through which the soul of the buried person could escape. Of course the supposition was that there would be a chink in a wooden coffin to allow the soul to pass out. This does not seem to me going further in principle than the argument used in “The Unseen Universe” as to material immortality. I think, in looking carefully at this book, that the writers in proceeding by this mode of argument, applying the laws of material science to the unseen universe, land us in these two conclusions (it would be unjust to the authors to say they do so intentionally), one being a belief in a material pantheism, and the second a belief in a mechanical immortality. Now, it seems to me that, even supposing their course of argument had been convincing, these are not the conclusions to which we wish to be brought. Therefore it is very satisfactory to find that the mode of argument by which we arrive at these conclusions is a mode of argument which *per se* we cannot adopt. I should like to point out one or two defects, which *primâ facie* occur in the earlier part of the book, and which are referred to in this paper. I allude to the fundamental error which, as I conceive, the authors make in trying to apply mechanical laws to the unseen universe. Dr. Irons says in the beginning of his paper, “Is there anything in science, or its admitted conclusions, which

leads to a denial of human immortality? Our authors think not." Now, of course, I am quite at one with them in not denying human immortality, but I say that, as far as science is concerned, the immortality of the soul affords no opportunity for investigation or experiment, properly so called, therefore *à priori*, it is impossible that the laws of science can either prove or disprove the immortality of the soul: and if this be so, we ought freely to admit that on scientific grounds we cannot deny the immortality of the soul, that being a matter to which the laws of science not only do not, but cannot apply. Therefore, instead of hailing this admission of the scientific possibility of the soul's immortality as a present given by scientific men to religious people, I for one say that I do not like the present; it leads us wrong. That is the first defect; then there comes another. I will not call it a defect, but a wrong argument, calculated to lead us astray. Our authors give us an interesting *resumé* of old opinions as to immortality, and Dr. Irons represents them as saying—and as far as my memory goes he is quite correct—"As to some 'Unseen Universe' there has been almost a *consensus* of belief"; but that almost universal "consensus" has never, with one exception, been grounded on principles of physical science. In the case of Plato it was merely a philosophic guess, grounded on the probabilities of observation and philosophical research, and we all know that the highest conclusion Plato came to was that, after all, he was not quite certain whether there was immortality or not. In his case it was, as I have said, a mere philosophic guess. But in other cases it may have been a religious conviction, as it was in the case of Job, not grounded on investigation, but grounded either on intuition, or inspired perception. But these writers have not told us, and they could not do so, that in any one single instance in ancient times the belief in immortality was grounded on the application of the principles of science to the unseen world. The one exception, which I do not wish to dwell upon, is to be found in the philosophy of Swedenborg; but I do not profess to understand that learned but obscure writer: as far however, as I do understand him, it seems to me that he reasons on material principles for a belief in immortality. I only mention this because in fairness I did not wish to say that there was no writer who grounded the hope of immortality on physical principles, for I think that Swedenborg did. I will here call attention to one more point. These writers take certain scientific terms, having certain technical meanings, and apply them to the unseen world and to the highest object in it, and then we are led to one of two alternatives, either God is not what we believe Him to be, or He has not done what He says He has done—I refer here to the arguments derived from the use of the words "infinite," "absolute," and "unconditioned," which many apply to God. If you apply these terms in their strict technical meaning, you exclude God from the universe, from creation, from all relation to ourselves. If it were not that I am now dealing with a very grave subject, I should almost call it an *argumentum absurdum*. If it be true that God

is "The Absolute," He cannot stand in relation to this world as its Creator ; for "The Absolute" has no relation towards anything. And so with regard to the term "unconditioned." If God is literally "The Unconditioned"—that is to say, is not limited in any way by any condition of relationship to others, He cannot be related to them as their Creator—He cannot be limited in any way. These words are applied again and again to God and creation, and we are led to the conclusion which Dr. Irons quotes :—"The statement is made afterwards that 'the conditioned cannot proceed from the unconditioned,' therefore, since all creation is "conditioned," and since God is "unconditioned," creation cannot have proceeded from God, *i.e.* God is not the Creator. Now, I do not for a moment suppose that the writers of this book really wish to land their readers in the conclusion that Almighty God is not the Creator,—indeed they deny this conclusion in one passage, p. 72, 4th ed. ; but if you take their technical philosophical terms and press them to their necessary results, you cannot escape the conclusion I have pointed out. There is another point where we come to the question about the "reality" of mind or matter. The writers ask whether the necessity of conceiving some "embodiment" does not show that there is a "reality about matter which there is not about mind." Now, here again we have the material scientific conception carried into the immaterial world and producing a difficulty. What do they mean by the word "reality" ? If by "real" you mean something capable of being investigated and analyzed, something of which the senses are cognizant, something the existence of which you can prove by scientific means, then no doubt mind is not "real" : but if you mean by "real" something which has an active and positive existence, then all the argument goes to show that mind is "real." What I wish to show is that, all along the course of this argument, we are not only led towards many unsatisfactory conclusions, but we are landed in immense difficulties. At sec. 14 of the paper it is asserted that a continuity of necessity, not of causation, is implied. Of course it is ; the moment you have got material laws there is "necessity," as those laws will be invariable. As soon as you impress the laws of material science on a subject, you get the material "necessity" directly. You cannot escape from that. Then, there is one word which rather puzzled me, and I want to know whether it is not possible that the word "rationality" is a misprint. It says at the end of sec. 15, "Till the universe itself comes to an end ;—though, we suppose, even then the law would remain the condition of all possible rationality." I suppose Dr. Irons meant "the condition of all possible material existence."

Dr. IRONS.—My intention in that parenthetical remark was, that we could not be rational unless there was continuity as the condition of all possible rationality. We could not go on without it. We could not think unless there were some continuity as the condition of thought itself.

Mr. OXENHAM.—There are other places in which defects are alluded to, but I will only point to two cases, which appear to establish the truth of

what I said just now, that this course of argument is unsatisfactory in itself. I ventured to say that we were led to these conclusions ; on the one hand material pantheism, and on the other mechanical immortality. In sec. 30 of the paper, I think the argument justifies this statement, but do not wish to be unjust. It is there stated—"We must think the great whole to be infinite in energy, and that it will last from eternity to eternity." Now this excludes the Creator from eternity to eternity. It gathers up in itself a self-moving energy which began *ab initio*, and continues by an unvarying law from eternity to eternity. What is this but material pantheism ? But the writers go on to say that they believe in God ; but God the Father is a remote sort of being with whom we have no kind of fellowship ; from Him there have been derived two developing agencies—the Second Person in the Blessed Trinity and the Holy Ghost. And here I may say that I wish to speak with all reverence on so grave a subject, and that, in what I am stating, I am only trying to repeat the conclusions to which this book leads us. You have first the Eternal Father, unconditioned and unapproachable in act, or conception by any of His creatures : next, God the Son, who is "a developing agency," having proceeded from the Father.

Dr. IRONS.—Such a Being is represented in the following paragraph in the book :—

"What means this mysterious, infinitely energetic, intelligent, developing agency residing *in* the universe and therefore in some sense conditioned ? In endeavouring to reply to this question we cannot do better than consult the Christian records."

Mr. OXENHAM.—An intelligent developing agency residing in the universe ?

Dr. IRONS.—They explain:—It is, they believe, a prevalent idea among theologians that the passages which they have been quoting from Scripture "indicate, in the first place, the existence of an unapproachable Creator, the unconditioned One who is spoken of as God the Father, and that they also indicate the existence of another being of the same substance as the Father, but different in person, and who has agreed to develop the will of the Father, and thus in some mysterious way to submit to conditions and to enter into the universe. The relation of this Being to the Father is expressed in Hebrews, in the words of the Psalmist, 'Then, said I, Lo, I come ; in the volume of the book it is written of me, I delight to do thy will, O my God ; yea, thy law is within my heart.' In fine, such a Being would represent that conditioned yet infinitely powerful developing agent to which the universe objectively considered would appear to lead up."—That passage, I think, is a fair justification of the passage in my paper.

Mr. OXENHAM.—There is a considerable difference whether you say an "agent" or an "agency" ; but it is quite clear, from my recollection of the book and of the passage you have read, that the distinction between "an agency," which is a mere abstract force, and "an agent," who is an individual

person, is not carefully observed. But this is only a subsidiary point. I want to remark that the God, here put before us, is the God of a Trinity, the First Person of whom is absolutely unapproachable and has no connection with us, so that it is untrue to say that "our fellowship is with the Father and with His Son Jesus Christ." And with regard to the Third Person, I could not see, when I was reading the book, why there should be any third person at all as an eternal developing "agency of life." The first principle is that of an eternal developing "agency of energy," and then we have an eternal developing "agency of life." I could not gather why, on scientific principles, there should have been these two developing agencies,—why the one developing agency should not have developed life as well as energy; and it appears to me that the second agency was only supposed, and given a distinct work, in order to meet what is conceived to be the notion of Christianity. I cannot say that I can see from the book any reason, on scientific principles, why there should have been two of these emanations in order to carry on the work.

Dr. IRONS.—The reason is that energy and life evidently did not come into being at the same time. That is the writers' theory—that the two things were distinct creations—that the Second Person in the Trinity is the Founder and Creator of energy, and that the Third Person in the Trinity is "the Lord and Giver of Life,"—a phrase which they skilfully adopt.

Mr. OXENHAM.—You are landed in a speculative difficulty as to whether life can exist without energy. This appears to me to be a very unsatisfactory notion of God. Let me next observe as to the second conclusion to which our authors bring us, that is to say, the description of immortality in which they are landed, that it is an immortality which is the necessary result of the material development of atoms. Of course it is needless to say that if immortality is a necessary result of the material development of atoms, we can have nothing whatever to do with any "hope" of immortality. Where you bring mere physical laws of cause and effect into the question, nobody thinks of moral causes. In sec. 39 of the paper, Dr. Irons says:—

"Thus also, the prospect itself of immortality, on any such theory of eternal and mechanical continuity, is fundamentally changed from that of a promise, a hope, an aspiration for the individual, to that of a physical, or transphysical certainty of a consecutive order of perpetual transitions, in which Personality (which is now supposed for all of us), need not, perhaps could not survive. To know that after the present life we, and all other existences, necessarily pass into another and differently conditioned Universe, and when that also is ended, as it will end, then pass on into another, a thinner and remoter Universe, still differently conditioned, and so on, and on, and *ad infinitum*, is at least different from the personal hope and expectation, of the Christian, that after this life, he personally shall be 'for ever with the Lord.'"

And Dr. Irons adds, with great force, and without going in the least degree beyond the truth, that "To call the two ideas by one name, 'Immortality,' is at least misleading, though necessary to our authors' scheme." I am quite

sure that all of us here welcome the investigations of science, and any help that science has certainly to give in rectifying mistaken religious notions ; but I do think we ought to be very careful indeed when we move, or help others to move, off the old ground of a belief in God's Revelation, in order to show that there is other ground on which a belief in immortality may rest,—viz. the laws of material science taken to support those hopes for the future, which, in reality, must rest, if they rest at all firmly, on totally different grounds. Let me say that I have the greatest possible sympathy with any effort to increase the grounds of our hope of a world beyond the grave, but I do think we are doing those, to whom we address ourselves, the greatest injury and unkindness in coming to them with arguments in which we invite them to rest their hopes of a future on grounds, which must be found perfectly worthless when the testing time comes. Therefore I, for one, am most heartily thankful to Dr. Irons for having pointed out to this Institute, as I hope he has done to a much wider circle of thoughtful people, that these authors have, with the very best intentions, gone the wrong way to prove their conclusions ; and that in the end they only land us in conclusions in which we do not wish to be landed. They offer us a hope of "immortality," such as we do not want to have ; they offer us a proof of the existence of such a "God" as we would rather not believe in. (Hear, hear.)

Rev. MALCOLM MACCOLL.—I have read Dr. Irons' essay—I cannot say with very great care, because I only got it very recently ; but the book it deals with I have read in all its editions, and I think I know the general drift of the argument pretty well. I am bound to say I think that Dr. Irons, as far as he has analyzed the book, has done the authors the fullest justice. Where I disagree with him is, not in his representations of the arguments of the book, but in much of his criticism upon it. I do not wish to weary you, but as I take the opposite side, I should like to meet some of the objections raised by Dr. Irons. Some remarks have been made as to the use of the phrase "unconditioned," which is used throughout the book. The same phrase is used by Dr. Mansel in the Bampton Lectures, and what is his object there ? Why, to show that the revelation God has made to us of Himself is not absolute knowledge but relative knowledge. It is quite true that our notion of a God who is eternal and absolute, is technically inconsistent with our conception of God the Creator ; but it is equally inconsistent with our notion of God the Eternal and Absolute, to call Him the Father. The condition of sonship you can reduce to absurdity also. There is hardly a phrase taken by itself, apart from history and technical use, that is not open to criticism ; and the way to regard this book is from the point of view taken by the authors, first, as to the purpose they had in their mind in writing it, and, secondly, as to the sense in which they use the language employed. Take what they say in the preface to the second edition :—

"Many of our critics seem to fancy that we presume to attempt such an absurdity as a demonstration of Christian truth from a mere physical basis !

We simply confute those who (in the outraged name of science) have asserted that science is incompatible with religion. Surely it is not *we* who are dogmatists, but those who assert that the principles and well-ascertained conclusions of science are antagonistic to Christianity and immortality. If in the course of our discussion we are to some extent constructors, and find analogies in nature which seem to us to throw light upon the doctrines of Christianity; yet in the main our object has rather been to break down unfounded objections than to construct apologetic arguments. These we leave to the theologian. The Bishop of Manchester has very clearly described our position by stating that (*from a purely physical point of view*) we 'contend for the possibility of immortality and of a personal God.'

The authors compose a book, not as Mr. Oxenham urged, to prove by physical argument the immortality of the soul; they do not attempt anything so absurd; but a great many people do argue that the soul does not exist after death, and the book is written to convince them that it may. A number of persons, Professor Clifford among them, argue that the notion of immortality is absurd. Those men say, "We are physical science philosophers, we take up your point and we demonstrate that there is no absurdity. We do not undertake to demonstrate that Christianity is true, but that the attacks on it are false." This is the way to look at the book. I will now read what I object to, if I may use the expression, in Dr. Irons' criticism. He says in sec. 42:—

"Here is their dilemma. To deny the distinct *beginning* of the Physical Universe is to remove the alleged scientific conclusion as to its end. When science ascertains that the Physical Universe will really *end*, it unequivocally infers its real beginning. But both end and beginning must be *real*. A Universe that eternally holds on from 'thin matter' into 'gross matter,' and at length 'continues' from the gross matter back to the thin, of course had no actual beginning, and will have no end; but is, as they elsewhere are obliged to say, 'Eternal.'"

I do not think that the authors' views of mechanical continuity are applied to the unseen universe; they are used with regard to this universe.

Dr. IRONS.—They say there is the same stuff—a thinner material, but the same physical material.

Mr. MACCOLL.—But they do not use the word mechanical as applied to the unseen universe.

Dr. IRONS.—I do not say that they did.

Mr. MACCOLL.—With respect to the authors' view with regard to eternity, the authors assert, as strongly as they can, their belief in an eternal God—the eternity of three persons, three living persons of one substance. And as to God the Father being unconditioned, there is St. Paul's saying, "Who only hath immortality, dwelling in the light which no man can approach unto; whom no man hath seen, nor can see." These are the words of inspiration in the Scriptures; the words of the authors do not go beyond this. We all believe that God dwells in eternal light, as St. Paul tells us. We must all admit some light, some luminiferous ether as existing co-

eternally with God, and the authors contend for nothing beyond. They say, how can you argue from the doctrine of continuity, that there is no God behind the visible framework of creation? They say the world has come into being somehow. How? Science can tell you nothing about it. Again, they say that science can tell you nothing about the origin of life. The doctrine of biogenesis is discarded by many of the greatest scientific men, including Huxley and others. Life is not to be accounted for by any scientific theory. But these writers say, Here are old records wonderfully in agreement with the conclusions of physical science. They tell us the time is coming when the stars shall fall from Heaven. That is now considered probable as one of the conclusions of astronomical science. It is conjectured that the sun and the attendant planets may fall into each other, and then into other suns, and that then the universe may be resolved into luminiferous ether. They do not call it physical immortality from beginning to end. They say the atoms are developed by an infinitely powerful Being out of an unseen substance. We must recollect that great liberty is claimed by the great Doctors of the Church. I might refer some of those who are here to-night to St. Augustine, who said :—"If God is Lord, He always had creatures obeying His dominion. He was before His creation, though at no time without it; preceding it, not in point of time, but by an abiding perpetuity." I admit that there are things in the book that I do not quite agree with. In sec. 36, in reference to the question of moral evil, Dr. Irons quoted the authors as saying, that "Evil is woven into the *essential* texture of the garments with which the Eternal God, our Father, has clothed Himself." But what do the authors say?—"We are thus drawn, if not absolutely forced, to surmise that the dark thread known as evil, is one which is very deeply woven into that garment of God which is called the Universe." This is not the same thing as saying, "Evil is woven into the essential texture of the garments with which the Eternal God, our Father, has clothed Himself." From the sense in which they use the phrase "eternity of evil," I cannot understand whether they apply it to the commencement as well as to the future: the paragraph on the subject does not clearly show this. I rather think it means the eternity of evil in the period that is to come, and not as applicable to the past from the beginning, though they say, in a parenthesis, that the New Testament points to a time when evil will come to an end; but they do not say this themselves. With regard to the statement, as to God being unconditioned, I should like to make one remark. Both Dr. Irons and Mr. Oxenham lay great stress on the authors calling God unconditioned, and incapable of being approached by His creatures; but theologians have asserted at all times, that we shall never know the Father, except through the Incarnation of the Son, and the Bible asserts the same thing. Now, I do not take the authors to mean what Dr. Irons seems to suppose in this passage, sec. 45 of his paper :—

"The Eternal Father, 'Whom to know,' we think, is 'life eternal,' (and Whom we do 'know by faith,' even now,) is placed, as they observe, 'as far

off as possible,' at the remote end of an 'illimitable avenue' of duly conditioned Universes. Unto Him the Son, as conditioned, seems to have no access."

I do not gather this from the book. It says He came out from the bosom of the Father; and the writers quote the passage, "Lo, I come; in the volume of the book it is written of me, I delight to do thy will, O my God." Then Dr. Irons says:—

"But the Son, the real Creator, was *always* God 'conditioned' as an 'Energy' forming the worlds. The Spirit is the 'Life-giving' conditioned Being, Who co-operates with the Creator of matter, or Son;—unless, possibly, 'matter' be eternal, and only 'energy' were created.

"Few Christians—believers that the Incarnation began at the Nativity—will accept this account of their faith, if nakedly put before them."

But the authors are not referring to the Incarnation at all in this place, but to the theological distinction between the Logos Endiathetos and the Logos Prophorikos—a distinction insisted on by Dr. Newman, when he says, "Endiathetos stands for the word as hid from everlasting in the bosom of the Father, while the Prophorikos is the Son sent forth into the world in apparent separation from God." It seems to me that the authors are in strict harmony with Newman's book on *the Arians* and with Mill's book on the Apostles' Creed, and that the objections vanish when the book is read in connection with the point of view taken by the authors themselves, after making allowance for certain points here and there.

Dr. IRONS.—I will only detain you a very short time, as I am not physically able to say much to-night. Almost every speech that has been made has contained valuable matter, and I must thank all the speakers, certainly not excepting the last. I think, however, that Mr. MacColl surprised me the most. He said I had made a statement that did not correspond with the book.

Mr. MACCOLL.—I said so of Dr. Irons' inferences, not of his statement.

Dr. IRONS.—Mr. MacColl quoted the statement as a quotation from the book that "Evil is woven into the *essential* texture of the garments with which the Eternal God, our Father, has clothed Himself." That passage seems to have appeared in inverted commas by some unobserved accident, and how it so came into the paper I do not know. But what I am most concerned in is, whether it is a true representation of the authors' meaning? whether they did not affirm that evil is not an accident, but that it is woven into the essential "texture of the garment."

Mr. MACCOLL.—There must be some mistake in my copy, because the passage is here given in inverted commas.

Dr. IRONS.—It is an accident which has occurred in this rough copy of the paper: a mere printer's accident which had escaped me. Evidently those quotation marks must come out; but the question is, whether the statement itself is a fair representation of the book? The point is, whether

the statement is a true one and fairly represents the authors' meaning? Hear what they say:—

“Just as the fire”—in the Gehenna—“was always kept up, and the worm ever active in the one, so are we forced to contemplate an enduring process in the other. For we cannot easily agree with those who would limit the existence of evil to the present world. We know that the matter of the whole of the visible universe is of a piece with that which we recognize here, and the beings of other worlds must be subject to accidental occurrences from their relation with the outer universe, in the same way as we are. But if there be accident, must there not be pain and death? Now, these are naturally associated in our minds with the presence of moral evil. We are thus drawn, if not absolutely forced, to surmise that the dark thread known as evil, is one which is very deeply woven into that garment of God which is called the universe. In fine, just as the arguments of this chapter lead us to regard the whole universe as eternal, . . . and therefore we cannot easily imagine the universe without its Gehenna.”

I have but summarized all this very briefly, using almost the very words, saying that “Evil is woven into the essential texture of the garment with which the Eternal God, our Father, has clothed Himself.”

Mr. MACCOLL.—There is however an essential difference.

Dr. IRONS.—I think not. I represent the actual meaning. I do not quote all the words, but I represent the meaning, and use the very words too.

Mr. MACCOLL.—What I wanted to put before you was that, as I understand them, the authors assert that life began outside the Trinity through the operation of the Third Person in the Trinity.

Dr. IRONS.—Energy, not life, according to our authors.

Mr. MACCOLL.—What I understand the passage to mean is that evil has existed since the creation of moral energy, and will probably exist always.

Dr. IRONS.—It is not for me to explain for our authors beyond saying that we are led by them to regard evil as eternal.

Mr. MACCOLL.—Eternal in the prospective.

Dr. IRONS.—No, in the past also. But I have a much more grave statement to make with regard to Mr. MacColl's own position. He actually supposes the theological doctrine of the Logos endiathetos to mean in fact a conditioned being, whereas the Catholic doctrine is that the Logos which existed eternally with the Father as endiathetos, became prophorikos or put out from God, at the time of the Incarnation.

Mr. MACCOLL.—Not at the time of the Incarnation.

Dr. IRONS.—I am stating what I believe to be the Catholic doctrine: you understand it to be something different. You think that the Logos endiathetos was the conditioned being.

Mr. MACCOLL.—Dr. Newman takes the view I have put forward.

Dr. IRONS.—Not that the Logos endiathetos is a conditioned being?—We have travelled to-day more over the theological peculiarities than the scientific difficulties, on which I had hoped some other persons would have

given us the benefit of their experience and wisdom. Probably the third chapter of the book is the best. There we have brought before us, in a most interesting and clear way, the fact that energy is an objective reality, existing in this visible universe; that it does not, although invisible, belong of necessity to the invisible universe. Energy is said to be contained in matter as its vehicle: matter, then, being the vehicle of energy, is declared to be both potential and kinetic, and there is a third form in which it is called heat. These facts however are put together so as to leave out entirely the idea of the origin of force; and it would not be too much to say that the existence of force is practically denied in the third chapter of this book; and I do not suppose the writers of the book would question this. Of course it is a subject of the most intense importance, and I did intend to have prepared something fit for you to listen to upon this subject to-night, but I have already stated why, during the last few days, this has been impossible. I think it would best become me now to thank you for giving so much attention to my paper, and to assure you that it still shall have all the care I can give it to make it worthy of this Institute; and when you receive it in your own homes, I hope you will study it with the knowledge that it has the approval of the writers of "The Unseen Universe," in so far that there is nothing in it misrepresenting the sentiments given in their book. The point I shall elaborate more fully is that which I have just glanced at—the doctrine of force. Allow me to point out one instance in which I have made a mistake, at all events in my judgment, of Professor Tait. I have said in sec. 66,—“Our authors’ half-avowed primary conception of a miracle really seems to be, that it is on purely physical principles a breach of continuity.” The word “conception” ought to have been in italics; what I meant was that it was the latent conception. Although they believed that the cause of a miracle was in the unseen universe, the force coming from without, yet in their idea it was the same kind of interruption which is assumed by almost all the modern writers on miracles; namely, that a miracle is something unaccountable on the ground of natural law. I think the writers would say, if they read the whole passage, that it is a full representation of the conception which underlies their whole treatment of the question of miracles; but if they prefer that I should express it differently, it shall certainly be done. I have to thank you very much for your attention. (Hear, hear.)

Rev. T. M. GORMAN.—*

The CHAIRMAN.—I have only one or two words to say. I think that all present must be glad that this discussion has taken place. The impression

* This speaker's remarks have not been returned to me; they were to the effect that in three instances at least, the authors of "The Unseen Universe," having relied upon a work by one of his biographers, had been betrayed into imputing views to Swedenborg, which were not to be found in his own writings.—Ed.

left on my mind from hearing the speeches is, that whilst many differ from Dr. Irons on one or two of the details, all, upon the whole, agree with him that the writers of the work are too materialistic, and ought to have brought in more of the spiritual.

The meeting was then adjourned.

REMARKS ON THE FOREGOING PAPER. By H. CADMAN
JONES, M.A., late Fellow of Trinity College, Cambridge.

At a time when objections brought in the name of science against the doctrines of revelation have obtained such currency, it might be expected that (to use the words of the authors of "The Unseen Universe") "those who have a profound belief that the true principles of science will be found in accordance with revelation," would "welcome any work whose object is to endeavour to reconcile the two fields of thought" occupied respectively by those who have faith in revelation, but not in the methods according to which men of science interpret the laws of nature, and by those who have faith in the latter but not in the former.

The work examined in Dr. Irons' paper was written with the above-mentioned object. The Victoria Institute is a body whose bond of union is a belief that the true principles of science will be found in accordance with revelation; but if that paper is to be taken as expressing the views of the Institute, their reception of the work is rather hostile than friendly. Does it deserve such a reception at their hands?

I venture to think that it does not, and without attempting a full discussion of the subject, I proceed to mention some material points in which the paper appears to me to do injustice to the work under review.

In the first place, it seems to be assumed throughout the paper that the object of the authors of "The Unseen Universe" was to work out a system of theology quite independently of the evidences, whether external or internal, on which Christian faith has hitherto been rested. This assumption pervades the whole of Part II. of the paper, and appears distinctly in sec. 47, where it is said of the authors, "The reasonable, the right, the absolute good, they have avoided as 'metaphysical,' and yet religion is their object"; by which the writer evidently means that their object is to establish the truth of religion.

Now it certainly was not the object of the authors to work out a system of theology, or even in any way to prove affirmatively the truth of religion. In the preface to the second edition they say—"Many of our critics seem to fancy that we presume to attempt such an absurdity as a demonstration of

Christian truth from a mere physical basis. We simply confute those who (in the outraged name of science) have asserted that science is incompatible with religion." Their work, as stated in sec. 51, is addressed to those who feel the force of the objections urged by some men of science against the immortality of man, and the existence of an invisible world, and do not see how to surmount them. Its object is to remove these objections, not to place religious belief on a new foundation. Thus, in sec. 245, the authors, after referring to the principle of continuity, say, "This leads us at once to the conception of an invisible universe, and to see that immortality is possible without a break of continuity. We have, however, no physical proof of it, unless we allow that Christ rose from the dead." Can there be a clearer proof than this that the authors never thought of placing Christian doctrines on any other than their old foundations?

The above misconception has naturally led the reviewer to place himself in an attitude of hostility to the work, as if the intention of the authors had been to abandon the old fortifications and erect new ones, whereas their aim is simply to silence a hostile battery.

It is difficult to examine satisfactorily many of the strictures contained in the paper, as the reviewer seldom gives a distinct reference to the passages which he considers to contain the propositions he impugns. Many of them are propositions which I cannot find in the work, and which, it appears to me, the authors would disavow. It requires to be shown in each instance that the proposition is either contained in the work or necessarily deducible from something contained in it.

Thus it should be shown that the work contains something to support the statement (paper, sec. 39) that the authors make "will, which acts from the unseen, a 'stuff' entirely subject to mechanical laws." The authors say, par. 93, "that there is something besides matter or stuff in the physical universe which has at least as much claim as matter to recognition as an objective reality"; and I have been unable to find anything in the work from which it can be deduced that "there is no power of alternative action in any conscious agent or cause."

Again—the views of immortality attributed to the authors are such as I apprehend they would emphatically repudiate. On what ground is it said (paper, sec. 48) that "Heaven is to them what the Emperor Hadrian's verses represent"? Does the statement (*ib.* sec. 39), "that after the present life we, and all other existences, necessarily pass into another and differently-conditioned universe, and when that also is ended, as it will end, then pass into another, a thinner and remoter universe, still differently conditioned, and so on and on, and *ad infinitum*," in any degree represent their views? I have been unable to find, in the only edition of the work which I have been able to examine, anything in favour of this infinite series. As regards the kind of happiness to be expected hereafter, it is true that the authors do not in terms state what is their own personal belief, and their work, being a scientific and not a religious one, such a confession of faith was

not called for; since science throws no light upon the subject; but few persons who have read sec. 247 will fail to infer that their conception of future happiness is something very different from that of "being an eternal molecule in a luminiferous ether" (paper, sec. 52).

The most startling proposition attributed to the authors is to be found in the Appendix, sec. 66. "Our authors' conception of a miracle, for instance, is that it is an unaccountable breach of continuity." Now the authors say distinctly, that a miracle is not a breach of continuity at all. "If," say they (sec. 237), "the invisible was able to produce the present visible universe with all its energy, it could, of course, *à priori*, very easily produce such transmutations of energy from the one universe into the other, as would account for the events which took place in Judea. Those events are therefore no longer to be regarded as absolute breaks of continuity, a thing which we have agreed to consider impossible, but only as the result of a peculiar action of the invisible upon the visible universe. When we dig up an ant-hill, we perform an operation which, to the inhabitants of the hill, is mysteriously perplexing, far transcending their experience; but we know very well that the whole affair happens without any breach of the continuity of the laws of the universe. In like manner the scientific difficulty, with regard to miracles, will, we think, entirely disappear if our view of the invisible universe be accepted; or, indeed, if any view be accepted that implies the presence in it of living beings much more powerful than ourselves."

Whether the views of the principle of continuity, which the paper attributes to the authors, are what they would indorse may well be questioned; and many more points might be mentioned in which the reviewer appears not to have rightly understood their positions. I cannot but think that if he had taken a more correct view of the scope of the work, he would have treated it in a different spirit.

The charge that the authors make the Deity impersonal, and place Him as far off as possible, is of more weight, as it appears to be supported by some expressions in the work which naturally tend to that conclusion. If, however, we take the book as a whole, I think that such is not the view to be derived from it. The authors consider (sec. 240) that there is no sufficient ground for denying the objective efficacy of prayer. Now, the objective efficacy of prayer addressed to an impersonal god appears simply inconceivable, and if it be admitted that God can hear and answer prayer, it can hardly be said that for any purpose material to Christian faith He is placed "as far off as possible" (sec. 85), or at the end of "an illimitable avenue" (sec. 86). These expressions, when taken in their context, seem to express in substance little more than the principle which leads us to such conclusions as (to take an instance given by the authors) that fossiliferous deposits came into their place through the operation of natural forces, and were not created at once as they are.

It is most important, in considering a treatise of this nature, to distinguish

between what is essential to the authors' view and what is merely accessory. The leading position of the authors I take to be this—that, proceeding solely on scientific grounds, we have reason to think that there is an unseen universe related to and acting upon that which is visible, and that there is no objection to supposing, but rather reason for believing, this unseen universe and its connection with the visible to be such as would remove the objections which have been urged on scientific grounds against the leading doctrines of revelation. Whether the writers have correct theological ideas as to the Trinity, whether the spiritual bodies with which we are to be clothed at the resurrection are now in course of formation or are to be created then, whether evil is eternal, are questions to which the principles of the authors give no certain answer, and their discussions on these points do not seem to affect the main object of the work. Probably the authors would admit that the remark which they have indorsed as to the world of spirits applies here,—that of these subjects “we cannot possibly know anything save by direct revelation.”

Though I belong to one of those classes for which, as the authors tell us, their book was not written, I still, however unworthy the reviewer (sec. 2) may consider such a feeling, profess myself grateful for it, not on my own account, but for the sake of the cause of truth. That so able an attempt to remove objections urged in the name of science against the resurrection of the dead, miracles, and the objective efficacy of prayer, should be met by believers in revelation with such strong censure and faint praise as are found in this paper, does not tend to lessen the distance between the two opposing schools of thought.

DR. IRONS' REPLY TO MR. H. CADMAN JONES'S REMARKS.

I am much obliged by Mr. Cadman Jones's courtesy in sending me a copy of his “remarks.” The difference of view between us is very great. I have tried to distinguish between the “theological conclusions” and the “scientific views” of these able writers. To the former I have tried to do justice, to the latter I have really done it. At least the reputed writers have not questioned it. If I had mistaken them in the least degree, I was ready, as they were informed, even to the last moment, to correct what I said. If my inferences are not the same as Mr. Cadman Jones's, it must be assigned to the difference of our logical ideas, and must be left to the general judgment of those who read my analysis, and *compare it carefully* with the work. The real service which “The Unseen Universe” has done I have amply acknowledged (secs. 63 and 64, &c.). I have taken pains to be fair, and I can,

with all my admiration of Professor Tait and Balfour Stewart, only repeat, with earnestness and sincerity, to Mr. Cadman Jones, or to any one else, "read *all* I have said—read it *again*—and you will agree with me." The rational faculty is not, after all, so very divergent in those who have it at all, but that I confidently cast myself on it.

As to the theological part of the subject, let me frankly say that I value truth above all things; but would not defend even truth with asperity. Yet I would not in theology, any more than in science, accept a false principle, on the chance of its doing good. The doctrine plainly avowed, of the "Eternal Father being wholly unknown and unloved," is to me utterly unchristian, and was formally repudiated, among other delusions of the Gnostics, in the Primitive Church, with a strength of language which I have abstained from using. Every word, every hint of a religious kind in my paper I submit to the catholic reason of the Christian Church. And as to Mr. Jones's defence of these able writers, it seems to me an appeal *ad misericordiam*.

I think I differ from my respected opponent Mr. Cadman Jones, also in the view he seems to entertain of the position and functions of our Institute. I do not think we are established to coax men into *any* kind of Christianity (such, *e. g.*, as may just arise from the doctrine of "Physical Continuity"). I must be logical. It is a necessity of my being; and I am sure that a species of religion which will not bear to be carried out logically (and I attempt nothing more in my paper) must relapse into scepticism. Not less than science, religion refuses to be illogical. I can no more flatter men on attaining half-truths in theology, than I could in astronomy or chemistry.

I wish distinctly to recognize Mr. Cadman Jones's view as a very natural one, and in my first sections I partly recognize it. But I think my way of treating such a work as that which is before us is more respectful by far than his, though he has so justly distinguished an authority as the *Church Quarterly Review* on his side; and I regret it. Scientific men, as a rule, like thoroughness. I am "thorough"; I cannot help it. I treat these men as great men—(which they are). Mr. Cadman Jones's method (and the strikingly able Review referred to also) would say, practically,—"What a fine thing it is for us followers of the Gospel of Christ to have such men even partly on our side! Don't scrutinize them too closely then; they mean well; as far as they go with us, let us accept them, and let them off easy, for the sake of the 'cause,' which they are looking hopefully to support!"—Now I think these eminent Professors would prefer my treatment to Mr. Cadman Jones's, and to the *Church Quarterly's*—much as I respect that able journal.

W. J. I.

ORDINARY MEETING, APRIL 9th, 1877.

THE REV. ROBINSON THORNTON, D.D., V.P., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBERS :—J. Dingley, Esq. ; H. F. Hall, Esq., F.G.S., F.R.H.S., President of the Liverpool Geological Society ; G. Harris, Esq., LL.D., F.R.H.S., F.S.A., Vice-President of the Anthropological Society of Great Britain.

ASSOCIATES :—Rev. T. Bliss, B.A. ; R. Sheward, Esq.

Also the presentation of the following Works to the Library :—

“Proceedings of the Royal Society.”	<i>From the Society.</i>
“Treatise on Man,” 2 vols. By G. Harris, Esq.	<i>The Author.</i>
“The Theory of the Arts,” 2 vols. By the same.	<i>Ditto.</i>
“Civilization Considered as a Science.” By the same.	<i>Ditto.</i>

The following paper was then read by the author :—

THE ETHICS OF BELIEF. By the Rev. HENRY WACE, M.A., Chaplain of Lincoln’s Inn, Professor of Ecclesiastical History in King’s College, London.

1. **T**HE subject of this Paper, as is indicated by its title, has been suggested by an Article contributed by Professor Clifford to the January number of the *Contemporary Review*. It is an article which has justly attracted a good deal of attention, not merely from its intrinsic force, but because it expresses very effectively a tone of thought which is peculiarly characteristic of an influential school of scientific scepticism. Little, indeed, if anything, is said which directly impugns the faith of Christians, though there are a good many oblique insinuations against it, and as will appear in the sequel, I venture to think that the tests of belief the article lays down are, on the whole, strongly confirmatory of the validity of Christian evidences, as generally received. There is, therefore, no occasion for anything like a polemical discussion of the subject, and this Paper will not, I trust, be conceived in

such a spirit. It is more congenial to the purpose of a society like this to consider the arguments of such an article as matter for friendly debate, and we shall be only responding to the appeal of their author if we institute an impartial inquiry into their value. At the same time it must be explained at the outset that the chief purpose of these observations is to call attention to an essential difference in principle between the spirit of Christian thought and the disposition of mind which the article in question represents. The difference is frequently disguised, or reluctantly recognised, on both sides; and it is the more desirable it should be distinctly acknowledged, and that the practical issue it involves should be fairly faced.

2. To state this difference concisely, it is whether in matters of religion and morals we are to build upon grounds of Faith or upon grounds of Science. In stating the issue in this form, it is not, of course, implied for a moment that there can be any conflict between the legitimate and ultimate results of the two principles. Their essential harmony is, and has always been, a primary axiom with the greatest Christian teachers, and to avow belief in it ought to be a superfluous precaution. The spirit of the following observations would again be wholly misunderstood if they were supposed to be prompted by any lack of sympathy with Science. But the best things, as a rule, have their special provinces and spheres of action, and it by no means follows, because the scientific spirit is admirable in itself, that it ought to be allowed to determine our religious thought and our moral conduct. Such, however, is the tacit assumption, not merely of Professor Clifford's article, but of a large proportion of modern argument on this subject, alike on the part of the advocates as on that of the impugners of the Christian Faith. Christianity seems too frequently regarded as a sort of scientific system, composed of a number of propositions on very mysterious subjects; and the question assumed to be at issue is the possibility or impossibility of verifying such propositions. Now, there may be some truth in this assumption with respect to the primary verities of religion, though the general reception even of these is probably to a great extent dependent on the testimony borne to them by those who exert most authority over men's consciences, rather than on the direct arguments in their favour. It is obvious also that there can be no absolute division between the two spheres in question. The scientific man will, in practice, often act on Belief, while the religious man will check the dictates of his faith by the aid of Reason and Science. But, nevertheless, there is this broad distinction to be drawn

—that the object in moral matters is to act, not only to act rightly, but to act promptly, and to act earnestly, while the object in matters of Science is to know, and to know accurately, and for that purpose to reserve a decision for as long a time as may be necessary. The consequence is that for the purposes of the former province the habit to be acquired is that of forming a rapid and positive judgment upon mere probabilities—those being, by the nature of the case, the only materials for judgment accessible; and the men who have the greatest weight with their fellows in practical life, and who become their natural leaders, are those who form such judgments the most boldly, and follow them with the least hesitation. But in the province of Science the habit to be acquired is that of not forming decided judgments upon mere probabilities; but, on the contrary, of suspecting all appearances, and of demanding the most rigid demonstration before laying down a scientific truth as a sure basis for action. Our whole attitude towards religious and moral controversies must, it would seem, depend on our recognizing at the outset the existence, as a matter of fact, of these distinct provinces of human life, together with the distinctness of the habits they respectively require, and determining to which of the two such controversies belong. According as we relegate them to one or the other, we shall approach them with different mental and moral dispositions, and the “Ethics” we apply to them will proportionately vary.

3. Now, in the article in question, this distinction has been so much overlooked that the special meaning of the word “belief” has been entirely left out of sight. It is a word of which the employment is somewhat vague in popular usage, but which will be generally recognized as possessing a fairly definite meaning for the purposes of such a discussion as the present. It is, at all events, very surprising to find that the distinction is not observed between belief and opinion—scarcely even between belief and knowledge. “Belief,” for instance, “that sacred faculty,” is described as being “rightly used on truths which have been established by long experience and waiting toil, and which have stood in the fierce light of free and fearless questioning.” But what occasion is there for the exercise of this sacred faculty on truths of this kind? They are simple matters of knowledge, if knowledge can be predicated of any mental condition. It would be incorrect to speak of believing the law of gravitation; we have a scientific knowledge of it. Belief is properly applied only to truths which are neither evident of themselves, like mathematical

axioms, nor scientifically established, like the law of gravitation, but which are simply probable. Nor does it in strictness apply to all of these. Where the probability arises from argument and from the nature of the case, our assent is not belief, but opinion. Faith or belief properly arises when our ground for accepting a statement is the testimony given in its favour. In the excellent definition of Bishop Pearson, "Belief is an assent to that which is credible, as credible"—not, that is, so far as it is probable, still less so far as it is demonstrable, but simply so far as it is supported by the evidence of credible witnesses. If we admit the testimony of Conscience as that of a kind of independent authority, bearing its witness within each individual soul, we may bring under this definition those primary religious and moral truths, to which, as Kant observed, our assent has the character of faith rather than of opinion. We can hardly expect a very accurate discussion of the Ethics of Belief when belief is thus confounded with another mental operation; and it is similarly impracticable to form a just estimate of the claims of the Christian Faith when it is treated not as that which is credible, but as that which is knowable.

4. Accordingly it may be described as the main doctrine of the article under discussion that the principles of scientific inquiry ought to be predominant not merely within the sphere of knowledge, but within the whole sphere covered by this vague extension of the word Belief. It commences by insisting on the duty of inquiry, and it treats this duty as always and everywhere incumbent upon us. "No simplicity of mind, no obscurity of station, can escape the universal duty of questioning all that we believe." Now this may be a very good rule within the domain of science, and may be a very proper attitude of mind for a scientific man; though it may be surmised with some confidence that Professor Clifford would not listen with much patience to any of those ingenious persons who exercise this universal duty by questioning the roundness of the earth, or the Newtonian system, or the impossibility of squaring the circle. But it may be safely said that, as applied to the practical business of life, such a principle is not only impracticable, but morally wrong. The daily course of life and the organization of society are made up of relations between man and man. Upon what are those relations founded? They are based, as a matter of fact, upon a general habit of mutual trust and faith. The child's first necessity is to believe what is told it, and to believe this in respect to matters which it has no power whatever of investigating for itself. Its instinct, the

first dictate of its nature, is to believe everything, to receive and to assimilate all that it hears and reads. If it be replied that it has sufficient evidence upon which to rest this habit in its experience of its father's and mother's trustworthiness, I would ask what parents would not be distressed to suppose that a child's confidence was based upon a mere calculating estimate of this kind? The essence of the filial relation is a moral confidence antecedent to experience, and capable, in fact, of sustaining severe apparent contradictions to that experience.

5. The case, however, of trust between adults is perhaps a still stronger instance of this principle. Life would be impracticable unless it were the primary rule to believe what is told us. There is not a single relation in adult life in which we are not compelled to depend upon the word of another—of a husband, a wife, a friend, an agent. We believe certain things respecting them—in their honour, their chastity, their affection, their faithfulness. To what kind of condition would life be reduced if we were to apply to these matters “the universal duty of questioning all that we believe”? In some, at all events, of these relations, it may be observed, it is in the nature of the case impossible that we should have “sufficient evidence” for our belief. It is an unquestionable fact that many a man who has been trusted, and who has for years borne an unexceptionable character, has proved faithless; and it is quite impossible I can be sure upon grounds of evidence respecting any particular man that he is incapable of this baseness. But the first condition of a genuine and honourable friendship is to believe this, to refuse to entertain a doubt of it, and, if need be, to uphold a friend's honour until he is absolutely proved dishonourable. With respect to trust exercised in commercial relations, it might perhaps be said that it is a mere application of the principle of probabilities. As a matter of experience, if customers are trusted, the majority of them will fulfil their engagements. It may be doubted whether tradesmen really do act in practice on this mere calculation of probabilities; but at all events the principle does not apply to the other relations of life just referred to. It would be an insult to a friend to say that you trusted and loved him because you thought it more probable he was true than that he was false. He expects from you, as the primary condition of true friendship, that you believe firmly concerning him that of which you cannot possibly have certain evidence.

6. This habit of mutual faith is, in fact, the necessary correlative of the primary duty of men. That duty is the observa-

tion of the Third Commandment—to speak the truth. But if it is the duty of my neighbour to speak the truth, it is equally my duty to believe that he does speak it. I have no right to suspect him of violating this obligation; and to do so is, in practice, to suggest the idea of falsehood to him, and to sow the seeds of it. A corrupt society is above all things marked by two characteristics—“a universal” habit “of questioning” all that is said, and an equally universal habit of saying what is not true. On the contrary, in a healthy society, like that of England, habits of trust and of truth mutually support each other; and it has now become, for instance, a principle of education that the best way to evoke truthfulness in boys is uniformly to assume that they are speaking the truth, and always to give them the benefit of a doubt, even when appearances are against them. In place, therefore, of Professor Clifford’s assertion that “the credulous man is father to the liar and the cheat; he lives in the bosom of this his family, and it is no marvel if he should become even as they are,” we should be much nearer the experience of practical life if we alleged this of the suspicious man. At all events, it may be safely said that the trustful man is father to the truth-speaking and the honest man; he lives in the bosom of this his family, and it is natural he should become even as they are. “With what measure ye mete withal, it shall be measured to you again”; and no more forcible appeal can be made to a man’s conscience than by placing trust in him.

7. Accordingly this principle, applied in its highest degree, has been the most powerful instrument of moral elevation and the indispensable means of all great achievements. In proportion as men have become as little children in this respect have they entered into the kingdoms both of heaven and of earth. It is an essential element in the power of great men, of those saints or men of genius who lift their race to a higher level, that they command the allegiance of numbers who are quite incompetent to judge whether there is sufficient evidence for the principles they assert. They throw the spell of personal influence over their followers, and induce them to act, with all the earnestness of intense belief, upon assumptions which it is impossible for them to verify. I will not insist on the well-worn example of Columbus and his followers, though it would be a somewhat harsh judgment to condemn them for having acted upon insufficient evidence in making the most momentous of geographical discoveries. But let us take the case, adduced by Professor Clifford, of the founders of those great

religions, which, with whatever errors and corruptions they have been associated, have still been, beyond question, advances in the elevation of the human race. Let us consider their influence, moreover, within the sphere in which it is admitted to have been legitimate—that of morality and of human experience. Has the chief instrument in these advances been as a matter of fact, the exercise of the duty of inquiry by the prophet's followers? It is very well, and, doubtless, very necessary, to lay down rules after the event as to the limits within which a prophet's authority may be accepted. But it is not by means of any such rules that the religion is established and the new morality enforced. It is by faith; by personal submission to the personal influence of the prophet, and by childlike obedience to him.

8. In matters of morality, in fact, this must always be the case, for moral habits can never to those who first adopt them be matters of experiment. If they are to be real, they must be adopted "with all the heart, with all the soul, with all the mind, and with all the strength." This, at all events, is the ideal to be aimed at; it expresses the spirit in which the most characteristic points of Christian morality were accepted, and it is utterly inconsistent with a doubting habit of mind. Professor Clifford admits that "there are many cases in which it is our duty to act upon probabilities, although the evidence is such as not to justify present belief; because it is precisely by such action, and by observation of its fruits, that evidence is got which may justify future belief. So that we have no reason to fear lest a habit of conscientious inquiry should paralyze the actions of our daily life." But if the observations just offered are valid, we have great reason to fear such a result from a habit of subordinating the duty of faith to the duty of inquiry. To repeat a question I have asked elsewhere,* what would be now the position of our race if the first Christians had confined themselves to tentative experiments on the relative advantages of monogamy and polygamy, instead of adopting the former in faith, in reliance on the testimony of the Apostles, and resolutely turning their backs upon the innumerable influences to the contrary which the heathen society of the day brought to bear upon them? In a word, if we are to be guided by the experience of mankind, Faith and not Science must determine the practical order of life. The Just, according to Professor Clifford, shall live by Doubt. But the lesson

* The Boyle Lectures for 1875. I. *The Province of Faith.*

alike of ordinary life and of the Scriptures is that the Just shall live by Faith.

9. Whereas, therefore, the first principle laid down in the article under discussion as belonging to the Ethics of Belief is "the duty of inquiry," it would be more true to nature to substitute "the duty of faith." Distinguishing Belief both from Opinion and from Knowledge, and restricting it, substantially, to the field of testimony, it may be laid down as the first principle of the subject that all testimony has a *primâ facie* claim to be believed, and that the *onus probandi* always lies upon those who question it. Such, perhaps, is in great measure the force of that appeal to authority in matters of opinion which has lately been discussed by two eminent writers. It seems too narrow an interpretation to say, as Sir James Stephen does, that "authority is only another name for the evidence of experts." In practice it is much more than this; the consentient belief of a large mass of mankind, even though the experts among them be comparatively few, having a distinct influence of its own. How far this influence may amount, as Mr. Gladstone has been understood to imply, to substantial evidence in favour of an impugned doctrine, would seem mainly to depend upon the character of the particular doctrine in question. The testimony of Christians to the fact that in their personal experience they have found the promises of the Gospel fulfilled must carry, for instance, and does carry, the greatest possible weight; but it can only afford indirect support to the truths beyond their experience which are alleged in the Creeds. It cannot, however, reasonably be denied that such general testimony constitutes a *primâ facie* claim in favour of a doctrine, and casts the burden of proof on those who question it. Our instinct—an instinct no less just than natural—is to believe what comes to us with such testimony, and from this instinct we must start.

10. But of course Faith, like all other instincts of nature, requires to be checked by the exercise of reason. It is like an appetite, a hunger or a thirst, which will insist on asserting itself, but which must nevertheless be controlled. To say, indeed, that a man who has no time to make himself a competent judge of disputable questions "should have no time to believe," is like saying that a man who has no time to study medicine should have no time to eat. A man must believe, whether he will or no. He must act every day of his life on the basis of certain moral and political—nay, religious assumptions, of which few men can be competent judges, and all that can be

asked of him is that he should give as thorough a consideration as his circumstances will allow to objections which are raised respecting them. It is perfectly easy, indeed, to imagine circumstances in which it is his clear duty to commit that "sin against mankind," as Professor Clifford designates it, of "keeping down and pushing away doubts which may arise in his mind." A naval officer who has once accepted a commission, and is in charge of a man-of-war, has no business to let himself be distracted in the enforcement of discipline by doubts respecting the justice of the Mutiny Act. When, moreover, a man has once fairly weighed the existing evidence for and against a certain truth, it is simply a mark of a weak and vacillating mind to be easily induced to re-open the inquiry. When, after full deliberation, we have taken one of two divergent roads, it is childish to be harking back at every difficulty and trying another track. Life was not made for men of science, but for men of action; and no man of action is good for anything if he cannot sometimes form a belief on insufficient evidence, and take a leap in the dark.

11. Nothing, however, is more certain than that it is the indispensable condition of progress to regulate by reason the action of even the most healthy instincts. Let the presumption only be established in favour of faith, as against scepticism, and there is nothing which is more desirable in the interests of a true faith than that the conditions under which it is accepted should be rigidly scrutinized. We may hope in this way to attain to some scientific as well as moral test for distinguishing true from false religious beliefs. Moreover, to every man who is capable of reasoning, the moment may come when he is confronted with some objection which imposes on him the duty of pausing in his course, and maturely judging of his position; while in proportion as opportunities allow him, he will be thankful to investigate anew the grounds of his faith, and to qualify himself to explain its reasonableness to enquirers or objectors. Accordingly, we may proceed with pleasure to enquire, with Professor Clifford, into the criteria to be adopted. In this part of his article he restricts himself with more accuracy to the proper meaning of belief, and simply investigates the conditions under which it is lawful to believe on the testimony of others. There appears to me, as I said at the outset, no reason to take material exception to the principles he here lays down. They are substantially those of Bishop Pearson—namely, that the credibility of testimony depends upon two conditions—first, the integrity, and secondly the ability of the witness. It is not enough to

have a firm conviction of his honesty ; we must also have ground for supposing that he has had the means of knowing the subject respecting which he testifies.

12. So far there is no difficulty. But our critic does not stop here. There can be no ground, we are told, for supposing that a man knows that which we, without ceasing to be men, could not be supposed to verify. This is, perhaps, a somewhat extreme and inconvenient mode of expression ; but it seems reasonable to admit that the testimony of a man with no other than human powers cannot be accepted in evidence of a fact beyond all natural capacity of human experience. It is clear, for instance, to take one cardinal point of our faith, that no mere human testimony can be adequate evidence, or any evidence at all, in support of the assurance that the Lord Jesus Christ will hereafter judge all men. But it may here be pointed out that this observation does but illustrate the coherence of Christian evidence. It is not upon mere human testimony that the assurance just mentioned is based. At this point the argument from miracles comes in, and by approaching it in this way its legitimate force may perhaps be more easily stated with accuracy. It seems overstating the case to say, as has been sometimes done, that the miracle is the proof of the doctrine. But this must at least be said, that it proves the person who propounds the doctrine to possess powers and to enjoy privileges which are beyond the ordinary range of humanity, and which transcend our measurement. In other words, we cease to be competent judges of such a witness's ability. He may, for aught we can judge, know things which are beyond human experience, just as he can do things which are beyond human powers. We are, therefore, thrown back upon the sole test of his integrity. Shall we, or shall we not, believe his testimony on his own unverified and unverifiable assurance ?

13. To this question I will return shortly ; but I would interpose one observation on a further principle laid down by Mr. Clifford, which might at first be supposed to render any belief in a miracle inadmissible. To believe a miracle is to believe something entirely beyond our experience ; and on what ground, it is asked, may we go beyond our experience in forming our beliefs ? The answer given is that we may do so when that which we believe is like that which we know, or, in other words, when it assumes a uniformity in Nature. I am not concerned to inquire whether this rule be adequate or admissible without qualification. It is sufficient to observe that whatever may be its validity, Christianity complies with

it by virtue of that analogy of Religion, natural and revealed, to the constitution and course of Nature, which is the subject of Bishop Butler's great work. Butler, following Origen, has met by anticipation any argument against supernatural revelation derived from the necessary unity and harmony—for "uniformity" is a very questionable word—of all divine operations. If, indeed, the word Nature be restricted to physical Nature, the harmony of miracles with its constitution and course is easily contested. But such a limitation simply begs the question, which is whether the moral and spiritual forces of human nature do not necessitate, under certain circumstances, a supersession of mere physical consequences. It is a matter of evidence whether instances of such supersession have occurred, and in considering the value of this evidence we are brought back to the question from which we started on this short digression.

14. That question is whether we can accept the testimony of persons whose competence as witnesses transcends our means of judgment on the sole assurance of their word. If the previous arguments of this paper have been valid, they will at least have advanced us one important step in considering this question. They will have shown that we must approach it from the moral rather than from the scientific point of view, and that we must consider it in relation to action, and not to speculation. The primary question is not, what are we to think? but what are we to do? These men—St. Paul, St. John, St. Peter—for reverential reasons I abstain from directly introducing into this discussion the Name which should be the most decisive of all—invite us to accept their guidance in life and their comfort in death, and to trust ourselves, body and soul, to the belief of their assurances. The function of the Christian Church and of its ministry is to bring that invitation home to every man's conscience, and as long as the Church performs its duty the appeal cannot be evaded. Shall we accept it, or shall we go elsewhere, to some modern guide, who will pronounce upon our duties and our destinies by the light of scientific forecast and legal evidence? The answer to that question can only be given individually, and its nature will depend, in the first instance, partly on the degree in which we retain that childlike habit of faith, of mutual trust between person and person, which I have endeavoured to vindicate as our normal and healthy disposition; and partly on the force with which the moral and spiritual power of such Saints lays hold of our souls. There are those to whom that force is overwhelming, and to

whom it appears idle to compare it with the moral force of other religious leaders. It touches at once the strongest and the tenderest fibres of the heart. It controls the fiercest passions and supports the gentlest. It is associated, in a manner which no similar influence has approached, with whatsoever things are true, whatsoever things are honest, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report. To those who are sufficiently sensible of this intense moral illumination, the supposition that it is associated with false testimony on matters of supreme moment is inconceivable. The case completely fulfils Hume's condition that, to establish a miracle, "the testimony be of such a kind that its falsehood would be more miraculous than the fact which it endeavours to establish." It seems idle to draw "psychological parallels," as has recently been attempted, between a moral giant like St. Paul and a worthy gentleman like Sir Matthew Hale, and still worse to compare the dark and confused morality of other Eastern religions with the grace and truth which came by Jesus Christ. His Apostles appeal to my whole being, to every moral sense of which I am conscious, to my weakness and my strength, my sin and my repentance, my intellect and my heart, and evoke towards themselves, and still more to One beyond themselves, that complete allegiance of the whole man which is designated Faith.* I do not pretend to have a scientific

* There could hardly be a better illustration of the claim of the Apostles in this respect than is afforded by the two following parables, which I take the liberty of extracting from Sir James Stephen's article on Authority in the current number of the *Nineteenth Century*. He appears to suggest their application to the claims of modern religious authorities. Whether or not those authorities would have occasion to shrink from such a test, there is nothing they would more desire than that it should be applied to the Apostles. Perhaps the strongest claim of Christ and His Apostles is that "they have proved themselves to be our superiors by appealing to the faculties"—above all the moral faculties—"which we have in common":—

A blind man and a seeing man were once discussing the existence of sight. The seeing man told the blind man that he had a faculty by which he could perceive innumerable things which he could neither hear, touch, smell, nor taste, and which were at a great distance from him. The blind man challenged the seeing man to prove his assertions. "That," said the seeing man, "is easily done. Hold me by the hand. You perceive that I am standing by you. I affirm that if you will walk fifty steps along the side of this wall, which you can touch with your hand, so as to be sure that you are moving straight on, you will find such and such objects, which I specifically describe, and as to the existence of which you can satisfy yourself by your own fingers."

The blind man admitted that the seeing man had proved his assertion.

knowledge of divine things, or to rest my convictions upon a scientific demonstration; but I can venture to say that "I know in Whom I have believed." Such a belief will be supported by collateral evidence, acquiring from age to age a cumulative and converging force; but its essential virtue will in all ages be derived from the vital sources of personal love and trust.

15. Such, I would suggest, are in substance the Ethics of Belief, as contra-distinguished from the Ethics of Science. Their essential peculiarity is that they are concerned in the first instance with our relation to certain persons, rather than to certain truths. They thus bring into play those obligations of trust and loyalty on which all social life is founded, and they render our religious convictions a matter of personal allegiance instead of mere opinion. The first question a Christian is asked is not whether he believes certain truths, but whether he believes in certain Persons; and he is a member of a perpetual society whose fundamental law is allegiance to its Head. The vitality of our religion and its influence for good have always been in proportion to the distinctness with which this characteristic element in it has been realized. In the early ages of Christianity, as Dr. Newman has shown, this personal devotion was predominant over all other influences, and constituted the supreme motive power of the Gospel. The great achievement of the Reformation was to revivify it, and to substitute a personal faith, involving trust in a person and self-surrender to Him, for mere habits of assent and formal obedience. The effect, wherever the Reformed teaching took root, was to revive at the same time the faculty of faith between man and man, and thus to reinvigorate society. Possibly a similar revival is equally desirable at the present day in order to hold in check the disintegrating forces now at work amongst us. We cannot, at all events, be too careful not to be driven from this ground in upholding

Of two men with eyes, A. and B., A. declared that he could see what went on in the sun, moon, and fixed stars, and that when he said "see" he meant not exactly common seeing, but a superior kind of seeing, very hard to describe to any one who did not possess it, which he called "intuing." B. (who had a good pair of eyes of his own of the common kind) challenged A. to read the *Times* newspaper at a distance at which B. could not read it. A. failed to do so. "Why," said B., "should I believe that you can 'intue' things in Sirius, when you cannot read small print on the other side of the room? If you want me to believe that you possess faculties of which I am destitute, you must prove yourself to be my superior by appealing to the faculties which we have in common."

or in propagating our religious belief. The question at issue in the first instance is not whether we think certain opinions on theological questions more tenable than others, but whether we believe certain men more worthy to be followed and trusted than others. Could their testimony be shown to be incompatible with truth scientifically established, of course their authority would be proportionally weakened, if not overthrown. But until this has been done the faith we have once pledged to them imposes on us obligations of trust and loyalty similar to those involved in other personal relations, and we can no more be always questioning their authority than we can be always investigating the faithfulness of a friend, a wife, or a husband. We are willing to entertain such an inquiry upon good cause shown; but our whole presumption is in favour of faith and not in favour of doubt. Of the two errors, it is safer in matters of practice, both for the individual and for society, to err on the side of belief and trust than on the side of doubt and hesitation.

16. Such considerations, it may be added, seem to have an important bearing on the question now under discussion as to the influence upon morality of a decline in religious belief. As the Dean of St. Paul's has observed, the question cannot be properly discussed unless it is understood definitely what belief and what morality are intended. But one thing is evident, that a decline in Christian belief involves a decline in the personal influence exerted by our Lord and by His Apostles. It is impossible that men who feel themselves competent, like most sceptical authors, to criticize the statements of St. John or St. Paul with as much freedom as those of any other teachers should submit themselves to their moral and spiritual influence as completely as Christians, who accept such Saints as supreme authorities, and believe them to have been in possession of truths far beyond our natural ken. The great personages of the New Testament must cease to be, in anything like the same degree as before, the personal guides and leaders of our moral and spiritual life. Whether morality in the abstract would lose in authority may be a matter for argument. But it seems scarcely questionable that Christian morality would in practice lose one of the most potent forces which sustain it. If we would avert such a misfortune, we must adhere to the old, and it is to be feared too much forgotten, Ethics of Belief.

The CHAIRMAN.—I am sure, from the applause, that I may return the

thanks of the society to Professor Wace for the excellent paper with which he has favoured us ; I now invite discussion upon it.*

The Rev. Principal RIGG.—I recognise, as we all must, the interest and importance of the subjects which have been raised. I confess, however, that I do not altogether go with the esteemed and able writer in the criticisms on the subject with which he has favoured us. For instance, it appears to me that the distinction between faith and science, which, as I apprehend, underlies the whole discussion, is much too absolute. As I understand, Professor Wace, throughout, uses the term science simply in the sense of natural science, and I do not find that the word is ever used in a wider sense.

Professor WACE.—That was not my intention.

Principal RIGG.—I think the word "science" is used throughout in the strict sense of that which can be absolutely demonstrated, which is just equivalent with natural science. But it appears to me that the word "science" should have a much wider meaning. We have been accustomed to read, and think, and speak, about moral science for instance, and I believe there is a basis for moral science. I do not myself find that the intuitional basis upon which moral science must rest, as all science must rest upon an intuitional basis, has been recognized in this paper. There is a very sharp line of demarcation indeed between faith and science. Science is what rests on demonstration—I am speaking now of the paper—faith is that which is antecedent to all demonstration, and not only so, but antecedent to all reasonable ground of belief ; that, as I apprehend, is the general purport of the paper. A child is to believe in and to trust its parent antecedent to all ground whatever for so doing ; a friend is to trust a friend antecedent to any ground for so doing. I confess that I cannot myself look upon the matter in this light. I do not think this would even furnish a basis for faith in the sense of that Church which professes to base all on authority. I think that if we consulted Dr. Newman's "Grammar of Assent," we should find that even that authority of the Church, for which he pleads, is made to rest on certain grounds which are different from authority, and which have in them a moral element. As to the case of the child, I apprehend that the reason why a child believes its parent is not antecedent to all ground : the relations between a parent and child, from its birth, have been such as to impress upon the unconscious convictions of the child, the assurance that the parent knows a great deal more than it knows, and is on the whole a safe guide, and that the parent means to do it good and not harm. These are convictions, wholly unconscious it may be, so far as any analysis is concerned in the child's own consciousness. Of course a child believes its father and its

* Amongst those specially invited for this evening were the Duke of Argyll and Professor Clifford ; the former wrote expressing his regret that he could not hear the paper read, being at present unable to attend any meetings.

mother, until experience, it may be, has brought some counter evidence which teaches that though the parent may love the child, and know more, and wisely guide it, and mean well by it, yet for some reason or other, owing to the parent's ignorance or folly, or worse, for sometimes the parent will deceive the child ; but I do not apprehend that the first trust is a trust without a basis. It rests on a basis, and on a true intuitional basis too, and it is consequently a trust to be recognized as related distinctly to science, to moral science. It appears to me that all our beliefs rest upon induction, more or less imperfect, coupled, it may be, with the verification which is afforded by experience. A belief in the case that I have just referred to rests upon imperfect induction, unconsciously performed, even by a little child. If the induction is very perfect—if you have a great many instances with no exceptions, of the trustworthiness, wisdom, and guidance of the person you trust, your induction becomes more and more perfect, and it may eventually become so perfect as to amount to something tantamount to scientific assurance. I apprehend that belief and trust really rest upon induction, and unless we are prepared to say that induction itself, and all that relates to inductive evidence, is to be banished from the sphere of science, we must admit that belief itself comes within the province of science. So I do not think that men are called upon often, or even once, to take a leap in the dark : they may be called upon to take a leap in the twilight, when they must either do that or be absolutely destroyed where they stand ; but if it be truly dark, so that they can see nothing before or behind, above or beneath, I know no reason why they should leap this way or that, or why, indeed, they should leap at all. They may be called upon to take a leap in an imperfect light, according to the best illumination they can have in the midst of the general obscurity. These are samples of the sort of thoughts which have been passing through my mind. Professor Wace has told us that as it is our duty to speak the truth, so it is a correlative duty to believe that everybody else is speaking the truth, at least in the first instance. Now I do not apprehend that there is any equivalence whatever in the obligation between the one of these things and the other. I apprehend that the obligation to speak the truth rests upon an entirely different foundation, and is an obligation of an altogether different sort from the duty to give a generous or charitable credence to what a stranger may say to me. This is a matter of courtesy or of convenience, or it may be a question of evidence. But it is not constant or invariable, and must be subject to the teachings of experience, which may warrant and lead me, as I get on in life, less and less to believe statements that I hear. As I get older, I apprehend that I am somewhat less inclined to believe everything that I hear at the first hearing of it ; but I trust that I am not the less likely, from experience or from the moral discipline of life, to speak the truth myself in my dealings with others. I think that the distinctions between opinion, faith or belief, and knowledge, need to be very carefully analyzed, and that they have not

been stated in the paper before us with sufficient accuracy for the purposes of scientific discussion. Belief and faith : there is a reference somewhere in the paper which evidently confounds them as though they were one and the same thing ; the belief in a fact, and trust and submission to an authority. Ultimately, it may be, that these two things repose upon the self-same principle of testimony, but nevertheless, there is a very great difference in nature between the belief in a fact upon testimony and trust in authority. In regard to moral conduct these two things are essentially distinct, and it is very necessary indeed, when we are dealing with this wide topic, that we should not confuse things so different as a belief in a fact, and that variety of faith which leads us to trust and to submit ourselves to authority, as if they were the self-same thing. Altogether, I do think it is of the utmost importance that we should not allow men of science to teach us that there are two entirely distinct provinces :—the one, the province of knowledge, and the other, the province of faith. I do not know where science would be if it were not for some faiths on which science itself reposes. I think it will be found that scientific men themselves, in their discussions, are perpetually taking for granted principles not to be distinguished in their nature from what they are pleased to call beliefs : taking for granted, in fact, things which cannot be demonstrated ; things of which we may feel absolutely certain, but which rest on no other basis than an intuitive conviction. The very existence of one's own personality will be found, when we come to analyze it, to be a necessary assumption in a great deal of scientific investigation and discussion, but it is a thing which can never be proved by science in that sense in which scientific men speak of proof to-day. Even in regard to the laws of the universe, there are a great many things which are assumed, as has been shown by Professor Martineau in his discussions on the subject, and we shall find, I think, that it is necessary for us to hold fast by the truth ; that there is no such wide and essential distinction capable of being established, as it is the custom to assume, between the province of demonstration in regard to matters of so-called science on the one hand, and the province of conviction in regard to matters of belief. Doubtless, all our faith as Christians rests ultimately upon historical investigation and demonstration—it rests ultimately, doubtless, upon testimony. Out of the facts of history, established as historical facts, the mysteries themselves come forth to our view, and it is precisely the same with science. There is hardly a fact of science which would not have been rejected beforehand as incredible. There is hardly a fact of modern science which, if it had been stated for the first time, without any sort of preliminary preparation leading up to it, would not have been rejected as a thing altogether inconceivable and altogether incredible. Science has, one after another, and by slow and painful effort, established things which all the world in the first instance, would have declared were things that never could

have been established, and they have been established by what? By observation. But what is observation? It is all testimony; it is the evidence of personal knowledge and observation. It will be found that science is full of mysteries, which, in themselves, are as improbable, not to say incredible, as any mystery which the Gospels rest upon, and they rest also upon the same basis of observation and testimony as the volume upon which our religion rests. We have to investigate these things on the ground where they took place, just as we have to investigate our Lord's life, and thus we gradually unfold mysteries whether of science or of faith which we must accept, though it is impossible for us to conceive or to understand them. I beg pardon for having occupied the ground, I am afraid, a little too long. (Hear, hear.)

The Rev. Principal ANGUS.—I feel deeply our obligation to Professor Wace, and I very cordially concur in many of the sentiments that are incidentally expressed in the paper itself. If I do not give a more formal expression of concurrence, it is because I think it is more to the purpose of our meeting that we should discuss the points which are open to objection. For my own part, beginning with the argument with which the paper closed, I doubt the wisdom or the propriety of distinguishing so pointedly between belief in a proposition and belief in a person. It is a very familiar distinction I know, and it is one which has a very deep significance; but I believe it is liable to considerable misapprehension. Of course there is a wide distinction between *fides* and *fiducia*—between faith and trust. To believe in a person is to have *fiducia* in relation to him, whereas to believe in a truth is simply to have *fides* in relation to it. It may have been the purpose of Professor Wace to set that forth; but I think not. I believe in the proposition that God is love; that is *fides*: I trust that love: that is *fiducia*; but that may be one meaning of belief in the proposition itself. The distinction in fact is not strictly between a proposition as true and a person, but between a proposition as believed in by the intellect, and as accepted by the heart. I believe it will be found that when I have said I believe in God, it really means that I believe a number of propositions in relation to Him—that God is Almighty, that He is holy, that He is loving, He is true. My belief in Him is really a belief in all parts of His character, in all He has done, and in all He will do; whereas my belief in a proposition may be simply a belief in a particular fact. If, for example, I say that God sent His Son into the world, the proposition embodying that particular fact is less wide and less influential as it stands in that naked form, than is the belief in God. But the two mental states may not differ, except in extent. To believe in God is to believe in a large number of propositions, whereas to believe in a simple proposition is to believe in one only. If it be held that a belief in God means trust in Him; so also may a belief in the proposition that God is love. Mere belief in God, say in the proposition, is *fides*: and trust in God, or in God as love, is *fiducia*. I think it unwise, however, to call one belief in a truth, and the other in a person. The fact is, that

the religious life always begins with a belief in specific propositions. The mature Christian may indeed believe in God and trust in God for everything; but religion begins with a specific belief in the statement, for instance, that we are sinners, or that Christ is an Almighty and loving Saviour. My dread of this distinction is partly owing to the fact that I think it an unjust distinction, and partly to the further fact that it produces a tendency to suppose that all we have to do in order to be forgiven and to be made holy, is to have an indistinct trust in God, we do not know why, and we cannot tell how; whereas I maintain, that the religious trust which moulds the character is reducible, if you examine it, to the most definite propositions, differing only from a belief in particular propositions, inasmuch as it involves a belief in many, and not simply a belief in one. On the chief question of the paper I confess that I am not convinced by the course of argument adopted. The "ethics of unbelief" means, I presume, in Professor Clifford's writings, that not to believe is really a duty, until the facts are proved. What, then, is the "ethics of belief"? The paper says, substantially, that "the ethics of belief" means that we ought to believe, because to believe is an instinct, and a tendency to believe is essential to the good of society, and is the correlative of truth-speaking on the part of those we trust. Now there is no doubt that belief, or a tendency to believe, is an instinct. Hume's statement that belief in testimony is the result of experience, is the very opposite of the fact. Men begin with a tendency to believe; and it is distrust that is the result of experience. But why is it our duty to believe? Professor Wace says, "because it is an instinct"; but that does not really give a moral reason for belief. If you tell me, for example, as an historical fact, that Jesus Christ was born in Bethlehem, and if you tell me also, that the sun goes round the earth, what is my duty in listening to the two statements? According to Professor Wace, I am bound to believe both: I am to believe a thing because it is told me. But surely there is no duty or virtue in such belief. What I hold to be the sin of unbelief is the moral state in which we reject truth. Belief is "morally right," only when it is sustained by evidence. I wish to have the truth spoken, I am so made. No doubt it is wrong to suspect needlessly, because that means uncharitableness and the imputation of motives. But the thing I call the sin of unbelief—that which is morally wrong—has always in it this element, that I am rejecting truth, because of the moral state of my nature. You tell me that sin is a great evil, a bitter thing, involving awful penalties and distress; but that is not verified, and it cannot be verified in all its extent and meaning, in this life, at all. The very fact that it is not fully verifiable in this life, is one evidence we give for a future life. Why do I reject it? If I reject it as an intellectual statement, simply because the evidence is defective, it does not seem to me that I am guilty of any sin at all; but if, having sufficient evidence, I do not like to acknowledge the truth; if there is a warping, through sin, of my moral nature, so that I do not recognize or feel the facts on which the proposition

rests, then I hold that in all such cases unbelief is **wrong**, and implies a sinful condition. There are infidels and infidels. (Hear, hear.) There is a form of unbelief that is purely intellectual, and I venture to say that it is as nearly innocent as any disbelief that man shows in relation to any statement. But I believe, as human nature goes, that a large mass of unbelief in relation to spiritual truth—the unbelief which condemns and morally ruins men—is essentially immoral, because it means a state of heart unfit, through sin, for appreciating spiritual evidence, and so much in love with sin that the owner of that heart will not give sin up. It seems to me that the wise thing to say on this occasion is, that while in relation to many of the truths of the Gospel the evidence is purely intellectual or scientific, much of it is also moral : and if, through our sinful nature, we fail to believe in the great spiritual truths which underlie the Gospel, the reason of our unbelief is largely moral, and therefore wrong. I think our wiser course then is, instead of saying that the sin of unbelief consists in a denial of our natural tendency, and in insulting our neighbours, to say that unbelief is practically of two kinds. There is one kind which springs from defective evidence, from defective faculties, or from defective examination, in which there may be no sin at all ; and there is another kind which springs from man's sympathy with sin, and man's dislike of a holy system that calls him to a self-denying and a holy life. All the unbelief that springs from this second source is of necessity "ethical" and morally wrong, because it springs from wrong motives, and because the blindness it implies is essentially a blindness of the heart. I hold that the belief which saves a man is partly intellectual but largely emotional, and it is only in proportion as men's hearts are touched that they have wrought in them the faith that is to sanctify and save. I thank Professor Wace, for the many striking and true things which his paper contains ; but on the great thesis itself I think that there is a deeper and truer exposition than the one he has given. (Cheers.)

Rev. Prebendary IRONS.—I rise at this early time chiefly to re-call attention to the paper itself, and with a hope that we may not stray from the subject which the lecturer has brought before us. Whether, for instance, it would conduce to Professor Clifford's conversion to Christianity to tell him that his unbelief is immoral, and that a large number of those who think with him are bad men, I very much doubt. I do not think Professor Wace would have taken this course with unbelievers ; and moreover, the facts of the case are hardly so illustrative of the immorality of unbelief as Principal Angus seemed to suppose—at least the fact is, that a man like Niebuhr earnestly desired that his son should be a Christian, although he could not possibly convince himself of the truth of Christianity. It is surely a painful position to take up at the very outset, when dealing with infidels, that a great proportion of them are bad men. I would rather deal with them as those who wish on the whole to be right and true. For it is no man's interest to believe in a lie, much less to go down to the grave believing in a lie ; and I hope and believe we might have more success

if we treated all men in a fair and candid spirit, as though we trusted at all events that the majority of them were as fair-minded as ourselves. Now it does so happen that every one of the points which have been demurred to by Dr. Rigg,—and I am sure he will forgive my indicating this to his eminently candid mind,—every one of them has been dealt with by the lecturer. I have marked the places to show where Dr. Rigg had overlooked or mistaken the meaning. His first position was that the paper ignored the idea of scientific knowledge of Religion, but this is what I read in the paper itself, in the 11th paragraph :

“We may hope in this way to have some scientific as well as moral test for distinguishing true from false religious beliefs.”

Again, it was said rather too strongly, that the intuitive grounds of faith were denied. Now, Dr. Angus seemed himself at one time to deny these intuitive grounds, and at another to assert that, after all, there were emotional springs of faith of which we must take cognizance. But instead of speaking of Dr. Angus, I will turn to the 3rd paragraph of the paper, where I find this :—

“If we admit the testimony of Conscience as that of a kind of independent authority, bearing its witness within each individual soul, we may bring under this definition certain primary religious and moral truths, to which, as Kant observed, our assent has the character of faith rather than opinion.”

I think that throughout this paper you may call the doctrine of intuitive belief almost an assumption—at all events it is very frequently, if indirectly, alluded to, and a large portion of the paper would be absolutely unintelligible except on that hypothesis. I think that when Dr. Rigg has read the paper once more, he will agree with me that it was rather a mistake to suppose, for an instant, that it did not admit the intuitive beginnings of faith. Even that passage which has been commented on so much, in which the relations of trust between parent and child are dealt with (in the 4th paragraph), it was almost intimated by Dr. Rigg, that a child's faith was made to depend on the facts which the child previously gathered together, in order to convince itself that its parents were trustworthy. But that is so far from being possibly the case, that one is surprised to find such a thought put forward for a moment. Professor Wace says :—

“The essence of the filial relation is a moral confidence antecedent to experience, and capable in fact of sustaining severe apparent contradictions to that experience.”

I must say, I am surprised that of all possible allegations this should be brought forward, when it was distinctly the purpose of the paper to explain the primary grounds and conditions of faith.

Dr. RIGG.—My argument was that there could be no moral consciousness antecedent to experience.

Dr. IRONS.—Surely the germ? It would spring up and grow contem-

poraneously with the experience. There would hardly show a 'fore and after—an antecedent and a posterior, in the case. The child has that confidence which the paper declared to be anterior to experience, only in that sense in which Dr. Rigg himself, as I understand him, maintains that it could not be only the *result* of experience, but must be something more. If my memory does not entirely mislead me, Dr. Rigg seemed to admit that it was absurd to imagine a child trusting a parent only in consequence of a series of experiences.

Dr. RIGG.—On the contrary, I argued that it had trust and faith in consequence of a series of experiences, and I would say that the intuitive part there, is simply a belief in the continuity or uniformity of cause and effect, and their relation to each other.

Dr. IRONS.—The uniformity of cause and effect is not a phrase which occurs in the paper, and a child would hardly trust his parent on that ground.

Dr. RIGG.—No, but that is how I should have explained it.

Dr. IRONS.—Well, I do not want to force any phrase, but only to do justice to the paper; and I must express my surprise that a paper which is, if indirectly, brimful of intuition, should be charged, as I understood, with having nothing of it. But why not deal with the paper according as the author treats the subject? The author has to do with the allegation of unbelief as put forward by Professor Clifford—I hope Professor Clifford is here to-night—and that allegation is, that every man must prove everything for himself. Now, I find it hard to conceive that any one is serious in maintaining such a view as this. Unbelief is to change into belief, in every instance, only after the careful examination of evidences! Why, not one in ten thousand could comply with such conditions; it would be absolutely impossible. You would have a world in which the whole population would be doubters and unbelievers if you could procure faith in no other way than this. Now, instead of finding fault with that theory of authority here drawn out in at least some detail by Professor Wace to meet unbelief, would it not have been more to the point to show how the infidel should be met in this matter, and how on other grounds we should answer men who expect no one to believe except on scientific grounds? I am as convinced as Dr. Rigg or Dr. Angus can be that our Religion is not a matter of guess: it is a certainty. It stands not in the wisdom of man, but in the power of God. I am quite as sure it is knowledge. Apostle after apostle significantly speaks of it as being a "knowledge of the truth." In reference to this, it is not to be denied that there are some passages in the paper before us which need to be brought out and greatly enlarged on; but surely the points themselves desired by Dr. Rigg are there, though no doubt they are somewhat latent in certain places. One thing which may be said against the paper is, that it makes too little of the *ego*—the man himself is not sufficiently brought out as a being responsible *ab initio*. Man must be regarded as a

being responsible to God and to his fellow-men, and responsible from the first, for righteousness ; and he cannot be that without faith. But it is the very reverse to tell a man, as Professor Clifford does, that he must ascertain everything for himself before he believes. That would be as good as separating him from all his fellow-men, and repudiating anything like human progress as well as Responsibility. Under such conditions we could not even avail ourselves of other men's experience, nor of the knowledge of ages, until we ourselves had personally verified them. To put that strongly before such a logician as Professor Clifford might perhaps convince him of the absurdity of the position ; and I think that is in some measure done in this paper. I apprehend that Professor Wace has been endeavouring to keep himself within limits and omitted much : he wrote a short paper in order that we might have the benefit of discussing it at greater length. Some of us have fallen into a worse habit, by producing long papers and leaving very little room for the discussion—a very bad plan, as I know from my own experience. But the universal inductive process, which Dr. Rigg has now intimated, with some inconsistency, must be gone through by every one, almost amounts to Professor Clifford's proposition. Once or twice Dr. Rigg seemed to me to endorse Professor Clifford's theory, that we are all of us to examine every point, and not to believe it unless we could prove it by experience. Not only was it knowledge, but personally-tested knowledge, which Dr. Rigg seemed to require. Two remarks in his speech seemed to me to be somewhat in conflict with each other ; in the one place, he thoroughly rejected the notion of omitting the intuitive instinct, and in the other he declared that we must always have the inductive process.

Dr. RIGG.—Which rests upon an intuition.

Dr. IRONS.—Then I do not see where your point of difference is. If there be an intuition, we are perfectly agreed that in process of time, as Professor Wace points out, the knowledge of religion may even become scientific.

Dr. RIGG.—Hear, hear.

Dr. IRONS.—Then gradually we go on to a science of theology, the queen of sciences, which is the very foundation of right knowledge. But it is wrong to find fault with the inductive process in one place and to insist upon it in another. I do not blame Professor Wace for not writing a treatise upon every subject he touched. I am not by any means holding a brief for Professor Wace, but I have read his paper carefully, and I protest against its being so far misunderstood as to lead us off the track of the argument. The point brought forward now is whether there is an *à priori* condition of the mind which claims for itself some knowledge and capacity, and whether there is also an ethical tendency in the religious mind which teaches it to fall back on certain intuitive beginnings of truth, and love, and courage, and devotion, which God has implanted in man. If Professor Clifford be here, I fear he will make some

use of the differences which this discussion has elicited as to first principles, principles which are of such vital importance. I should like to know, however, what he would say to this statement, that the individual man cannot stand alone; he must have *common* first principles in mathematics, in science of every kind, and in religion; he cannot possibly proceed a step without them. I know that somebody has been trying to demonstrate the axioms of Euclid and so to supersede their existence as axioms, but I cannot even imagine any kind of proof that would satisfy us on that point. We must begin with some assumptions: every man assumes his own powers, and trusts them to a certain extent; he cannot help it. Then there is something also that is not himself. Not only does he begin with the *ego*, but he recognizes the *non ego*, that is, something "out of himself that makes for righteousness"—as Matthew Arnold puts it, which, after all, is only a roundabout way of expressing the *à priori*. How, then, *can* we test everything around us before we believe anything? It is almost a contradiction. I do not wish to deprive any one here of the opportunity of criticising the Professor's paper, and therefore, having said thus much to take us back into the right track, which is to inquire—How we are to deal with the infidelity which intends to make every man prove his faith or be a doubter?—I am quite satisfied to leave the matter in the hands of the meeting. (Cheers.)

Rev. G. W. WELDON—I will only occupy your attention for a few minutes. I believe that the author of the paper will have very little to do when he comes to reply, because the critics have answered each other. The paper, I must say, possesses the three points which are essential to success in an essay, sermon or speech—it is short, modest, and above all, it is to the point. I cannot help feeling, however, that though I endorse almost everything contained in the paper, there is one most important fact which we should not forget. The great question of the day is a belief in the supernatural. There are some things which are knowable by reason, and some things which are not. Those things which are knowable by reason have never been revealed, because there was no necessity for it; but other things have been revealed; and it is our duty to accept the testimony which has been put before us, because we believe that those who have spoken for us have seen far enough to be able to guide us. I believe in this kind of testimony. This is the age of doubt, and the question is whether we shall pass through life believing in our fellow-men, with that faith between man and man which is far more manly and chivalrous than constantly recurring doubts. The article of Professor Clifford would break down every possible trust between man and man. The faith of commerce takes it for granted that no man can be honest, but must be accepted as a rogue until he is proved to be trustworthy; but Professor Wace's paper teaches you to believe every man to be true until you have found him dishonest. I believe that paper will leave its trace upon our hearts, and tend to improve our conduct; and that it will enable us to go forth believing, more firmly than ever, that

we have a revelation in which we must believe on the testimony of its authors. (Cheers.)

Rev. C. N. EDGINGTON.—I think it is unforunate that some atheist, sceptic, or infidel has not taken part in the discussion to-night. I protest against its being supposed that Christians are prepared to believe anything that happens to be told to them. Our belief must stand upon something valid if it is to be accepted as true. I cannot agree with Dr. Rigg that we are obliged to accept as truth, matters of faith which are absolutely inconceivable and unintelligible. I think that such statements are much more likely to damage Christianity than any number of articles by Professor Clifford. I am sorry Professor Clifford is not present to hear the paper read, but I entirely agree with that paper, which I think answers Professor Clifford on his own ground. It was not Professor Wace's purpose to go higher than that, or he would have done so. I do not agree with Dr. Irons in thinking that the paper is brimful of intuition, though I think our faith does rest in a great measure upon intuition; and I was glad to see, in the current number of *The Nineteenth Century*, that Mr. Fitzjames Stephen admits that the beliefs which rest on intuition are elements which must be considered. They are facts to be set before a jury, although they do not prove the case. Scientific men sometimes come and tell the clergy, as they have done at Sion College, that if we state to our congregations facts which we cannot prove scientifically, or of which we do not present any sensible evidence, we are more or less lying. Now this kind of statement affects clergymen very considerably, and I am glad to find that Mr. Fitzjames Stephen and others are prepared to admit that some of our beliefs do rest on intuition, and are beliefs which we cannot prove. Theology is not the only science which rests upon something unprovable—even mathematics, the most exact of all the sciences, rests on axioms which you cannot prove, and in the same way we cannot prove the elementary truths of religion; but, given certain facts of our moral and spiritual consciousness, and we are prepared to confirm them by other facts which we can prove. Those who have read Professor Clifford's article will the more fully appreciate the force and value of Professor Wace's essay. It would have added much to the interest of the discussion if some one had taken up and argued the subject from Professor Clifford's point of view. But at the same time it must be remembered that Christian Faith is something far higher than a belief in probabilities, or even than a belief in merely human testimony. Faith is the acceptance of Divine Revelation because it is true, and rests ultimately on the deepest convictions of the heart and conscience.

Dr. IRONS—Let me offer a word of explanation. I did not mean to say that Professor Wace's paper was a full or open defence of the doctrine of intuition; for that you would have to go to such a paper as Dr. Martineau's in *The Nineteenth Century*; but I did mean to say that intuition was the assumption of the whole paper, which would have been unintelligible without it.

Rev. A. C. MACPHERSON.—As a new and untried member of this Institute, I desire to offer two or three remarks upon the paper before us. The first thing I would point out is, that in my opinion some of the statements contained in the paper might have been considerably amplified. There are some things which have not been made enough of, and there are one or two things also which have been made too much of. One of the things not made enough of was, the fact that the region of thought and action in which we have to decide on probable evidence, is very much larger than the region of thought and action where things can be demonstrably proved, and this will always give the claims of faith a great advantage over the claims of proved science. This point might, I think, have been made more of, because, when we have to exercise our judgment upon faith, the matter is one of much more importance than when we have to come to demonstraable conclusions. I was much struck with the argument of the paper, that faith moves in the region where man acts upon man by trust and confidence, rather than in the region of cold calculating intellect. However beautiful and symmetrical a man's doctrines may be, his character and the sum total of his acts, will have far more influence than his words. Another point on which I wish to say something is in reference to the word "belief." Philosophically, the word "belief," like the words "subject" and "object," is of very little consequence or importance. We say "I believe," of things which are altogether out of the region of trust and confidence. I may say I believe the atomic theory, although that theory is not yet fully proved. The fact is, we want a word to express what is generally called "belief," as distinguished from "knowledge." Before we use the word "belief," we should distinguish the region in which we use it. The trust argument was a very strong one, but I think it was pressed too far, and the older we grow the more we shall see that the world teems with gigantic mistakes forced upon it by gigantic liars. The victims of these mistakes are to be numbered, not by millions, but by hundreds of millions, and it could not but have been well if those many millions had had the faculty of trying and estimating the evidence set before them. However, this faculty was not exercised, and to this fact the world is indebted for the progress of Mahommedanism, Buddhism, and all other false religions. We can only accept Professor Clifford's paper however, within narrow limits. It is only just that something should be said on his side of the question, and though no doubt we should be far from saying with him that to believe without questioning is a great sin, which in the future shall cast a man into darkness and oblivion, yet nevertheless it is useful that a man should have and exercise the faculty of trying conclusions, and those who hold the Christian religion and the truths which we have been taught from our childhood upwards, should be the very first to desire anything of the kind. We believe that the more our religion is tested the more firmly it will be found to stand, and therefore I think that, within very narrow limits, Professor Clifford's paper should be accepted. It is surely right to say that a man who can judge is wrong if he

does not exercise the faculty of judging. No doubt it is hard to say what man can judge and what man cannot, but that is no harder than a good many other things in this world; and it is a case of *solvitur ambulando*. There is a sort of rough-and-ready justice which will put men on their proper level, and Professor Clifford's theory seems to give us a stronger argument to rest upon even than the great moral habit of mutual trust. But here comes in the necessary limitation: let us restrict *knowledge*, and, therefore, the duty of proof, to those things which are knowable, and faith or belief to those things which are unknown or unknowable. Unless we can find or coin a new word, this will be the safest way. And starting from this necessary limitation, we shall soon find that the region of the unknown and unknowable is infinitely larger than that of the known or knowable, and that therefore faith has a far wider sphere to act in, than knowledge or proof. There is scarcely one man in ten thousand, in any corner of the world, who will not, at some time or other, have an uneasy consciousness that there is a future beyond the grave. This future beyond the grave is the great unknown and the great unknowable; and the fact that in that future, faith is the only interpreter and the only guide, will always render paramount its claims. Where science ends her course, faith begins; and where science is dumb, faith is eloquent; and it is because of this that the claims of faith will always be most amply acknowledged among millions of mankind. (Cheers.)

Dr. Rigg.—May I be permitted to say just one single word of explanation. I was much grieved to be misunderstood by one gentleman who said that a phrase of mine would do more harm than all the articles of Professor Clifford. I may have been entirely wrong in what I said, but all I meant was that the mysteries of science, no less than those of faith, are things which in themselves are inconceivable, and yet we are obliged to receive them.

Mr. T. HARRIOT.—*

* Mr. T. Harriot, in a MS. read and handed in, says:—"Learning from the Scriptures that the Supreme oftentimes turns into foolishness the wisdom of the most learned, and that the most simple-minded may, by a life of child-like trust in Him, and humble walk in the light of His countenance become the possessor of perfect intelligence of His will, and inherit the promises, I am emboldened to treat this learned subject on simple grounds of faith alone." He then refers to Professor Clifford's ironical expressions, "the portion left for a divine messenger to occupy is the unintelligible alone," "Religion consists in blind emotions," and says, "I would remark that faith is not the evidence of things seen (for then it would not be faith); but 'of things not seen.' If indubitable evidence of unseen things were furnished to man, the Divine Being who knoweth the heart, could little esteem the recognition of Him,—which intellectually or scientifically could not be withheld. Inexpressibly as I reverence the Bible, I firmly trust that even if it were proved to be utterly untrustworthy it would not affect the soul's deep trust in God, our Father; Religion has a deeper foundation than that, in souls purified by Divine Love, and its light will shine for evermore."

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The CHAIRMAN.—I am sure the meeting will desire that the discussion should now be brought to a close, and therefore I will not intrude any remarks of my own, but will simply call on Professor Wace for his reply.

Professor WACE.—It would be very unreasonable if I took up much of your time by a reply, as I have already occupied three-quarters of an hour in reading my paper. On several points, moreover, in respect to which the paper was misapprehended it has been sufficiently vindicated by other speakers ; and it will therefore only be necessary to notice the main objections which have been raised against the position I endeavoured to maintain. If I should seem to neglect some of the observations which have been made, I hope it will be attributed, not to want of attention to them, but to the necessity of being as brief as possible. I think it may be safely concluded that the substance of the objections to the paper were stated at the outset by Dr. Rigg. Those objections have been more or less renewed by various speakers ; but I think Dr. Rigg touched the main question, and it is satisfactory he should have done so, because it showed that, although there are points in the paper which might have been put forward more clearly, still it did raise a definite issue, namely, whether there is a specifically distinct basis for the acceptance of the main truths of the Christian faith, and for the acceptance of the truths of science. One of the objects of the paper was to enforce the existence of such a distinction ; and, notwithstanding what has been said, I am disposed fully to maintain it. Take Dr. Rigg's statement. He argued that the truths of science were substantially similar in their evidence to the truths of religion ; and he went so far as to say that the truths of science, like the truths of religion, depend upon testimony. He mentioned the fact of certain truths of science being extremely incredible at first sight ; but, he says, we believe them on the testimony of those who observe them. Now this appears to me very far from being the fact. There is this essential difference between the two cases, that whatever incredible statement is made by a man of science, it can be verified within twenty-four hours, or at all events within a given time, and nothing would be accepted as a truth of science, whether incredible or not, which would not admit of that verification. Nothing can be more incredible at first sight than the statements of every-day occurrence with regard to the truths of astronomy ; but they are verified by the use of the Nautical Almanack, which makes calculations for years in advance, and verifies such statements every hour of every day. The last speaker indeed put the case much too strongly when he said we can suppose the contrary of our religion, because that is denying the analogy between natural and revealed religion. It is, however, somewhat surprising there should have been so much said which seemed to take for granted that the essential truths of Christianity could be matters of intuition or intuitive belief. Take the belief in our Saviour's coming to judge the world. The point is, not that He exercises a judgment, but that He is personally to return to judge the world ; and by what possible process that can be placed

upon a verifiable basis like a truth of science passes comprehension. I may take another illustration. The cardinal doctrine, or one of the cardinal doctrines of Christianity, is the Atonement; and upon what principle of scientific knowledge can we be assured that God has been appeased? I do not assume any theory of the Atonement, but, speaking generally, and taking the Atonement as a reconciliation between God and man, it seems inconceivable upon what basis of intuition or science we can verify that matter. We may contemplate the facts of our Lord's life, as revealed to us in the Scriptures, and see that His acts are capable of constituting such an Atonement; but that they have actually produced that effect upon the relations of God to man, is surely a truth which it would be an extravagant piece of presumption for any one to assume as a matter of induction. We can only assume it on the faith of our Lord's own statement, and the statements of the apostles; and that also applies to what Dr. Rigg said with respect to the whole life of our Lord. Dr. Rigg says we have to draw certain deductions from that life. Now we have to draw deductions, not from our Lord's life merely, but from His life combined with His statements and those of the apostles, and therefore we throw ourselves to a large extent upon belief in their word on the subject.

Dr. RIGG.—Hear, hear.

Professor WACE.—I am glad Dr. Rigg expresses approval, for if he concedes this, the substance of my paper is maintained. If the doctrine of the Atonement, with all its importance, rests, not on induction but on the faith we place in personal statements, the validity of the main argument of the paper will be seen to be of vital consequence. I have dwelt upon this subject because it seems to me to be a matter of the deepest importance in the present state, and, indeed, in all states of the controversy with infidelity; that we should distinctly realize that the matter must be argued upon a personal as distinct from a scientific basis. The moment you bring the truths of Christianity face to face with pure science, that moment you set a dissolving force to act upon them, and you are incapable of solving all the doubts that may arise. But when you bring the witness and the conscience face to face, the solvent force is exerted not upon the truths but upon the consciences of men; and the more we adopt this course the more we shall return to the original process of Christian conviction. We may safely assume that the process which first propagated Christianity in the world is likely to be in all ages the most effectual. Now that process at its commencement must have been independent of anything verifiable in a degree which we cannot conceive. St. Paul stands up in the Areopagus of Athens with nothing whatever but his own personal authority, however that authority may have been supernaturally attested. It was by the force of the appeal thus made by apostles and saints to individual consciences that their victory was won, and it would be rash for us to attempt to base our faith upon a different foundation. (Cheers.)

The Meeting then adjourned to the Museum, where refreshments were served.

ORDINARY MEETING, MAY 1ST, 1876.

C. BROOKE, ESQ., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

ASSOCIATES :—E. Simpson, Esq., London ; Revs. G. D. Copeland, B.D., London ; E. F. Hewson, B.A., Ireland ; E. de Pressense, B.Th., Paris ; Miss Freeman, London.

Also the presentation of the following Works for the Library :—

“Proceedings of the Royal Geographical Society,” Part 3. *From the Society.*

“Proceedings of the Royal United Service Institution,” Part 85.

From the Institute.

“United States Geological and Geographical Survey,” Bulletin II.

From the Survey.

“Bible Difficulties.” Rev. G. D. Copeland, B.D.

From the Author.

“St. John the Baptist.” Rev. Dr. Reynolds.

Ditto.

Smaller publications from Rev. Dr. Leask, Rev. Dr. Quarry, Dr. Sexton, and C. M. S.

The following Paper was then read by the Rev. J. L. CHALLIS.

ON THE METAPHYSICS OF SCRIPTURE. By the
 REV. PROFESSOR CHALLIS, M.A., F.R.S., F.R.A.S., Plumian
 Professor of Astronomy and Experimental Philosophy in the
 University of Cambridge.

1. **T**HE reasons for entitling this essay "On the Metaphysics of Scripture" will be unfolded in the course of discussing the questions which the title is intended to embrace. At present it will suffice to state that "Metaphysics" will be taken to signify specially the department of abstract human knowledge which (as the name implies) comes after, and is intimately related to, natural science, and that it is the purpose of the essay to inquire whether the foundations of metaphysics in this limited sense may not be derivable from the revelations of Scripture. It might also, I think, be a matter for inquiry as to whether the science of Metaphysics, in the comprehensive sense in which it is usually understood and treated of, may not have its ultimate basis in divine revelation; but I do not intend in this essay to enter upon so large a subject.

2. It will, accordingly, be proper to begin with considering in what manner, and to what extent, metaphysical science arises out of, and depends upon, the special department of natural science usually called *Physics*, and afterwards to discuss its relation to other departments, as *Geology*, *Botany*, and *Natural History*. It will, for this purpose, be requisite to advert to the principal steps, in historic order, by which the science of Physics has advanced to a position which brings it into connection with Metaphysics.

3. The works of Aristotle give evidence that he directed his attention to various kinds of natural phenomena, and acquired to a considerable extent such knowledge of them as could be obtained merely by *observation*; but in his time, and long afterwards, the method of getting precise information about natural objects by employing the test of *experiments* had not been thought of. Bacon seems to have been the first to recognize fully the necessity of commencing the study of nature by gaining a knowledge of facts and laws by means of experiments; but he did little towards exemplifying the principles he laid down. This part was performed with

remarkable perseverance and success by his contemporaries Kepler and Galileo. The achievements of these two philosophers, which were essential contributions towards the advancement of natural philosophy, were widely different in character. The laws of the planetary motions, as discovered by Kepler, were formal relations of space and time, determined by observation alone, without reference to the action of *force*; whereas Galileo's experiments were expressly directed towards ascertaining *laws of force*. He proved by experiment that a projectile acted upon by gravity at the earth's surface moves in a *parabolic path*. By this means he established (in combination with the law of *vis inertiae*, according to which a body persists in a state of rest, or of uniform motion in a straight line, unless it be disturbed by extraneous force), the fundamental law of the acceleration of a body acted upon by a constant force; *viz.*, that the acceleration, as estimated in the direction in which the force acts, takes place in the same degree, whatever be the actual motion, and direction of the motion, of the body acted upon.

4. With prospective reference to an argument that is to follow, I now assert—what perhaps is not generally understood—that no mathematical reasoning, such as that employed by Newton or Laplace, was capable of demonstrating the parabolic motion which Galileo ascertained by experiment, and that the whole of the mathematical reasoning in physical astronomy depends on establishing *by experiment* that law of parabolic motion. This was perfectly understood by Newton, who frequently, in his *Principia*, refers to the results of Galileo's experiments as being of a fundamental character, and in particular calls the parabolic motion "Galileo's Theorem." If it be urged that there are well-known methods of calculating the parabolic motion of a projectile, without reference to Galileo's experiments, the answer is that these calculations take for granted the fundamental law of accelerative action above mentioned, which law is incapable of establishment on any other basis than that of experiments such as those made by Galileo.

5. Armed with Galileo's theorem, and with the powerful method of calculation (equivalent to the differential and integral calculus) which he had himself discovered, Newton was able to give an *à priori* demonstration of Kepler's Laws. But here it is particularly to be noticed that this demonstration rests on the *hypothesis* that the force of gravity varies inversely as the square of the distance from the particles from which it emanates. Besides this hypothesis, it is also assumed, in physical astronomy, that each particle of a given body attracts all the particles of the same body, as well as all the particles of surrounding bodies, according to the law of the inverse square. But physical astronomy furnishes no

means of demonstrating that law. It is true that by taking for granted Kepler's Laws, the law of the inverse square might be arrived at by reversing the process of reasoning by which the Keplerian Laws were demonstrated. But it would be reasoning in a vicious circle to call this a demonstration of the law of gravity. The truth is, the law and the universality of gravitating force are ultimate facts for which no *à priori* reason can be given, at least on the principles of physical astronomy, although the reality of these facts is abundantly demonstrated by the great number and variety of the explanations of phenomena which the hypothesis of their truth enables the physical astronomer to give.

6. I trust that I shall be held excused for bringing before the members of the Institute the foregoing statements, although the complete evidence for their claim to be accepted can only be understood by means of an acquaintance with the applications of mathematical reasoning which but few can be supposed to possess. The mention of these particulars was required for making intelligible and justifying the following general conclusion, of which essential use will be made in the subsequent reasoning:

All the results in physical astronomy that have been obtained by Newton, Lagrange, Laplace, and all other theoretical astronomers, are deductions by mathematical reasoning from Galileo's theorem of parabolic motion, and from the hypothesis of a universal gravitating force varying according to the law of the inverse square.

7. Supposing this conclusion to be accepted, there will evidently arise the question as to what is the quality of the fundamental conditions. Are they ultimate facts, or do they admit of being demonstrated on the basis of ulterior facts? The answers which these questions have received have given rise to two opposite and irreconcilable systems of philosophy, respecting which I shall here say, in anticipation of the sequel of this discussion, that one of them is in accordance with, and the other directly opposed to, what I consider to be properly designated as "the metaphysics of Scripture." It is, consequently of prime importance, as regards the purpose of this essay, to place these two philosophies in contrast with each other, and by all legitimate means to decide between their claims to acceptance. With this object in view, I adduce the following considerations.

8. When the laws of gravitation had been ascertained by the reasoning contained in Newton's *Principia*, much speculation arose as to the quality of this agent. As it was proved that one body was capable of attracting another without any discernible intervening substance, it began to be thought that gravity might be an *occult quality*, inherent in substances, and producing motion according to certain laws, but by means respecting which our

senses could give no information. It is well known that Newton rejected this view, contending that no one competent in philosophy could admit the possibility of such "action at a distance." He even conceived of the existence of a rare and universally diffused elastic medium which might perform the part of intermediate agent. But in Newton's time, and long after, neither mathematics nor physics were in a sufficiently advanced state for showing how the force and the law of gravity might be referable to the pressure of an elastic fluid. Under these circumstances it would have been legitimate philosophy to adopt the law of gravity merely as a convenient provisional hypothesis, in the expectation that a reason might be given for it in a more advanced stage of natural philosophy. This course, however, was not taken; the occult quality of gravity was almost universally admitted, and all attempts to assign a *cause* for the action at a distance were abandoned. At this juncture Hume, who was neither a mathematician nor a physicist, promulgated the doctrine that natural philosophy has nothing to do with *causes*, but only with *laws* of phenomena, and that these laws consist of an invariable order of antecedence and consequence of phenomena, the discovery of which order constitutes the proper and sole purpose of observation and experiment. This philosophy labours under the serious defect of affording no criterion whereby to decide whether a supposed consequent of an antecedent is *immediately* consequent, or whether it might not be possible to discover other facts which, by being interposed between these, would produce a *different* law of antecedents and consequents. It will presently be shown that no such indeterminateness pertains to the other philosophy.

9. Hume's doctrine has had, both on physical and metaphysical science, a widespread and persistent effect, and, perhaps, under no circumstances has its influence been manifested in greater degree than in the empirical philosophy of the present day. The doctrine seems to have been originally propounded with the view of proving the impossibility of *miracles*: this, at least, was the use made of it by Hume and his immediate followers. It has since affected in various ways almost all modern physical and metaphysical productions, and has even tainted the theological opinions of many who profess to believe the teaching of Scripture. Recently the advocates of the sceptical philosophy have begun to see that the possibility of miracles must be granted, if the actuality of creation and of a personal creator be admitted, miracles being nothing more nor less than a repetition of the exercise of creative energy. Hence, with an evident intention of getting rid of any reference to agency governed by *personal will*, theories have been proposed which ascribe to *law* functions which belong only to *creative power*. This,

I think, will account for Darwinism being excogitated, and for the character of its assumptions, as well as for other characteristics of modern science; for instance, the postulation by geologists of enormously extended periods of operations on the superficial materials of the earth, little different from those going on at the present time; the throwing back the beginning of the existing order of the external world to an immeasurable past, and placing the epoch of its termination in an immeasurable future; and the materialistic view which ascribes "potency" to atoms.

10. To show that in what I have said above I have not misrepresented the object and character of the modern phase of natural philosophy, I beg to refer to a work recently published, entitled *The Unseen Universe*, which may be regarded as exhibiting the latest development of the consequences to which that philosophy conducts. In page 132 the following passage occurs: "We think it is not so much the right or privilege as the bounden duty of the man of science to put back the direct interference of the Great First Cause—the unconditioned—as far as he possibly can in time. This is the intellectual, or rather theoretical, work which he is called upon to do,—the post that has been assigned to him in the economy of the universe." It does not seem likely that a man of science who has this preconceived view of "bounden duty" can devote himself to the pursuit of science with his mind unbiassed, and free from the influence of pre-judgment. Surely the man of science has nothing to do but to make use of all available means of acquiring knowledge, apart from anticipations of results, or obligations of duty.

11. The passage in the same work next after the one above quoted is this:—"If, then, two possible theories of the production of any phenomenon are presented to the man of science, one of these implying the immediate operation of the unconditioned, and the other the operation of some cause existing in the universe, we conceive that he is called upon by the most profound obligations of his nature to choose the second in preference to the first." There is nothing in this assertion, taken in its literal sense, that any physicist can object to. The case, however, has another aspect after ascertaining what the authors intend to include under the expression "the operation of some cause existing in the universe," and discovering that the assertion is not of so simple a character as at first sight it seems to be. From other parts of the work, as especially the latter portion of Chapter II., it appears that the causation referred to is subject to a "Principle of Continuity," the meaning and the reality of which may be called in question. For authority for the existence of this principle Groves' book

entitled *The Correlation of Physical Forces*, is cited (p. 53). It is true that the discussions in that work do point to some bond of connection between the different physical forces of such kind that together with diversity in the modes of manifestation of the effects of the forces, there is unity as regards the intrinsic quality of the forces themselves. (This, for instance, would be the case if the different kinds of force might be supposed to be modes of *pressure* of a universally diffused elastic medium.) But I fail to see how facts and laws which indicate the existence, between physical forces, of relations depending on such *unity*, establish the reality of an abstract and necessary principle of *continuity*. The authors of *The Unseen Universe* make large use of such a principle, which, after having studied their applications of it, I can perceive to be nothing but Hume's principle of invariability of antecedence and consequence put in a new guise. Whether or not this be admitted, it is certain that this principle, equally with that of Hume, is opposed to regarding a *miracle* as an act determined exclusively by *personal will*, and as incapable of being referred to antecedent conditions. This remark, which is clearly justified by the citations above given, is important as respects what I shall have to say subsequently concerning the philosophy of *The Unseen Universe*.

12. I proceed now to state as distinctly as I can the principles of the philosophy which I have already spoken of as directly opposed to that of Hume. This philosophy received its chief development at the epoch of Locke and Newton. With respect to Newton's share in originating or unfolding its principles, I do not so much refer to the natural philosophy established by the propositions of the *Principia* (although this was a necessary preliminary), as to "the Rules of Philosophizing" which he gave at the beginning of the third book, and to the conclusions he has come to in the general Scholium at the end. It is there that we meet with Newton's metaphysical views respecting matter and force, agreeing in the main with those held by Locke.

13. In the following arguments I use the expression "Newton's Metaphysics," or "Physical Philosophy," rather than "Newton's Philosophy," to avoid ambiguity, as the latter expression might be taken to include his theory of Universal Gravitation; whereas the subject I propose to discuss relates exclusively to the intrinsic qualities of *matter* and *force*.

Now the governing principle of the Newtonian metaphysics is, that there are no essential, or ultimate, qualities of matter and force, but such as we can understand by means of *sensation* and *experience*. This is a *regulative* principle, proper for being employed to determine what, according to this philosophy, are the

essential qualities of matter and force. I proceed now to make such application of this principle.

14. MATTER.—It is a fact of ordinary experience that bodies admit of being divided by breakage or cleaving into parts varying in number, form, and size. Newton speaks of “least parts” into which bodies are divisible, meaning parts of magnitudes so small that their qualities cannot be immediately discerned by our senses. According to the above-stated rule, these parts can have no other essential qualities than those which we are cognizant of by our senses, when we see and handle masses; namely, the qualities of *magnitude, form, mobility, and inertia*. This inference is expressly insisted upon by Newton in his Third Rule of Philosophizing. By taking magnitude to be an essential quality, we, of course, exclude the infinite divisibility of matter, and may properly designate Newton’s “least parts” as *atoms*.

15. That the quality of *inertia* is recognisable by the *senses* may be shown by such an experiment as the following. Conceive to be placed on a perfectly smooth horizontal plane a perfectly smooth sphere, and suppose the sphere to be pushed with the *hand* so as to be made to move in a straight course on the plane (without rolling) with a certain uniformly accelerated motion during a certain interval of time. This might be practically done, with sufficient accuracy for the purposes of the experiment, by regulating the motion communicated to the sphere by the hand, so that it shall be parallel and equal to the motion of another sphere (which might be called a *pilot* sphere), the latter having been caused to move by *mechanical* arrangements in the above-specified manner. Let the same thing be done with spheres of the same material, of twice, three times, &c. the size of the first, and in each case let the motion be regulated by *the same motion* of the pilot sphere. Then it would certainly be *felt* that the motion of the sphere was in each instance produced by a *personal effort*, and it would be perceived that the effort was greater the greater the size of the sphere, the effect of friction being assumed to be inconsiderable. The experiment might even suggest the law that the effort was in exact proportion to the size of the sphere; but it is not adapted to *prove* this law, the evidence for which, as will be stated subsequently, rests on different grounds. It proves, however, that the motion of the sphere was accelerated by a *personal effort* consciously exercised. Now the *inertia* of the body may be defined to be the quality which under the given circumstances necessitated the effort employed to accelerate its motion. Hence we may draw the noteworthy conclusion, that *the reality of inertia as a quality pertaining to bodies is recognizable by a sense of personal effort*.

16. It is also an essential peculiarity of inertia that it is not *quantitative*; that is, as Newton has remarked (Regula III.), it is not, like gravity, susceptible of any law of variation. The same matter may be more or less heavy according to circumstances, and there may be more or less of inert matter, but under no conditions can matter be more or less inert. For these reasons, inertia may be said to be an *innate* quality of bodies; while the same assertion is not true of gravity. To express this quality Newton uses the word "insita."

17. It is not necessary to adduce here the usual arguments of metaphysicians (those, for instance, of Locke), which show that we are cognizant of the other essential qualities of bodies,—*magnitude*, *form*, and *mobility*, by means of the senses of sight and touch. It will suffice to state that in the subsequent reasoning it is taken for proved that these fundamental qualities are all cognizable by information given immediately by the senses. Relative to this principle Newton makes the assertion, "This is the foundation of all philosophy" (Reg. III.).

18. To carry on the *à priori* argument respecting the ultimate properties of matter, another regulative principle is to be taken into account, namely, that these properties are *not quantitative*. We have already seen that the quality of inertia satisfies this condition. In order to satisfy it with respect to magnitude and form, we must suppose that in any given atom these properties are absolutely incapable of variation. The reasons for this second regulative principle cannot be fully unfolded till we have had Force as well as Matter under consideration. So much, however, as this may be said at present: Whatever is quantitative, or variable in a manner expressible by numbers, admits of being determined by mathematical reasoning. Such reasoning is necessarily based on principles, and conducts, according to ascertained rules, to quantitatively expressed results, or laws. The principles in the present inquiry are ultimate physical qualities, or properties; which, consequently, must be such as are not susceptible of quantitative variation.

19. With respect to the *forms* of atoms, if Newton's dictum, that "nature is wont to be simple and consonant with herself" (Reg. III.), be accepted, we might say at once that *all* atoms have the spherical form. Also "the tenor of facts of experience," attention to which is another rule laid down by Newton for forming *à priori* conceptions, conducts as follows to the same inference. If we agitate water in a vessel in any manner, and then leave it to settle into its original state, it will in all respects and for all purposes be the same water as before. But the agitation will have altered the relative positions of the ultimate parts in an unlimited number of

ways, and to conceive how such changes should produce no residual effect, it seems necessary to suppose the form of each atom to be such as to have no special geometrical relation to the positions of surrounding atoms. This condition can be satisfied only by the spherical form.

20. By the foregoing considerations we have been conducted to the following very definite result: *An atom is a very small inert sphere of invariable magnitude.* But however definite and intelligible this conception of an atom may be, inasmuch as the considerations leading to it were of an *à priori* character, we are not entitled, without inductive verification, to say that an atom is really such. We may, however, assert that the hypothesis of its being such is an appropriate basis of mathematical reasoning, and that by comparing results from mathematical reasoning thus founded, we can decide whether or not the hypothetical atom is a reality. The way in which this has to be done will be indicated by the discussion I am about to enter upon relative to the nature of Force. The discussion will at the same time take account of the property of *mobility* which is common to all matter.

21. FORCE.—From the experiment described in art. 15 we may gather that in the production of motion by force, the sense of touch tells us that *two* bodies are concerned, one of which is active, and the other relatively passive; one is the mover and the other the moved. As this is a mode of producing motion which is intelligible by sensation and experience, according to the philosophy I am expounding, there is no mode of producing motion which is essentially different from this. I assume that when a body is moved by being pushed with the hand, the physical action between the body and the hand is precisely the same as when one piece of *dead* matter moves another by pushing against it. And it must be admitted that in neither case have we reason to say that the parts of one body come into *actual* contact with the parts of the other. But in the case of the *personal* act there is a *felt* contact which is distinguishable from non-contact. Consequently our philosophy necessitates the conclusion that in every case of the production of motion (as of an atom by the ether) there is contact, *as felt*, between the moving and the moved body. Of course, if this be so, it is a necessary consequence that there is also the consciousness of a personal agent. For my part I accept this inference on the general principle that it is inconceivable there can be any production or event which is not determined by antecedent will, and by the power, in operation, of a conscious agent. But this part of the discussion I reserve at present, as it may be more appropriately handled with reference to a special metaphysical question that will

be treated of in a subsequent portion of this essay. I shall now only make the remark that this philosophy altogether excludes any action at a distance of one body on another which is not produced by means of an intermediate substance.

22. Newton, who regarded "the action at a distance" as a physical absurdity, has left on record his opinion that the substance by the intervention of which visible and tangible bodies act on each other is a fluid ("a certain very subtile spirit"), in all respects like air of given temperature, but exceedingly more elastic. This is the fluid which is now generally called *the ether*,—a term which, like *atom*, has come to us from a remote philosophical age. As the principles laid down in art. 21 do not allow of any other form of force than pressure, we have to assume that the ether has the property of *pressing*, and that, like air, it is susceptible of variations of density and pressure, as being in like manner atomically constituted. For the purpose of laying a foundation for mathematical reasoning, we may make the hypothesis (to be subsequently tested by results), that the variations of pressure are in exact proportion to the variations of density. After this there is no more occasion to refer to the atomic constitution of the ether, the calculation of the effects of its pressure being made on the supposition of its being a *continuous* fluid, and in exact accordance with the ordinary principles of *Hydrodynamics*.

23. Let us here briefly recapitulate what has been said respecting the foundations of Natural Philosophy. On the one hand we have the ultimate atom, endowed with inertia, spherical in form, and of constant and extremely small magnitude; on the other we have the ether, a perfect fluid, susceptible of variation as to density, and endowed with the faculty of pressing in exact proportion to its density. The ether is the active substance, the atom is the passive substance. But although the ether, regarded as being of uniform and constant elasticity and unlimited in extent, might be taken to be the source from which all *active* physical force emanates, it may still be true that there exists in the universe *another kind* of physical force having a different origin. The property of constancy of form and magnitude, with which we have supposed the atom to be endowed, would act as *resistance* to any pressure tending to change its form or dimensions, and, *pro tanto*, would be a real physical force. Such force could only have its origin, and be maintained, by the Will and Power that originally brought the atom into existence and affixed its properties. If Dr. Tyndall attributed to atoms only this passive and delegated "potency," I could agree with him; but I am not prepared to assign to them any active agency.

24. After the foregoing discussion of the principles of the

Newtonian physical philosophy, it is next required to show in what manner the consequences of its hypotheses may be calculated, and how by comparisons of calculated results with facts of observation the truth of the hypotheses may be tested. First, it may be remarked that the properties of the atoms and of the ether have been so defined that they form at once a basis for *mathematical calculation*. In short, under these hypothetical conditions, the facts of observation become for the most part only problems to be solved according to the principles and rules of *Hydrodynamics*. Towards effecting such solutions little could be done in Newton's time, because mathematics were not then sufficiently advanced to admit of this application. Not long afterwards, the occult quality of gravity, as I have already intimated (art. 8), having been generally accepted, Newton's metaphysical views were discarded or fell into neglect, and at the present day they are either silently put aside, or are even strenuously opposed. Consequently for pointing out the consequences to which that philosophy conducts (which for the purposes of my argument it is necessary to do), I am compelled to advert to researches which I have myself undertaken with the view of testing its principles and extending their application, none of my scientific contemporaries, for a reason which I shall shortly have to point out, having occupied the same ground.

25. Previous to stating by means of what calculations the hypotheses of the Newtonian system of Physics are verified, it is necessary to obtain a distinct conception of the meaning of "moving force." Reverting again to the experiment described in art. 15, it will be seen that what is there called a *personal effort* is, in fact, a *moving force* in the ordinary sense of this expression. It is, however, moving force in a special sense, having reference only to the personal efforts required for accelerating *different masses in the same degree*. But clearly another experiment, in which the mechanical acceleration of the pilot sphere could be changed at each trial, might indicate that different personal efforts are required for accelerating *the same mass in different degrees*, and might suggest that the effort is in exact proportion to the acceleration. Both kinds of experiment are required for exhibiting the complete meaning of "moving force"; and the metaphysical inference to be drawn, according to this philosophy, from the two together, is, that moving force is always and everywhere in essence *personal effort*. This, however, is not the inference with which we are concerned at present. In consequence of what is suggested by these and like experiments, moving force in its *scientific sense* is assumed to consist of two factors, one of which expresses that it is exactly proportional to the mass when the

acceleration is given, and the other that it is exactly proportional to the acceleration when the mass is given. After assigning to the two factors appropriate units, their product constitutes the analytical symbol which is universally employed in calculations relating to the effects of moving force. The hypothesis of the *exactness* of the proportions suggested by the experiments is abundantly verified by comparisons of the calculated results with experimental facts. It may, further, be remarked, as a corollary to this argument, that it verifies two of the fundamental qualities of matter; its *mobility*, by showing that it is capable of being moved by force, and its *inertia*, by showing that it requires force to move it.

26. Considering the special object of this essay as expressed by its title, and the usual character of the communications made to this Society, it would be altogether inappropriate to enter into details respecting the mathematical reasoning of which the adopted definitions of the atoms and the ether form the basis. Neither, as far as regards the exhibition of the general argument, is there any occasion to do so; but it will be necessary to state some of the principal results. Respecting these it is important to make the preliminary remark, that as they are deduced from definitions that are intelligible from *sensation* and *experience*, they are *theoretical* results in the strict sense of that term,—the sense it has by being derived from *θεωρία*, *viewing*. By modern physicists the word *Theory* is used in various senses, as, especially, to denote the representation by formulæ, however obtained, of the experimental laws of physical phenomena; but its proper scientific meaning is that in which it is applicable, as just mentioned, in the Newtonian system of physical and metaphysical philosophy. Now since, as I have already said, this philosophy has not been adopted, or carried on, by any of my contemporaries, it follows that I am alone responsible for the deductions from it which I am about to state. These are results which have been obtained by mathematical reasoning from precisely defined premises; and although, as must be admitted, the application of the mathematics is attended with difficulties, and the reasoning is for the most part of a novel and high order, the results may, I think, lay claim to consideration on the ground of being the fruits of labours devoted to the solution of hydrodynamical problems through a long course of years. At all events, I hope by means of the subjoined statements, whether or not they be assented to, to indicate what is the actual position of physical science, and to remove some prevailing misapprehensions as to its character and objects.

27. The following inferences, deduced mathematically from the adopted definitions of the atoms and the æther, are stated here as being of chief importance relative to the conclusions that will sub-

sequently be drawn from the foregoing discussion of the Newtonian Physical Philosophy.

(1.) Foremost among the results of Theory are to be placed the explanations of phenomena of *Light*, which are given by means of a mathematical investigation of the laws of *Undulations of the Ether*. These explanations, so far as they rest solely on the assumed properties of the ether, are analogous to explanations of phenomena of sound by vibrations of the air. So numerous and specific, and so complete, are the theoretical explanations of this class, that in published discussions of them I have ventured to express the opinion that of themselves they afford strong presumptive evidence not only of the reality of the ether, but also of its being such as it was assumed to be.

(2.) The mathematical investigation of the motions of the ether conducts to a unique species of motion which may be called ray-vibration, inasmuch as it consists of vibratory motions partly transverse and partly parallel to an axis. These ray-vibrations may be supposed to be the exponents of *rays of light*; and whereas experiment has shown that the sensation of light results from action on the retina of the eye, the direction of which is *transverse* to the direction of incidence of the light, it is reasonable to ascribe this action to the transverse vibrations above mentioned, and to suppose the direct vibrations to be in this respect inoperative.

(3.) The phenomena of Light which depend on relations between atoms and the motions of the ether are not in general as readily explained, on account of our not knowing the exact conditions of the problems, as those which depend simply on the motions of the ether. But in cases in which the atoms are constituents of regularly crystallized substances, phenomena under special circumstances have been observed which admit of satisfactory explanation on the Undulatory Theory of Light. It is here that the Theory of Light is brought into relation with the sciences of *mineralogy* and *crystallography*.

(4.) The sensation of Light, as well as the phenomena of Light generally, being attributable to motions of the ether which are of the *first* order, and consequently vibratory, or recurring motions, it follows that the transverse light-producing vibrations impress on atoms only vibratory motions. But I have found, by including in the mathematical calculation terms of the *second* order, that the direct vibrations of a ray, or those of a *wave* composed of an unlimited number of ray-vibrations, are capable of causing an atom to vibrate, and, at the same time, giving it a permanent motion of translation; and that even the transverse vibrations can produce the same effect. There is nothing antecedently improbable in this result; for, in fact, it has recently been ascertained by *experiment*

that translatory action, which appears as attractive or repulsive force, may be produced by vibrations. But if this be so, it is plain that we have the means, without having recourse to occult qualities, of framing a theory of attractive and repulsive forces, inasmuch as these might be accounted for by dynamical effects of vibrations of the ether. Accordingly, since it is allowable to assume that as there are light-producing vibrations of the æther, there are also heat-producing, we can by this theory give a reason for the observed repulsive power of *heat*.

(5.) By applying this theory of motion of translation of atoms caused by ethereal undulations to the case of *gravity*, I have found that this force may be attributed to the translatory action of undulations of such magnitude that they may be supposed to traverse large masses, such as the sun and the planets, without undergoing sensible change or retardation. The space occupied by the matter of the atoms must be supposed, even in the densest bodies, to be very small, compared to the intervening spaces. Under these circumstances it appears that both the law of the inverse square, and Galileo's Theorem, which were spoken of in articles 3 and 4 as constituting the foundation of Physical Astronomy, may be accounted for.

(6.) A *molecule*, as the name implies, may be taken to be a mass of *atoms*. One molecule may be conceived to differ from another solely by reason of difference in the *number* and *arrangement* of the atoms. The law of action of *gravity* on all bodies equally is most simply explained by supposing the constituent atoms of all bodies to be of the same size. My hydrodynamical researches point to the necessity for fulfilling this condition in order to account for that law.

(7.) As there are *winds* of the air as well as vibrations, so there are *currents*, as well as vibrations, of the ether. The ethereal vibrations are concerned in producing the repulsion of heat, molecular attraction, and the force of gravity. Electric Force, Galvanic Force, and Magnetic Force, are referable to steady ethereal currents in a manner I shall endeavour presently to give some idea of. From Hydrodynamics we learn that such currents are accompanied by variations of density and pressure from point to point of space, and to these variations of pressure differently produced in the three instances, the three kinds of force are attributable.

(8.) The solid, liquid, and gaseous states of the same substance are referable to different conditions of the action of the atomic repulsion of heat and molecular attraction within a superficial stratum of the substance of extremely small thickness. In the gaseous or aëriiform state there is no superficial molecular attraction to control the atomic repulsion, and consequently a gaseous body,

under the influence of heat, may be enormously expanded, as is seen to be the case with respect to the comæ of some comets on approaching the sun. At the surface of a liquid there is an excess of molecular attraction, giving rise to the phenomena of *Capillary Attraction*, but the resulting action is too feeble to affect sensibly the fluidity. On the contrary, in the solid state each atom in the superficial stratum is equilibrated by counteracting atomic repulsions and molecular attractions in such manner that fluidity is destroyed and the atom can only oscillate about a certain normal position. Experience, however, shows that this state of the superficial stratum may be altered by *friction* applied at the surface, and that the atoms may thus be made to take other positions, which it is found, they retain with more or less persistence, till at length the substance returns to its normal condition. Whilst the superficial atoms are in the abnormal positions the substance is in an *electrified* state.

(9.) It seems evident that when by friction the superficial atoms are disarranged and the electrified state is induced, forces are called into play which disturb the equable distribution of the atoms in the *interior* of the substance. They must become in some degree more closely packed at some parts than at others, and there will consequently be a *gradation of atomic density*. Now I have succeeded in showing, on the before-mentioned hypotheses of the hydrodynamical origin of attractive and repulsive forces, that so long as by the action of such forces the substance is maintained in the *constrained* state above described, there will also be maintained steady ethereal streams circulating in, and in the neighbourhood of, the substance. The dynamical effects of these streams account for *electrical attractions and repulsions*.

(10.) *Galvanic* Force accords with Electric Force so far as both are due to the agency of ethereal streams which have their origin in disturbances of the atomic state of superficial strata. But in galvanism the disturbance is the result of *contact of dissimilar substances*, intensified generally by the action of acids; and because this generating process is of a *continuous* kind, it is necessary to provide conducting wires for the circulation of the streams, or for transmitting them from one position to another in the earth's interior. Whilst in these respects electricity and galvanism differ, the conditions of *polarity* are the same in both.

(11.) In the generation, by Seebeck's experiment, of *thermo-galvanic* currents, the requisite gradation of interior atomic density is produced by *unequally* heating the two ends of a lamina of metal.

(12.) There is nothing in the state of the superficial atoms of a *magnet* which has any relation to magnetic force. Yet this, like

the forces of electricity and magnetism, appears to be due to ethereal streams generated under the condition of variation of interior atomic density. Such variation may be supposed to be produced in a magnetic bar in the following manner:—It is evident that in any case of *uniform* atomic density, the molecular attractions acting on a given atom will be equal in all directions, and will therefore just neutralize each other; and that similarly the resultant of the atomic repulsions acting on a given atom will be zero. But it is quite conceivable that the equilibrium of an atom might result from the counteraction of one set of forces by the other; only in this case there must be a *gradation of atomic density*, molecular attraction always acting in the direction from rarer to denser parts, and atomic repulsion in the opposite direction. The capability of satisfying magnetic physical conditions, which exists in an eminent degree in iron, can only be attributed to the particular constitution of the substance. The effect of the known processes of *magnetization* seems to be to induce a gradation of atomic density; in soft iron, temporarily, and in hardened steel, permanently. The ethereal steady streams, generated under the conditions in which this gradation of atomic density is maintained by the interior molecular attractions and atomic repulsions, produce by their action on temporary or permanent magnets, and on galvanic conductors, those movements which experimenters ascribe to *magnetic attractions and repulsions*. Such phenomena are consequently accounted for by the hydrodynamical theory of magnetism. I take occasion to state here that I have succeeded in demonstrating, according to the principles of that theory, two well-known experimental results obtained by Gauss; namely, that the action of a large bar-magnet on a small one, when the axis of one points perpendicularly to that of the other through its middle point, varies inversely as the *cube* of the distance between the middle points; and that, in case the axis of the small one points to the middle point of the large one, the action is just *half* what it is in the contrary case. The theoretical explanations of these facts are specially noteworthy, because they depend entirely on the supposition of the *spherical form* of atoms, and may be regarded as verifications of that fundamental hypothesis.

(13.) Like all other magnetism, *Terrestrial Magnetism* is to be referred to the agency of ethereal streams; but in this instance the streams are not due to gradation of atomic density, but are simply impressed on the ether by the constituent atoms of the earth in their diurnal revolution about its axis. The generating cause being steady, the streams also are steady, and have always nearly the same relation to the position of the earth's centre, the system of streams being, as it were, borne along by the earth's motion in its

orbit. Terrestrial magnetism is, however, subject to diurnal, annual, and secular *variations*, attributable, apparently, to modifications of the ethereal streams resulting from periodic changes produced in the distribution of temperature in the atmosphere, and other matter pertaining to the earth, through solar and planetary influences. It may be noticed that the above view of the generation of magnetic streams by impulses given to the ether by the earth's revolving atoms involves the fundamental hypothesis that the atoms are of *sensible magnitude*.

28. In deducing the foregoing inferences, (1)—(13), from the Newtonian physical philosophy, I have relied on mathematical arguments contained in three works relating to the study of mathematics and physics in the University of Cambridge, which I produced in the years 1869, 1873, and 1875, and on physical investigations which I have contributed from time to time to the *Philosophical Magazine*. Any one who wishes to be fully acquainted with the reasoning which, from a few intelligible hypotheses, has conducted to results so numerous and so various, would have to consult those publications. Perhaps, however, these results, even as stated above, may be considered to give, at least, *primâ facie* evidence that the system of philosophy I am upholding is in character and comprehensiveness such as, to be true, it is required to be. If it does not embrace the whole range of physics, it fails altogether. By inspection of the words which, in the statements, (1)—(13), are put in *italics*, it may be seen that the condition of comprehensiveness, as regards the different branches of physics, is fulfilled. Considering, therefore, that a presumption has thus been established that the principles of the Newtonian philosophy are true, I shall now proceed to inquire what, accordingly, are the character and limits of physical science, and what *metaphysical* consequences may be deduced from it.

29. In the first place it is to be observed that this philosophy postulates the existence of *two* kinds of realities, those of the first kind being the ether, the atoms, and their intrinsic qualities, as already defined, and those of the other kind, consequences shown by mathematical reasoning to flow from certain conditions and mutual relations which the first kind have been ascertained to be susceptible of. As our philosophy admits of no qualities other than those the cognition of which is acquired by sensation and experience, the first class of realities are perfectly *intelligible*; and such also are the other class, because they are shown by mathematics to be consequences of the first. The very term *mathematics* (from *μάθησις*) implies this. There is, therefore, nothing *occult* in this philosophy. When we have arrived at the second class by reasoning mathematically from the first, we may be said to have

given a mathematical theory of the former, and in this way to have accounted for them. It would evidently be absurd to attempt to give a theoretical explanation of the first class, inasmuch as they are the foundation of all physical theory. If then it should be asked, What was the origin of these fundamental entities? the only answer that can be given to this question is, that they came into existence, and are such as they are, by the immediate will and power of the Creator of all things. They are *facts*—things caused to be—as are all the objects which the ordinary observer or the experimentalist calls facts. (Possibly the word had its origin in personal consciousness of the power to act and to make.) Thus in physics we are concerned with two classes of facts, which may be distinguished as *primary* and *derivative*.

30. As it must be granted that every rational *act* is done by a person and with a purpose, it is reasonable to inquire, For what purpose has existence been given to these two classes of facts? This question admits of the following explicit answer: The world was created and furnished, as we may presume, with reference to man, its principal occupant. Having endowed him with intelligence, the Creator willed to show him both His power and His wisdom. The first class of facts are indicative only of the attribute of power; the others are significant of wisdom, as consisting of ends accomplished by means. These means take the form of *laws*; whence it follows that physical laws are proper subjects of human inquiry. The inquiry consists of two parts distinct from each other, but both indispensable for constituting physical science. First, the laws which govern the results of given physical circumstances have to be ascertained by observation and experiment; and then *reasons* have to be given for the laws by employing *calculation*, according to known rules, for deducing them under the given conditions from the primary qualities of the ether and the atoms. Such results of calculation are those stated in art. 27. The calculation is possible, because “all things are ordered in measure, number, and weight” (Wisdom xi. 20), and it is not too much to assume that the Creator so ordered them for the express purpose of enabling us to obtain complete knowledge of His laws. The discovery and certifying of laws by experiment does not constitute the whole of physical science; it is a necessary part of it, but subordinate to the theoretical part. Not till we have succeeded in accounting for laws by mathematical *reasoning* founded on intelligible and ultimate premises, can we be said to have reached physical *science* properly so called. These considerations may be appropriately concluded by the following illustration:—

31. An engineer who had constructed a steam-engine to do certain work, would be able to explain to us how, by the arrange-

ment of the different parts and adjustment of their relations, the proposed end was accomplished, and we might have good reason to admire the invention and skill with which he had adapted the means to the end through his knowledge of the properties of fire, fuel, water, and iron. But it would be unreasonable to ask him to tell by what means such properties were produced, inasmuch as it suffices for his purpose merely to know that they exist. Just so we may be able to understand the prescience and wisdom with which the Creator effects His purposes in nature by operating with instruments to which He has assigned certain cognizable qualities, although the instruments and their qualities should be referable to no antecedent physical causation, but exist by immediate creation. Further it may be said, when account is taken of the Scriptural assertion that man was created in the image of his Maker, that the human intelligence displayed in mechanical constructions is not essentially different from the divine intelligence whereby the mechanism of Nature was planned and executed.

32. Before proceeding to another part of the discussion, it will be proper to introduce here a question the consideration of which will bring the Newtonian physical philosophy into close connection with the metaphysics of Scripture. In art. 18 mention is made of a regulative principle, according to which the ultimate properties of matter which form the basis of physical theory are *not quantitative*, inasmuch that gravity, the law of which has a numerical expression, is on that account not an ultimate quality. There is, however, a noteworthy exception to this rule in the definition we have given of the ether. This medium was assumed to have the property of varying in pressure proportionally to variations in density. But this hypothesis is contradictory to the principle just mentioned of non-variability of ultimate properties. In addition to this, such relation between pressure and density is a *law*, actually pertaining to air of given temperature. Now, since it is the province of theory to account for laws, this law of the ether should be referable to some ulterior cause. As respects the air, I have reason to say that the law may be accounted for by the dynamical action of the ether. It would seem, therefore, obvious to ascribe the existence of the same law in the ether to the action of another ether of still greater tenuity; and so on. This inference respecting successive ethers is very analogous to the idea of "invisible universes" of successive orders proposed in pp. 170-172 of *The Unseen Universe*, on the agency of which the authors of that work lay great stress. But it seems to me much to be questioned whether there is reason to admit the reality of this succession of ethers in the sense in which we may admit the reality of the one ether whose existence and qualities we recognize by *phenomena* (see art.

27 (1)). I do not know that I can better express my views on this point than by quoting from one of the works referred to in art. 28, which was published in 1875 under the title, *Cambridge Mathematical Studies, and their Relation to Modern Physical Science*.

33. In page 92 of that work I have argued as follows: "It was legitimate to assume the existence of an ether having the properties of pressing, and of pressing proportionately to its density, provided it could be shown that these hypotheses were necessary for giving reasons for natural phenomena. Let it be assumed that this has been shown, or may be shown, by our system of philosophy, and that thus the pressure and variation of pressure of the ether may be proved to be realities. The question might then be asked, What account can be given of the agency concerned in this pressure and variability of pressure? It is to be noticed that this is not a *physical* question: we have now (on the above assumption) passed the boundary of physics. It can, therefore, receive answer only by reference to *metaphysical*, or *spiritual* agency." (These assertions are made on the ground that, as presumptive evidence has been given that the Newtonian physical philosophy is true (see art. 28), we may suppose all physical phenomena to be explainable on the hypothesis of a *single* ether, and consequently infer that there can be no phenomenal evidence of the existence of any other as a physical agent.) "It seems to me not unreasonable to suppose, since we, as partaking of a spiritual nature, are endowed with power over the gross matter which constitutes our bodies, to move it at our will within prescribed limits, that there may be intelligent spiritual beings of another order, by whose conscious and immediate agency, exerted in fulfilment of their Maker's will, the pressure of the ether, and the law of variation of its pressure, are maintained, that thereby it may perform its destined physical functions. This view is in conformity with the teaching of the Scriptures respecting *angels*, to whose agency they uniformly ascribe what we call Nature's operations, apparently because, as I have already said, it is inconceivable that there can be any production or event apart from the purpose and consciousness of an operator." May we not in this sense interpret the text, "He maketh His angels spirits and His ministers a *flame of fire*"? (Heb. i. 7). According to St. Paul's preaching to the Athenians, we possess the power of moving the body by reason of union with our Creator, for he asserts that "in Him we live, and *move*, and have our being" (Acts xvii. 28). So also the power of angels is conditioned and derived, and what is done by angelic agency is done by God Himself. The foregoing argument may be taken to be the sequel of that which was begun in art. 21.

34. After the preceding discussions we may proceed to consider in what relation the Newtonian physical philosophy stands to the question of *miracles*. Since it has been shown that according to this philosophy there are two kinds of natural facts, one primitive, the other derivative, one referable to no physical causation, but resulting immediately from creative energy, the other derived from the first by recognizable physical causes operating according to ascertainable laws, obviously a miracle may be put in the first class of facts, and be regarded as the product of a re-exertion of creative power. By whatever personal instrumentality a miracle is performed, it is the act of a *Creator*, who must be conceived to be Omnipotent, and consequently no human judgment could be antecedently formed as to what might be the character or limitation of miracles, their actuality and quality being absolutely determined by will and power which are not subject to limitation or condition.

35. Yet the testimony of the senses is as adequate to certify respecting the reality and character of a miracle as if it were any ordinary event. This may be shown by the following argument. According to the principles of our philosophy, a miracle cannot be a *violation* of physical laws, inasmuch as these laws are *logical* consequences of primitive facts of an invariable kind. It is true that these facts, or premises, may by a miracle be changed as to number, mutual dependence, and relations to time and space, but the characteristics of the primitive facts, and the *reasons* derivable therefrom for the laws (as shown in art. 30), remain always the same. When, for instance, five thousand persons were fed with five loaves miraculously multiplied, the bread that they ate was endowed from the first with the same qualities as ordinary bread, and became subject to the same laws. The miracle consisted in the *multiplication* of the loaves by an operation which, as being *creative*, is incapable of being submitted to logical inquiry. But the wonderful effect was matter of actual observation and experience.

36. The Scriptural miracles may be placed in the category of "Metaphysics of Scripture," not solely because they are due to personal will and agency, for this, as we have argued in articles 25 and 33, is to be predicated of all natural operations, but because they are due to such agency exercised for special purposes *supernaturally*. Consequently, in so far as the metaphysics of Scripture include the supernatural agency whereby miracles are wrought, they stand in no contradiction to the Newtonian physical philosophy, which, according to our argument, allows of creative miraculous acts; rather, miracles may be regarded as the logical outcome of that philosophy. On the contrary, the metaphysical philosophy of Hume, as also that maintained in *The Unseen Universe* (see the citations and remarks in articles 10 and 11), are directly

opposed to such definition of a miracle as that which is proposed and exemplified in articles 34 and 35. The reason of this diversity may be stated in few words. It arises altogether from a gratuitous rejection, on the part of these philosophers, of the physical doctrine, that the essences of matter and force are cognizable by sensation and experience, and their inability, in consequence, to admit the existence of the class of facts which Newton asserts to be the foundation of philosophy.

(To prevent misapprehension, I take occasion to explain that I have made no allusion to what the authors of the above-mentioned work say respecting Newton's *mechanical* philosophy, which they make much of, and about which there is no room for dispute. I refer only to their persistent opposition to Newton's Third Rule of Philosophy at the beginning of his Third Book, in consequence of which, as it seems to me, they deviate from the prescribed path of physical *theory*, and are compelled to have recourse to arbitrary *speculation*. In justification of this remark I may appeal to the vast amount and singularity of the speculations which the authors of that work, and others who think with them, have recently promulgated. See what I have said in pp. 73—81 of the publication cited in art. 32.)

After what has now been said on the question of miracles, in addition to the views expressed in articles 8—11, and considering that the same subject is discussed in my remarks appended to the Rev. Prebendary Row's Paper on "The Principles of Modern Pantheistic and Atheistic Philosophy" (contained in No. 31 of the Journal of the Transactions of the Institute), to which remarks I beg to call the attention of readers of this essay, there is no need to say more on the relation of Scriptural Metaphysics to the department of science designated as *Physics*. I shall now proceed to analogous inquiries relative to other departments of Natural Science, as especially *Geology*, *Botany*, and *Natural History*.

37. There is this particular advantage in having treated of Physics first, that as being more completely understood than the other branches of science, it furnishes a pattern whereby the discussion of these for the purposes of our argument will have to be regulated. Accordingly it may be presumed that in each department there will be both primitive and derivative facts, and we shall have to employ all available means to distinguish one kind from the other. Also, arguing analogously from the conclusions arrived at in Physics, we might say that in all cases the primitive facts exist by immediate *creation*, and that by this criterion they are distinguished from the derivative facts, which are results of the operation of *laws*. Now, the first chapter of Genesis professedly

gives an account of the creation of heaven and earth and all the things therein. Considering that this account treats of subjects that were far removed from all human cognizance and experience, it would be a foolish proceeding to draw inferences from it on any other hypothesis than that it is a direct communication from the Holy Spirit of the Creator. On this ground alone can it be accepted as trustworthy. And surely there is nothing unreasonable in the belief that the Creator has Himself given to His intelligent creatures an account of His creation. The principles I am advocating are such as to make it necessary to insist on this point. For, by definition, the primitive facts cannot be reached by reasoning, although, without knowing them, the sciences to which they respectively belong have no theoretical foundation. It may be admitted that something may be done towards *hypothetically* laying such foundation by observation and research, since, in fact, this has been done in the case of theoretical Physics; but with respect to other departments of Natural Science I shall presently have occasion to remark that attempts of this nature have led to very uncertain results. It is, at least, evident that no surer foundations for the sciences of Geology, Botany, and Natural History could be laid than authoritative declarations from the Author of the Universe as to what are really the ultimate and primordial facts of these sciences. At the same time it must be admitted that with respect to the *laws* of the operations whereby facts of observation result from the ultimate facts, no information can be obtained from the first chapter of Genesis, which states only primary conditions and final causes, leaving apparently the *modus operandi* for our scientific researches. It may, however, be said that it is legitimate to employ the knowledge acquired by such research in *interpreting* the Scriptural statements.

38. This being understood, we may next inquire what information respecting the foundations, or ultimate facts, of Natural Science may be gathered from the revelations of Gen. i. In making this philosophic use of that chapter I propose to take it just as it is given in the Septuagint, on account of the sanction which this version has received in the New Testament, and the improbability that any rendering of Hebrew texts of later date by many centuries than the text which was in the hands of the Seventy Interpreters can as faithfully express the meaning of the original and the mind of the Spirit as that ancient Interpretation. The literal translation of verses 1 and 2 is as follows:—"In the beginning God made the heaven and the earth. Now the earth was invisible and unfurnished; and darkness was upon the abyss; and breath of God was borne upon the water." The first verse may be taken as simply asserting that all the constituents of external nature were

originally created in such manner that, as explained in the Epistle to the Hebrews (xi. 3), "things seen were not made of things that do appear." Interpreted on the principles of physical science, this original creation may be understood as referring not only to the ether and the atoms, but as embracing also the composition of all visible and tangible substances, whether simple or compound, as respects the number and arrangement of their constituent atoms and molecules. This supposition does not exclude, but rather lays the foundation of, the sciences of *Chemistry* and *Crystallography*, the former consisting, for the most, in analyzing, and to a limited extent compounding, bodies, and the other in determining the forms of their superficial boundaries as resulting from their composition and the ætherial forces which maintain the arrangement of the atoms.

39. It does not seem possible to conceive how the *proportions* of the gaseous, liquid, and solid parts of our earth were determined to be such as they are except by creation according to an antecedent design. What is said in verse 2 implies the existence already of these components, mention being there made of earth, water, and air (γῆ, ὕδωρ, πνεῦμα), and of relations between them. Of the earth, or solid part, it is stated that it was "invisible and unfurnished," which might well be, owing to its being covered by an "abyss" of water, of unperceived depth, but bounded by an upper surface. On this surface rested the air we breathe, πνεῦμα Θεοῦ.

(The Septuagint does not admit of the translation "the Spirit of God," because the article τὸ is not prefixed. Also the word translated "was borne" (ἐπεφέρετο) applies only to a material substance, being the same word as that used in Gen. vii. 18 to express that the ark was borne up by the waters of the Deluge. What in Job xxvii. 3 is called "the Spirit of God" according to the English version, and πνεῦμα θεῖον according to the Septuagint, and is said to be in the "nostrils," is evidently air that is breathed. When, however, it is considered that it is only in consequence of perceiving effects of the air we breathe that we speak of *the spirit of life*, it will appear that the adjunction of Θεοῦ to πνεῦμα necessarily has implied reference to the Holy Spirit, the Giver of Life.)

40. Hence, according to the statements of Scripture, as scientifically interpreted, we have to think of the primordial earth as consisting of a solid nucleus, enveloped by a shoreless ocean, on the surface of which an atmosphere is incumbent. The generation of Light by God's command on the first day might be the sensible evidence of the contemporaneous commencement of all the vibrations and motions of the ether by the action of which, according

to the principles of our philosophy, the gaseous, liquid, and solid states of the earth's tripartite materials are maintained. It will be seen that in these views no account is taken of Laplace's *Nebular Hypothesis*. I confess that I have never been able to accept that hypothesis, on account of the hopelessness of the possibility of our ever comprehending in what way masses of porphyry and granite, and such substances, could have been produced from cosmical nebular matter. Since, as I think I have shown, the words of Scripture point to the existence of primordial conditions of quite a different kind, and since also, according to our principles, we can look for information respecting such conditions only from the Word of the Creator, I conclude that there is no foundation for the *Nebular Hypothesis*.

41. In Eastern nations it seems that a traditional cosmogony was extensively prevalent, according to which the original state of the earth is likened to an *egg*. Whether or not this idea had its origin in Scripture, it certainly approximates closely to the view taken above of the description in Genesis i. of the earth's primordial condition. Now, as by mere application of heat the chick is generated out of the albumen and yolk of the egg, analogous effects might result from the action of *heat* on the component parts of the earth disposed as above stated. The first effect of such action might be to produce the *firmament* spoken of as made on the second day, the heat generating by evaporation from the ocean-surface a cloud-stratum, separated by a certain interval from the earth's surface, and analogous in that respect to the ever-varying and cloud-like stratum which the telescope shows to us as encompassing the body of the sun.

42. Before proceeding to the next step, I beg to call attention to a singular circumstance relating to the distances of the planets from the sun. The intervals between successive orbits increase, it seems, with distance from the sun according to an empirical law, called *Bode's law*, which, however, has no pretension to exactness, and was found, in fact, not to be satisfied in the case of the distant planet Neptune. As the theory of gravity will not account for such a law, possibly it may be ascribed to a repulsive action between the planetary masses at very remote geological epochs, when their internal and radiated heat might far exceed the amount of any existing at the present time. Supposing a change of distances from the sun to have resulted from this operation, till the planets settled down into their present mean distances, and supposing their masses at the same time to have undergone a process of cooling, we have in the consequent variation of the earth's internal heat, and in the before-mentioned cloud-stratum, just the conditions which, according to the arguments in my paper "On the Relation

of the Scriptural Account of the Deluge to Physical Science," would suffice for causing *the dry land to appear*. It is here, I think, we may see on what kind of foundation the science of *Geology* rests. We cannot predicate the primordial state of the earth; but this being told us, the physical consequences are matters for logical inquiry and mathematical investigation.

43. By the combined action of water and heat the surface of the dry land might be prepared for the reception of herbs and trees, which in Gen. i. 11, 12, are said to have been created on the same third day. Respecting this creation it suffices for my purpose to remark that the Scripture states that the herbs and trees were of different kinds, and that each kind was complete in itself, having *seed* in itself, and yielding *seed*. The *seed* is the primitive fact. The science of *Botany*, which has nothing to do with the origination of seed, consists in ascertaining the laws of *growth* therefrom, and of the *reproduction* of herbs and trees.

44. The creation of "the two great luminaries" and of "the stars also," is referred to the fourth day. Speaking scientifically, we should say that they were already in existence, having been created at the same time as the earth. But here a principle discoverable in Scripture narrative is to be taken into account, the non-recognition of which has given rise to much error (as, for instance, in Dr. Colenso's writings on the Pentateuch). The principle is, that an order of narration with respect to time is subordinated to an order governed by relation. The pervading purpose of the statements in Genesis i. is to indicate the successive steps by which the earth was made fit for the life, growth, and reproduction of plants and animals. Alternation of day and night and of seasons might not have been necessary for the life and growth of *plants* in remote geological times, and, in fact, would not have existed, if, as might reasonably be assumed, the earth, by reason of a high degree of temperature, was then *self-luminous*. But, according to existing circumstances, alternations of day and night and seasons are required for the life and sustenance of *animals* and of man. Between the epoch of the first creation of plants and that of the creation of animals, the decrement of terrestrial temperature might have so modified the cloud-stratum as to give it the ever-varying and intermittent conditions which we witness at the present day, and allow the luminaries to be seen so as to rule days and nights, and months and years. According to the above-stated principle, their creation would be mentioned in connection with that change. It is to be noticed that what began to be *effected* by the luminaries on the fourth day is chiefly dwelt upon, their creation being only incidentally mentioned.

45. On the fifth day God commanded the *waters* to bring forth

fish and fowl. As this is not a natural process of generation, the command given to the waters signifies that the effect was produced simply by a *creative* act. It is expressly said that both fish and fowl were *thus* created "after their kind," which is a direct assertion of the original generation of *species*.

46. So also on the sixth day the *earth* is commanded to bring forth beasts, and cattle, and reptiles; which, for the same reason as that just mentioned, means absolute *creation*. Lastly, man is created, male and female, in the image of his Maker. Adam was made of the dust of the ground, and Eve of a bone of Adam, expressly to show that the human race had its beginning in a single pair by *creation*, all others coming into existence by means of natural generation. The creation of *species* of beasts and cattle is as expressly affirmed as that of fish and fowl.

47. I suppose that no advocate of development would contend that an oak might have had its origin in a lichen, or a blade of grass. There is just as little reason to say that man was developed from an oyster. Different species were created *ab initio* for different purposes. The lion, the horse, the lamb, severally have assigned parts both in nature and in Scripture. The ape, possibly, might be intended for setting forth by contrast the grace and nobleness of the human form, being all the more adapted to that end by its proximity in external appearance in some respects to man. But the Scriptural doctrine of species forbids us to admit that man could have had his descent through an ape.

48. I propose to conclude this Essay by directing attention to the leading points of the arguments I have adduced. With respect to all that has been said, the most essential principle is the distinction between created existences and those which result from them by the operation of laws. To this principle I have been led by adopting the Newtonian Physical Philosophy. The distinction pertains to all departments of physical and natural science. In Physics the primitive entities are the ether and the atoms, the creation of which is implied in the account of the Creation in Gen. i., although their names have been derived from Greek philosophy, and their reality is established by modern science. But with respect to the other departments of natural science, my contention is that we are absolutely dependent on Scriptural statements for knowing what are really the primitive facts originating in creation. Modern theories of the origination of the facts of the external world are only vain attempts to dispense with having recourse to the Word of God for information. Darwin has invented *phrases*, which have become current, but how far they express realities still remains to be shown. The *protoplasm* of Huxley only demonstrates the perfection of the instrumental means

by which the *consequences* of the primordial conditions have been traced to their minutest particulars, but is itself in no respect *primary*. In an article contained in the *Fortnightly Review* for November, 1875, Dr. Tyndall expresses great admiration of the beauty of the form of the *snow-flake*, which he seems disposed to attribute to some undefined virtue in atoms, but dares not say that there is "Mind." The mathematical physicist, who has ground for expecting that he may be able to account for this form by reasoning from the properties of the ether and atoms, has not the less reason on that account to admire its beauty; and besides, as knowing that his mathematical symbols are only means to help him to *understand* how the effect is produced, he is compelled to believe that the *modus operandi* was ordered by mind, which from the first perceived the consequences. It is remarkable that in Gen. i., where after each creation it is said that "God saw that it was good," the word for "good" in the Septuagint is *καλόν*, which, as applied to material substances, can only mean "beautiful."

The authors of *The Unseen Universe* are certainly not chargeable with opposition to Divine Revelation. But by not accepting the Physical Philosophy which ascribes our perception of ultimate qualities to sensation and experience, they reject the aid of *personal consciousness*, which in Scripture is recognized as a source of knowledge. ("That which may be known of God is manifest in them."—See Rom. i. 19, 20.) This, I think, accounts for the *inconsecutiveness* of the arguments by which they attempt to connect physical science with the truths of Revelation. (See Appendix II. of the work cited at the end of art. 32.)

I am well aware that arguments have been adduced in this Essay that are insufficiently developed to be generally intelligible, and others that might be called in question. I think, however, that I may have done something both for science and for religion if I have succeeded in demonstrating that physical science consists of two distinct parts, one relating to *causes*, and the other to *laws*, and in indicating their respective relations to Scriptural truth.

The CHAIRMAN.—I am sure you will unite with me in returning cordial thanks to Professor Challis for his very able paper; it will be open to those present to offer remarks thereon after two communications have been read.

The HONORARY SECRETARY then read the following letters:—

"THE CLOSE, LICHFIELD,

"28th April, 1876.

"DEAR SIR,—I have to thank you for your courtesy in sending me the 'proof' of Professor Challis's paper, which is to be read at the Victoria Institute on the 1st prox. I see by his first paragraph, and his subsequent handling of his subject, that he uses the word 'metaphysics' in its etymo-

logical and Aristotelian sense only, and not in the 'comprehensive' and technical sense in which the term is now ordinarily used. I wrote to you, therefore, under a misapprehension of the Professor's intention. I am sorry that he has given by his terminology any countenance to the idea that metaphysics, in their ordinary sense, are to be found in Scripture. I learnt from Bacon's *Advancement of Learning*, that 'natural theology hath been handled confusedly with metaphysique,' (p. 134); and again, I learnt from him to beware of basing divine revelation on any *à priori* grounds of reasoning, (p. 129). 'Out of the contemplation of nature, or ground of human reasoning, to induce any verity or persuasion concerning the points of faith is in my judgment not safe, "Da fidei quæ fidei sunt."—*Conf.* p. 310, Pickering's edition, 1825. I should imagine that all that can be truly said about the metaphysics (properly so called now) of Holy Scripture would be that the Bible *takes for granted* a Personal God and our own personal consciousness—('God and my own soul,' as Dr. Newman phrases it) and the existence of external matter. With the Professor's paper I am not capable of dealing.—I remain, yours faithfully,

"C. J. ABRAHAM (Bishop)."

"COLLEGE, REGENT'S PARK,

"April 26th, 1876.

"MY DEAR SIR,—I cannot agree with what Professor Challis says in para. 39, the part within brackets; or in part of the preceding paragraph.

"It will not be generally admitted that *πνεῦμα Θεοῦ* cannot mean 'the Spirit of God,' or rather 'God's Spirit,' on the ground that the article is omitted (see *e.g.*, Matt. xii. 28; Luke iv. 18; 1 Cor. xii. 3; 2 Cor. iii. 3; where the reference to the Spirit of God is clear though there is no article). Nor is it well to paraphrase *πνεῦμα Θεῶν* as the *air*, or the air we breathe. The conclusion reached, that by the addition of Θεῶν there is an implied reference to the Holy Spirit as the *Giver of life*, is, I think, just, but it is hardly consistent with the *verbal* criticism that precedes.

"The general principle is, I think, accepted—that when *πνεῦμα* refers to the Spirit of God, τὸ Πνεῦμα calls attention to his PERSONAL agency and πνεῦμα to his *influence*. Hence our Lord was begotten not by τὸ πνεῦμα but by Πνεῦμα ἕγιον simply.

"I think it likely that Professor Challis may intend to affirm that *πνεῦμα Θεῶν* means the *vitalizing* air of which God by His Spirit is the Creator; but this is hardly expressed; and the Greek criticisms are not, I think, sustainable in the strong form in which he puts them.—Yours very truly,

"JOSEPH ANGUS."

REMARKS BY MR. JOHN WALTER LEA.—I wish to say a few words upon one point in Professor Challis's paper, viz. his censure of a passage in *The Unseen Universe*, quoted in para. 10. "We think it is not so much the right or privilege as the bounden duty of the man of science to put back the direct interference of the Great First Cause—the unconditioned—as far as he possibly can in time. This is the intellectual, or rather theoretical, work which he is called upon to do—the post that has been assigned to him in the economy of the universe." "It does not seem likely," says Professor Challis, "that a man of science who has this preconceived view of 'bounden duty' can devote himself to the pursuit of science with his mind unbiassed and free from the influence of pre-judgment."

Now I grant that, at first, the statement is startling. The authors may have intended to startle, in order to compel thought. For myself, though alive to its possible abuse, I am, on reflection, ready to adopt it.

For I take it to mean no more than this: that the vocation of the man of science, the distinctive work which God has given him to do, and which it is his "bounden duty" to do, is to investigate physical phenomena and their causes; to relegate every such phenomenon to its corresponding physical cause, if it has one; and if no such cause exists, to show its non-existence, *i.e.* to explore the chain of physical causation to its first link; and as in every successive link the cause is but the effect in the link immediately preceding, the process extends backwards indefinitely, though necessarily not infinitely. But in every case, in the absence of, at least, overwhelming probability to the contrary, the presumption will be, and ought to be, that physical effect is preceded by physical cause: this is the essential condition of his working at all. It is always so. The spectrum-analyst presumes that every substance under properly arranged conditions will present *some* kind of spectrum; the chemist, that every compound substance is a combination of elements in *some* definite proportions; the biologist, that every organism has had a similarly organized immediate progenitor; the zoologist, that every example of an animal whose ordinary mode of reproduction is known has been produced accordingly; and every one of these men will work on that presumption, unless in any given case it is plainly untenable. So, generally, the scientific man must work on the principle that physical phenomenon involves physical cause, till the contrary be proved; and this is nothing but "to put back the direct interference of the Great First Cause—the unconditioned—as far as He possibly can in time," not because he wishes to be rid of it, or fancies that the process of "putting back" can go on for ever, but simply because God has given him work to do which he can do in no other way; and therefore fidelity to his vocation and to his God demands it of him.

No doubt the godless investigator may abuse his vocation. He may worship secondary causes and deny the First altogether, or only recognize Him as exerting a momentary creative energy, followed by a virtual self-extinction in favour of an endless routine of blind automatic "law." Both these theories are practically atheistic. The one denies the existence, the other the providence of God. But the atheism of the latter is in no wise the necessary result of his veneration for "law." A saint may place the immediate intervention of the Creator at a point equally remote. His humility may forbid him to say, "I have reached the limit of the chain: beyond this there is nothing but the fiat of the Supreme Will." He knows that a point exists where the Creator and the created stand face to face; but though it may be impossible at some conjecturally attainable point to predicate absolutely the continuity of physical causation, its necessary discontinuity is obviously equally unpredicable; and in such a case I think duty requires that (practically) science should have the benefit of the doubt, and that the inquirer should never despair of ultimate success in a search for what he cannot, perhaps, at the time even hypothesize. There is no necessary tendency in this to get "rid of any reference to agency governed by *personal will*" (para. 10), since intellect and religion seem satisfied by the conception (to quote the words of Professor Nicholson lately delivered to this Institute) of the "Government of the world by Providence, acting through and by secondary causes and according to invariable laws." Unroll the coil of secondary causes as far back as we will, if we hold fast by Providence we are secure. For it excludes for ever the idea of a world "constructed

originally like a huge machine,—that now goes on without the presence or intervention of the mind that made it.” On the contrary, it constrains us to “believe that the Divine Mind is never absent from nature ; that every event, even the smallest, is individuated by it,” and the recognition of “law” only requires us to believe that in every event, small or great, the forces of nature are so guided and directed by the Supreme Mind as to give effect to His will” (see *Church Quarterly Review*, vol. ii. p. 26). Practical atheism may concede an original creative act, but not a continuous Divine Providence, even though acting through invariable laws, and thus operating only mediately. God’s Providence preserved the three Hebrews in the furnace and Daniel in the den ; the same Providence truly and literally gave us every meal we have eaten. But in all these cases probably numberless laws intervened ; the greatest number, perhaps, in the ordinary case of our daily food. Law and Providence are in perfect concord. “One sparrow shall not fall on the ground without our Father” ; yet “till heaven and earth pass, one jot or one tittle shall in no wise pass from the law till all be fulfilled.”

The conception is not incompatible with the doctrine of evolution. It is as literally true that God “made me” as if I had been not only the first man, but the primordial germ of all created things. And I perceive no logical or other inconsistency between this and the further belief that every event of my life, though governed by invariable laws, has been as completely under the guidance of an ever-present and ever-acting Providence as if it had been the immediate result of a special exertion of Divine power.

The dictum of the authors of *The Unseen Universe* may, I think, be accepted by any scientific man without arrogance or irreverence. The greater his humility and the more profound his adoration of the unsearchable wisdom of God, the greater may be his unwillingness to believe that he can ever run up the clue of causation to the Throne of the FIRST CAUSE. God is “a God that hideth Himself.” Surely a man may attribute it to his own infirmity that he can see no further along the golden chain, rather than flatter himself that he has run through the links home to the beginning. And so I, for one, prefer to call such a persistent search after secondary causes a seeking after God rather than an attempt to get rid of Him.

Such a man may believe with Dr. Lionel Beale, that vitality is a distinct force or “power unknown to physics,” and that “the more minutely we investigate the phenomena of living matter the less likely does it appear that the causes of these will be discovered in the domain of physics, or that any vital action will be proved to be in the grasp of physical law” (*Protoplasm*, 3rd ed. pp. 310, 343) ; but none the less will he increase the power of his microscopes and patiently peer into those silent depths whose very simplicity is so awful. Or again, he may hold to the physical theory of life ; he may overleap, with Dr. Bastian and others, the line of assumed demarcation between the living and the non-living, the organic and the inorganic ; he may even reach out, with Professor Tyndall, to the “potentialities of the primeval mist” ; still there is nothing even here incompatible with true religion and true reverence, if only he believes in God the Creator and Preserver, Who, as Creator, gave His creation a “law which shall not be broken,” and, as Preserver, ever sustains it in conformity with that law. God’s providence is the real test. Such a conception of “invariable law” differs *toto caelo* from the soulless and barbarous necessitarianism which is the outcome of the philosophy of some who dream that they, if not they only, “think deeply.”

I contend that religion and faith are not necessarily implicated either way

in these strictly scientific speculations. To myself personally the evolution theories of Professor Tyndall, Dr. Bastian, and Mr. Darwin, as well as the physical theory of life generally, have always seemed scientifically unsatisfactory; but evolution of some kind, as at least an important factor in the Divine method of creation, commends itself to me more and more. And so far from its obscuring the recognition of a personal God or weakening belief in His never-failing Providence, it has an eminently contrary effect. And I desire to express my earnest conviction that the advocates of special creations and immediate providences, and the assertors of continuity, evolution, and invariable law, may meet on common ground of piety; and falling down together before God may worship Him in that glorious Trisagion which deserves to stand as the confession and thanksgiving of every true son of Science, "Holy, Holy, Holy, LORD GOD Almighty, Which was, and is, and is to come. THOU art worthy, O LORD, to receive glory and honour and power; for Thou hast created all things, and for Thy pleasure they are, and were created."

Rev. Prebendary Row.—I am desirous of offering a few remarks on the present paper. The examination of the strictly mathematical and scientific portions of it I shall remit to others. My observations will be chiefly confined to those portions of it which deal with the subject of miracles, which may be considered to come more particularly within my province. To some points, as laid down by the Professor, on this subject, I shall have to take exception. Before doing so, however, I wish to ask a question as to the atoms and the ether, which are so frequently referred to by Professor Challis. He seems to divide the universe into two portions, atoms and ether. Are we to understand that the ether is material, or immaterial? If the former, does it consist of atoms? If so, it is merely dividing the universe into atoms and atoms. The ether is described as possessing the power of pressure. Whence does this power originate, if the ether consists of atoms? There is something analogous to the Professor's views on this subject in the work called *The Unseen Universe*; but its authors go a step further, and affirm that *force* is a thing which has an actually objective existence in the universe, and as such, that it passes from the visible into the invisible universe. This is certainly, to say the least of it, a startling position. I wish to express my full agreement with the Professor's observations in paragraph 10 of this paper; as to what the authors of *The Unseen Universe* assert as to the duty of men of science, "to put back the direct interference of the Great First Cause—the unconditioned—as far as they possibly can in time." One thing, and one thing only, is the duty of the man of science, to discover truth, and to embrace it whenever it can be found; and not to enter on his investigations of the universe with any prepossessions whatever. It seems to me, that such a view of the universe is one which resolves it into a huge machine, which goes on in a series of self-evolutions, and represents the Creator as standing entirely external to it. If my memory is correct, they make use of the following metaphor to give us an idea of their meaning.

They represent the position of the Creator, as if He were seated at the head of an interminable avenue of pillars, and the utmost that we can do is to get an extremely distant view of Him. This idea may be all very well, if God is nothing but a perfect mechanist, who has contrived a machine so marvellous that it goes on grinding out its results in so admirable a manner as to dispense with the necessity of His presence in His works. Such, however, is certainly not the God of the Christian Revelation. If there is one thing which the Bible affirms more strongly than another, it is the constant presence of God in His works. The forces of nature are His forces. "In Him," not simply by His agency, "we live and move and exist"; and this idea seems to me to permeate Revelation from one end of it to the other; affirming, as it does, His constant presence and energy, not only outside, but also in everything that exists. I also fully concur with the remark made in the following paragraph, that the views in question are inconsistent with regarding miracles as acts determined by personal will. The authors in question, if I remember rightly, have at any rate partially adopted Mr. Babbage's theory of miracles. This, as you will remember, consists in applying to the laws and order of the universe, the principles of his calculating mill. Its Auctor in fact has constructed the universe so as to grind out miracles, whenever occasion arises for them, in the same manner as Mr. Babbage's machine will grind out a new series of numbers differing from those which it habitually grinds, and then quietly return again to the first series. This idea of Mr. Babbage is a most ingenious one, and precisely such as one might have expected would commend itself to his mechanical mind. Viewed in this aspect, the universe may be designated a miracle-working machine, which is capable of producing events which will answer the purposes of miracles, without any interference whatever with the action of its ordinary forces. The author of *Supernatural Religion* objects to this miracle-working machine, as an evasion of the real point at issue, and, I think, justly; for the plain fact is, that whatever things of an apparently miraculous character such a machine might be able to produce, it would be utterly unable to give out the most important miracles of the New Testament, as, for example, the resurrection of Jesus Christ. With abstract theories about miracles generally, we have little concern; but the very existence of Christianity is involved in the objective reality of some of the facts which are affirmed in the New Testament. These, no cunningly-devised operations of Mr. Babbage's miracle-working machine could possibly have effectuated; and therefore, however wonderful a piece of mechanism such a machine may be, it is useless to us, for it is plain that the great supernatural events recorded in the New Testament require the intervention of personal will, which no piece of mechanism, however ingenious, can possess. I now turn to Professor Challis's theory of miracles, embodying the assertion that the conception of a miracle involves an exertion of creative power, by which I understand him to mean, that the conception of a miracle

implies an exertion of that power of God which we designate creation, as distinct from that power which is exerted in the providential government of the universe. Such a view seems to be laid down in several parts of this paper, especially in para. 35 ; and by the reference to the miracle of the loaves and fishes, it seems to imply that their multiplication necessarily involved the creation of matter not previously existing. I think it most inadvisable to include in our definition of a miracle any statement of the *modus operandi* which has been employed by God in its performance. Of the mode of the divine action we are profoundly ignorant ; and therefore to affirm that God must have acted in this or that particular way in the performance of a miracle, is only to involve the subject in a number of needless difficulties. I have been under the necessity of giving the deepest attention to this subject in answering *Supernatural Religion*. Its author has taken advantage of the imperfect definitions which theologians have given of miracles, and which opponents of Christianity have borrowed from them, to involve the whole subject in a complete fog. It has taken no less than six chapters of my answer to that work, to clear away the mists of confusion in which we have become involved. Among these imperfect definitions are the assertions that miracles are contrary to the laws of nature ; that they are violations of them, that they are suspensions of them, or that they necessarily involve creative acts. I contend that there is nothing in the conception of a miracle which requires us to assume that the laws of nature have been either violated or suspended. The narratives of some of the miracles in the Old Testament directly affirm the contrary, as, for example, the passage of the Red Sea ; for it is expressly asserted by the historian that the division of its waters was effected by God having employed the agency of an east wind for that purpose, a force already existing in nature. A similar affirmation is made as to the miracle of the locusts. Not one word is there to imply that they were created for the occasion : they were conveyed to Egypt by the agency of what we designate second causes. So again with respect to Peter's walking on the water. The account in the evangelists makes it plain that the forces of nature were so far from being suspended on the occasion, that they were in active energy all around him, for the moment his faith failed him he sank. The force of gravitation must therefore have been in active energy at the moment of the performance of the miracle. How it was effected we are profoundly ignorant ; but it is important to observe that the only thing which the miracle necessarily presupposes is, the presence of a power able to counterwork the force of gravitation by which Peter's body was borne downwards. A similar power we exert whenever we lift a stone from the ground ; when we do so we neither violate nor suspend a single natural force. Surely what is possible to man must be possible with God. If man can regulate the forces of nature so that he can effectuate his purposes through their agency within his limited sphere, without violating or suspending them, much more can God within

His infinitely extended one. Similar remarks are applicable to the multiplication of the loaves and fishes. I entirely disclaim the intention of making any affirmation as to how this miracle was accomplished ; but to affirm that it involves the creation of matter which was not previously in existence is only to involve the subject in needless difficulties. I have fully pointed this out in my answer to *Supernatural Religion*. The constituents of the seven loaves and the two fishes had been built up into their existing forms by God through the ordinary forces and laws of nature. Who will affirm that He could not have effectuated the same result by means of some combination of these forces different from that which He usually employs ? The ingredients necessary for multiplying the loaves and fishes were all present, either in the earth, the water, or the air. In the ordinary processes of nature He builds these up into loaves and fishes in one way ; in the miracle in another. Of the mode of the divine operation we are ignorant, but it is simply to encumber the entire question with needless difficulties to affirm that a miracle must involve either a suspension of the forces of nature, or a violation of its laws or order, or the creation of matter not previously existing, or even the creation of a new force ; for God is everywhere present in nature and its forces. The question of miracles has been already sufficiently confused through the ever-varying senses in which both theologians and scientists have used the terms, nature, law, force, natural, supernatural, miracle, and then arguing on them as though they had one clear consistent and invariable meaning. Such confusion forms the very storehouse from which unbelievers draw their weapons. What, for instance, do we mean by the word "nature" ? Does it include all things that exist ? or is it confined to the regions of necessary law ? or does it include man, his voluntary actions, and self-originating power ? According as our use of it includes one or the other, we apply it to wholly different classes of phenomena ; and the ideas intended to be conveyed by the terms "natural and supernatural" must undergo a corresponding variation. Thus the whole question about miracles has been allowed to drift into a mass of confusion, through the ambiguous use of words ; and by the introduction of unnecessary terms into our definitions. It is a deep sense of the confusion into which we have thus fallen which leads me to protest against introducing into our definition of a miracle, that it necessarily involves the exertion of what is popularly called "creative power." To my own mind, to speak of a power in God which is creative, as a thing which is distinct and separate from that which He constantly exercises in the universe, conveys no clear or definite conception. I hold that a miracle involves the energetic action of the power of God ; so does the growth of an oak tree ; so do all the energies of what we call nature ; but what kind of power we know not. The essence of a miracle is *not a display of power, but of purpose*. The power displayed in many of the miracles recorded in the Bible is quite on a small scale compared with that which God exerts in His providence every day. The evil is, we have got

into the habit of thinking and speaking in such a manner as to imply that the ordinary operations of the universe are *automatic, and not the energies of God*. One word in conclusion on paragraph 33. Professor Challis endeavours to account for the pressure of the ether, and the law of its variation, as well as other physical operations, by the operation of angels. This, like some other positions in this paper, is a pure assumption, of which we have already had far too many, both in theology and science. Some expressions in this paper have brought strongly to my mind another class of phenomena of very serious import, which bear some degree of analogy to those here mentioned. I have just completed the reading through of Mr. Wallace's work on Spiritualism, in the marvellous and grotesque phenomena of which he not only avows himself a believer, but of some of them an actual witness. It was all very well for us to pooh-pooh these kind of things as long as the belief in them was confined to weak-minded people; but it seems to me to be impossible to do so with safety any longer, when several Fellows of the Royal Society, men eminent as lawyers and physicians, and persons well known in the literary world, publicly state their conviction of their truth. It is impossible to deny that the facts are attested by very strong evidence; yet they are so prodigiously grotesque, and absolutely unmeaning, that I cannot accept them as actual occurrences; and I feel firmly persuaded that there is a delusion somewhere. It is impossible to deny that the whole subject has a very intimate bearing on the question of miracles. Mr. Wallace affirms that the force of evidence has converted him from an unbeliever in the existence of spirits, into a believer in the reality of these spiritual manifestations and the immortality of man. I fail to discern in his work any approach towards Christianity. On the contrary, the miracles of our Lord, even the multiplication of the loaves and fishes, are assigned to a special form of this spiritualistic influence. To a precisely similar influence, the demon of Socrates, the pagan oracles, and various other phenomena of the ancient world are attributed. I regret to add that some of the alleged phenomena of witchcraft are also traced to the same source. Mr. Wallace is a believer in answers to prayer. But how are prayers answered? By prayer ascending up before God? No; but by spirits of the departed sympathizing with the offerer of the prayer, and making known his wants to those who are able and willing to supply them. According to Mr. Wallace, no spirit of the departed knows anything more about God or Christ than we do. Surely such are very serious matters when they are propounded by men whose scientific attainments are undeniable, as well as by men of eminence in other callings. It is high time that such delusions, if delusions they are, should be traced to their origin, and proved to be delusions. To do so is certainly a work which lies within the legitimate functions of a society like ours, which professes to be at once both religious and philosophical. Mr. Wallace tells us that there are several millions of spiritualists, and that no one who has become convinced

of its truth has ever become an apostate. The facts which they affirm as real have a most intimate bearing on Christianity. Surely they ought to be thoroughly sifted by an institution like the Victoria Institute.* I must also express dissent from the views which are propounded in this paper as to the authority of the Septuagint version, on which some of the theories before us rest for their support. The opinion of its superior accuracy as a representative of the autographs of the Old Testament writers is founded on the supposed "sanction which this version has received in the New Testament," and on the supposed impossibility that subsequent scholars can have translated with equal accuracy. I fear that in this opinion Professor Challis has not the support of any eminent modern authority. Different parts of the version differ greatly in point of merit; different parts of it were made by different persons, and at considerable intervals of time. The old story about the seventy translators, their each translating the Old Testament separately, and the verbal agreement of each separate translation—in one word, that its authors were supernaturally inspired—is abandoned as a myth by every man of sense. It is also no less clear that on certain points its authors accommodated their translation to the Greek taste, and that they have not succeeded in doing this with perfect correctness. This is especially manifest in the manner in which they have toned down several of the more striking anthropomorphisms which the Hebrew has applied to God; and in several other peculiarities of the version. Alterations of this kind have been systematically made by its translators. Nor can any weight be attached to the affirmation that it has received the sanction of the writers of the New Testament by their constant quotation from it. In the first place, this is not the fact; and in the second place, the citations of the Old Testament in the New are very far from being made with anything like consistent accuracy. Any person desirous of testing this question for himself may see the case clearly stated in Mr. Sanday's work in answer to the second part of *Supernatural Religion*. In this work the quotations are tabulated under the different heads of accurate, slightly variant, and widely variant citations, and the result proves that the position taken by the Professor in this paper cannot be maintained.

Rev. T. M. GORMAN.—I think the references to the Septuagint a weak point in the paper: take for instance the word *καλόν*; the original Hebrew word means "good," a different word being used for "beautiful."

Rev. A. I. McCaul.—Mr. Gorman has just spoken of the word *καλόν*. I do not think there is any doubt that the Hebrew word is used for beautiful, and therefore I do not agree with Mr. Gorman. Neither do

* Since these remarks were made, the subject of "Spiritualism" was very ably taken up at the Glasgow meeting of the British Association, shortly after which the lengthy "Slade" investigation took place.—ED.

I quite agree with the wording of Professor Challis's passage on the subject :—

“It is remarkable that in Gen. i., where after each creation it is said that ‘God saw that it was good,’ the word for ‘good’ in the Septuagint is *καλόν*, which, as applied to material substances, can only mean ‘beautiful.’”

There are several passages in the book of Genesis alone, where this word *καλόν* is used as the translation of the Hebrew word *טוב* and is applied to material substances, and yet there is no one of them in which it would be translated “beautiful.” In Gen. ii. 9 you have it used with reference to food, and again in iii. 6. So again in xv. 15, where it stands “in a good old age”; and in xxv. 8 and xxx. 20, “God has endowed me with a good dowry.” Other instances are to be found in xli. 35, and in xlix. 15, “having seen the rest that it was good.” I think, therefore, that the facts scarcely bear out the assertion that the word *καλόν* as applied to material substances must mean beautiful. In the 45th paragraph of the paper Professor Challis says :—

“On the fifth day God commanded the waters to bring forth fish and fowl.”

In the Hebrew the two clauses are co-ordinate, and the Hebrew does not represent the fishes as produced from the water; the English version is faulty. There is no necessity for making the second clause subordinate. The fact is, that the relative pronoun in Hebrew is often omitted, and therefore the rendering of the English version, and of the Septuagint, and of the Vulgate, is not contrary to Hebrew, but it is quite unnecessary—it is unnecessary in raising any argument as to the Mosaic account of creation. As to the use of the word *ἐπιφέρετο*, referred to in the 39th paragraph of the paper, we may decide that matter without going to the Hebrew at all. The word is used of moral agents elsewhere. You have it in the Second Book of Maccabees, xii. 35. I do not quite see the point of saying that the word applies only to a material substance. Then we come to a point concerning which I feel the greatest anxiety—that is as to the meaning of the phrase translated in the Septuagint *πνεῦμα Θεοῦ*. I have seen it stated that because the Hebrew expression had not got the article it must mean the wind, but I never before saw it stated that because the Septuagint had not got the article it must mean the wind. In the genitive relation in the Hebrew the article is not admissible. You cannot put it in in that construction, and the Septuagint generally follows the Hebrew in these matters. I think it is unnecessary to have any argument upon the absence of the article, but here again I would rather rely on the custom of the Septuagint. Anybody can test the matter. The expression is one which occurs often, and it is translated sometimes *πνεῦμα Θεοῦ* without the article, in other passages *πνεῦμα θεῖον*, and sometimes *πνεῦμα κυρίου*; but in all the passages the article is omitted. I will mention a few passages where the phrase occurs :—In Gen. xli. 38; in

Exod. xxxi. 3 ; xxxv. 31 ; in Num. xxiv. 2 ; in 1 Sam. x. 10 ; xi. 6 ; xix. 20 and 23 ; in 2 Chron. xv. 1 ; xxiv. 20 ; and in Ezek. xi. 24. I will not read the verses at this late hour, but the point of them would be to show that nothing else will suit the facts—that nothing else can be meant but the Spirit of God : nothing else will translate it. In his 38th paragraph Professor Challis says :—

“In making this philosophic use of that chapter I propose to take it just as it is given in the Septuagint, on account of the sanction which this version has received in the New Testament, and the improbability that any rendering of Hebrew texts of later date by many centuries than the text which was in the hands of the seventy interpreters can as faithfully express the meaning of the original and the mind of the Spirit as that ancient interpretation.”

Now I am not aware that there is the least breath of a suspicion that there was ever any different text from the text which we have now in the first chapter of Genesis. The differences which arise are simply paraphrases, and it is not at all necessary to assume any other text, and therefore I think this expression about a text of later date is unhappy, because it is liable to misapprehension. And so with regard to the quotations from the Septuagint. I think any ordinary reader would suppose that the author of the paper inclined to the opinion that the way in which quotations are dealt with in the New Testament is such that the Septuagint is set entirely above the original Hebrew text in point of authority. I do not say that that is Professor Challis's opinion, but I think an ordinary reader would argue that it was ; and I think that is unfortunate, because it is likely to do a great deal of mischief, and it is not borne out by the facts. The great majority of the texts quoted in the New Testament from the Old are simply the ordinary straightforward renderings which any average Greek scholar would have made in translating from the one to the other. There are a few passages where the quotation taken from the Septuagint differs from the English translations, but that is not the case in any quoted here, and therefore there is no necessity whatever for introducing another text. I thank Professor Challis for his paper.

The CHAIRMAN (C. Brooke, M.A., F.R.S.).—No one has yet touched upon the important physical aspect of a considerable portion of this paper. In his 13th paragraph Professor Challis has applied the test of sensation and experience to such things as matter, force, and inertia ; but sensation and experience are not the substratum of a great deal that followed, and it appears to me that Professor Challis has indulged in a very large scientific use of imagination as Professor Tyndall calls it. But with regard to ether, that is purely a hypothesis : atoms and ether are not matters either of sensation or of experience. We cannot perceive ether or examine it chemically or physically ; we know nothing of it, and it is merely a hypothesis that it exists. As to atoms, an atom is generally supposed to mean an indivisible

portion of matter, so minute that it cannot be further reduced, and it is perfectly legitimate to suppose that atoms have a spherical form : if, however, as Newton has suggested, the spaces intervening are indefinitely large compared with the atoms themselves, it does not much matter what form they are supposed to have : but the phenomena of crystallization, which require the existence of unequal polar forces in two and sometimes three directions, seem to point rather to a spheroidal, or ellipsoidal form. Afterwards Professor Challis speaks of their "sensible magnitude."

Professor CHALLIS.—I mean matter not infinitely divisible.

The CHAIRMAN.—I supposed the phrase meant magnitude capable of appreciation by the senses, but that is not the case with regard to atoms of matter. Then Professor Challis has ascribed both gravitative attraction and, as I suppose, magnetic and electric attractions and repulsions, to currents of ether : it may be so, but as we know nothing of it, and cannot tell whether ether has currents or not, the whole of that part of the paper is to my mind imaginative, and is not capable of being in any degree reduced to the test of sensation and experience. It is a theory, and must stand as such. In one place Professor Challis speaks of a moving force being personal force, but in many cases that is not so, a watch spring moves a watch, but that is not a personal force.

Professor CHALLIS.—It seems to mean the same.

The CHAIRMAN.—I may remark, in conclusion, that there are many other points on which, if time permitted, I should be disposed to join issue with the author of the paper.

Professor CHALLIS.—Through defect of hearing I have not heard nearly so well as I wished to have heard the remarks which have been made upon my paper, and I therefore must hold myself excused if I pass over a good many things which I have not sufficiently heard. I will, however, make mention of a few, the purport of which I caught and can remember. Prebendary Row asked me whether I thought ether was composed of atoms. I say it is composed of atoms, because I do not know of any material substance that is not so composed, and I consider ether to be a material substance. With regard to my use of the Septuagint, I have stated in the paper the grounds on which I use it. I anticipated that there would be a discussion relative to the Hebrew text, but I had determined beforehand that that would be shifting the basis of my argument, and that I could not enter upon it. I only enter upon what I have undertaken, and that is to draw inferences from the Septuagint ; but I have not undertaken to compare them with the sense of the Hebrew text. The word *ἰπερέτερον* I referred to simply as respects one point, and that point was that the word is used in the first chapter of Genesis, just as it is used in that passage of Genesis which relates to the ark being borne up by the waters of the Deluge. Other applications of the word were not to the point I was concerned with. The identity of the use in the two passages was all that I had to consider, and it is remarkable that

in the Septuagint the form of expression in the two cases is absolutely the same. I cannot agree with the supposition that atoms and ether are only imaginative. I think they are as real as anything else that is real. I do not know what is real if they are not, because they compose all that is real. The Honorary Secretary of the Institute (Capt. Petrie) kindly sent me a letter he had received from Dr. Angus, on which I think it right to make some remarks in reply, because its contents bear on other criticisms which have been made during this discussion. It is specially with reference to the expression, *πνεῦμα Θεοῦ*, that I have to speak. Dr. Angus has misunderstood me where I say that, on account of the article being absent, the phrase cannot be translated, "the Spirit of God." I did not say so in any general sense. What I said was only with reference to that particular passage. In a hundred places *πνεῦμα Θεοῦ* might mean "the Spirit of God," without the article; but in each such case there is something in the context which will tell you that the Spirit of God is signified, and that every other sense is excluded; whereas, in this passage of Genesis, there is a sense which is not excluded—namely, that the air, a material substance, was borne upon the water. Perhaps I may be allowed to give a reason, which is strong in my mind, why we have in the Scriptures the expression *πνεῦμα Θεοῦ*, signifying the air we breathe, although it usually signifies the Spirit of God. In the Scriptures, wherever there is an abstract sense or meaning there is also the concrete, and the two are put so close together that you cannot separate the one from the other; and this is done on purpose to show their necessary connection. St. Paul, for instance, says: "They are not all Israel that are of Israel." "Israel" is here, in one case Israel after the flesh, and in the other it is spiritual Israel, both senses being expressed by the very same word. That same principle extends through the Scriptures from beginning to end. Perhaps, in conclusion, I may just advert to another part of the essay in which I speak of angelic agency. Very likely there may be a difference of opinion on that point, and I want to say that I do not claim originality in regard to what I have said about it. I was led to speak of it by reading the recently-published work, *The Unseen Universe*. The authors of that book do not assent to Newton's idea of referring our understanding of all things to sensation and experience, and therefore they cannot assent to the notion that pressure is the only form of force that we can understand. Thus they have to find out some means of accounting for pressure, and the way in which they do so is by supposing that there are an infinite number of little corpuscles in the space where pressure is in action, falling in all directions, and striking against each other, and that by their impact pressure is produced. This view is quite contrary to what we were taught at Cambridge by Professor Airy, namely, that impact is a short and violent pressure. These authors cannot, on their supposition, account for variation of pressure, and consequently they put forward this strange hypothesis, that there are certain little doors in the space where pressure operates, and at each door

there is stationed a being—a spiritual, intelligent being—who opens or shuts the door to let the atoms pass through or to stop them, so as to regulate the amount of the collision, and thus to produce variation of pressure. This is the most extraordinary idea relating to physical science I ever saw propounded. No doubt it is a very great difficulty to account for the variation of pressure on any physical hypothesis—I mean the variation of the pressure of the ether; and the difficulty is not diminished when the attempt is supplemented by this sort of spiritual agency. My view is, that we have nothing to say about the quality of pressure excepting that we have an instance in our own persons of spiritual agency, by which matter can be moved. That idea Sir John Herschel, the greatest of modern philosophers, produced in one of his publications, where he said that the power of moving the arm is one of the most wonderful facts in creation. The idea amounts to this, that there exists a spiritual power which we, as spiritually constituted, are conscious of, whereby we can move matter. It is but a short step from this to say that there is a spiritual power which can move the ether and produce the great effects we perceive to be consequences of its motion. This is not a very violent transition, and I think it might be accepted, rather than have recourse to the idea of the agency of little spiritual beings. With regard to the question of miracles, and the phrase “creative energy,” which Prebendary Row objected to, I cannot see any difficulty about the application of that expression to miracles, if we allow of creation at all. If you do not allow of creation, why, then, the objection to applying that expression to miracles remains in force. Philosophers, who object to miracles, try to get rid of personal agency in creation; but, if creation be admitted to be a fact, I do not see that it could have taken place without personal energy. I may also mention that I have heard it constantly said that no atom was ever destroyed—that an atom of matter is indestructible. Now, it seems to me that that is very false philosophy; for if you make that assertion, you do in effect maintain that matter was not created. You cannot assert of matter that it is indestructible, because that would be equivalent to saying that it was not created. I think a great deal of philosophical error arises from assuming as an incontrovertible truth that matter can never be destroyed. This point, as implying the non-creation of matter, touches the question of miracles. One would think, for instance, that the miracle of the feeding of the five thousand must have involved the creation of matter—it is hard to see how it could otherwise have been wrought.

The Meeting was then adjourned.

SUPPLEMENTARY REPLY.

[PROFESSOR CHALLIS having imperfectly heard the discussion on his Paper, and not being accustomed to address audiences extemporaneously, requested that the speech which he made in reply, on the occasion of the Meeting, might be supplemented by the following remarks, written after seeing the discussion in printed form]:—

I was not surprised to find that the title of my Paper had given rise to misapprehension as to its purport, such as that mentioned by Bishop Abraham, and I therefore take occasion to explain further, that I adopted this title with reference to the views of modern metaphysical writers, who draw from facts and laws established by physical science conclusions adverse to the statements of Scripture relating to miracles and spiritual agency (which I designate generally by the terms "The Metaphysics of Scripture"), and it was my object to prove that the *Newtonian Physical Philosophy*, rightly understood and comprehensively carried out, stands in no contradiction to these statements.

Relative to the remarks in Dr. Angus's letter, I wish only to add that I have no objection whatever to translating πνεῦμα Θεοῦ "the Spirit of God," on the general linguistic principle of diversity of usage of the article in different languages, its use, for instance, in Greek being partially dispensed with, and in Latin entirely, where in English and French it could not be omitted. The context decides whether in the absence of the article in the original it should be admitted in the translation. If the article had been present in the passage of Genesis, the translation must have been "the Spirit of God," and the Septuagint would then have asserted what is altogether unimaginable, namely, that spirit—the Spirit of the Creator—was borne up by the material substance of water. On this ground alone I said that "the *Septuagint* does not admit of that translation." The absence of the article allows of escape from this incongruity by translating "breath of God," meaning air, the breathing of which is a necessary condition of life. I forgot to mention at the meeting an intimation from my son, who read the Paper for me, that Josephus with reference to this passage has "a wind."

I beg to return my thanks to Prebendary Row for the full and careful consideration he has given to portions of my essay, and for the measure of accordance therewith which he took occasion to express. There are, however, points of difference which I propose to take notice of. Having already answered the question as to the materiality and atomic constitution of the ether, to the additional question. "If it is so constituted, whence did the power of pressure it is supposed to have originate?" I make reply that I know nothing of either power or pressure apart from the indications of my own consciousness, and that I am conscious to myself of being able to press by

the intervention of the material substance of my body. It is conceivable, therefore, that the Creator, of His own will, exerts pressure by the intervention of a material substance, atomically constituted, but of much finer composition than the gross bodies we see and handle, and that such pressure, acting under different external conditions and circumstances, takes the various forms usually called physical forces. Accordingly, the origin of pressure and of forces in nature is the will and power of the Creator *immediately* operative in the ethereal medium.

With respect to Prebendary Row's strictures on the view I take of the character of miracles, I begin with admitting that I certainly regard that exertion of power of God which we designate creation as distinct in mode of operation from the power which is exerted in the providential government of the universe, and that I consider a miracle to be wrought by the former kind of power. I am accustomed to make the distinction in my own mind by means of the following analogy: We know that a planet moves in an elliptic orbit about the sun, not alone because the sun's gravitation attracts it, but also because it is endowed with the quality of *inertia*. So long as we only take account of gravitation and the *vis inertiae*, we cannot see how the motion ever had a beginning, or how it will ever have an ending. But, supposing that the body received an impulse at a certain moment of time, causing it to begin to move with a certain velocity in a certain direction, the motion in all subsequent time can be submitted to calculation, and be proved to be regular and conformable to law. The original impulse would be due to power momentarily exerted, whereas the subsequent motion would be due to power exerted to maintain the attraction of gravity and the *vis inertiae* of the planet. Thus the actual motion is the result of two quite different kinds of action, the one sudden, arbitrary, and having no relation to antecedent circumstances; the other producing motion which is continuous, governed by law as to amount and direction, and dependent at each instant on antecedent conditions. The former corresponds to a creative or miraculous act; the other to the continual direction of events in the ordinary course of Providence. It is, however, to be observed that there are instances in which a miraculous act occupies time; but in that case it consists of a sustaining, during an arbitrary interval, of the impulsive power above characterized.

After this preliminary, I go on to state that I can assent to Prebendary Row's assertion respecting miracles, that "of the mode of the Divine action we are profoundly ignorant"; only I should not adopt these terms, but rather say of a miracle that it is something so entirely *sui generis* that it does not admit of *logical* inquiry, and, therefore, we cannot predicate of its essence either ignorance or knowledge. And here I cannot forbear remarking that by saying that the expression "creative power," which I have adopted, involves a statement of the *modus operandi* of a miracle, Prebendary Row charges me with a fault which he has himself committed. For, where he says,

with respect to the miracle of multiplying the loaves and fishes, that "their constituents had been built up by God through the ordinary forces and laws of nature," and that "the ingredients necessary for multiplying them were all present in the earth, the water, or the air," is not this affirming something about the *modus operandi* of the miracle; something, too, involving inference from modern physical science? The view I take of the character of miracles absolutely forbids my entering upon any such considerations, inasmuch as I hold it to be out of the province of the human intellect to inquire concerning either mode or limitation relatively to miracles wrought by an Omnipotent Creator. In sec. 35 of the Paper I say of the miracle just mentioned that "it consisted of the *multiplication* of the loaves by an operation which, as being *creative*, is incapable of being submitted to logical inquiry." The word "multiplication," inasmuch as twelve baskets of fragments were taken up, simply expresses the matter of fact; and as to the word "creative," when it is considered that the creation of the universe was the first and greatest of all miracles, no term for specifically designating miracle-working power could be more appropriate than one significant of creation. In fact, the external world supplies no other term indicative of the essential character of a miracle, the word "miracle" having properly only the subjective meaning of *wonder*, such as an act of creation might be supposed to produce.

I come now to a part of Prebendary Row's speech, the consideration of which will serve to point out the source of the divergence of views above referred to. That a miracle involves no "violation of the laws of nature," I fully admit for special scientific reasons which I have stated definitely in sec. 23 (1) of the Essay on "*The Indestructibility of Matter*," read at the Meeting of the Institute on May 7, 1877. I concur also in taking the view that God brought on the plague of locusts, and divided the Red Sea, by natural operations expressly adapted to effect these purposes. Still I maintain that it is not allowable to try to account for miracles by natural causes not specified in Scripture, or to derive explanations of them from suppositions gratuitously made relative to the operation of laws known only by scientific research. If such explanations were valid in any instance, they should be applicable in all. But that this is not the case will, I think, appear from the following argument. It is, first, to be especially noticed that in *all* instances of Scriptural accounts of miracles an instrumental cause is mentioned, which according to all human judgment and experience would be pronounced to be wholly inadequate to produce the observed effects. For instance, handkerchiefs and aprons brought from the body of the Apostle Paul to the sick, cured them of diseases, or sent evil spirits out of them (Acts xix. 12). It would demand a great effort of the imagination to conceive of any natural operation by which such effects could be produced by such means. As another instance, our Lord "made clay of spittle and anointed the eyes of a blind man," and *then*, after washing in the pool of Siloam as he was bid to do, the

blind man "came seeing" (John ix. 6, 7). It may be presumed that the miraculous effects were caused to be consequences of such antecedents that eye-witnesses might be the more convinced of the actuality of the miracles. The account of the plague of locusts states that Moses stretched forth his rod over the land of Egypt, and the Lord caused an east wind to bring the locusts; "before them there were no such locusts, neither after them shall be such"; and "the Lord turned a mighty strong west wind," which cast them all into the Red Sea. Again, with respect to the passage of the Israelites through the Red Sea, the narrative states that Moses stretched out his hand over the sea, and the Lord caused the sea to go back by a strong east wind, and the waters were divided so as to be a wall to the Israelites on their right hand and on their left; and when Moses again stretched his hand over the sea, the waters returned and overwhelmed the Egyptians. I have collected these particulars in order to demonstrate the hopelessness of attempts to refer Scriptural miracles to any mode of natural causation. Even where natural causation is specified as to quality, the effects are such in kind or degree as have never been known either before or since. In short, as respects their antecedents (Moses stretching out his hand, &c.) and the limitation of their consequences through *personal* agency, the miracles of Scripture (at least those performed in Egypt) are wholly out of the category of intelligible physical causation.

What I have said about angels is a logical and necessary consequence of an axiom stated in sec. 21 of the Paper in these terms: "It is inconceivable there can be any production or event which is not determined by antecedent will, and the power, in operation, of a conscious agent." This, it must be admitted, is true with respect to what God does. It is true also with respect to what man does, as I can tell by my own consciousness. But since in God "we live, and move, and have our being," our acts consciously performed under conditions of time, space, and bodily organization which He has imposed, are His acts. But besides God and man there are other agencies in the world, "Fire and hail, snow and vapours; stormy wind, fulfilling His word" (Ps. cxlviii. 8). Inasmuch as these natural phenomena fulfil God's word, they are the products of conscious agency. This agency is ascribed in Scripture to *angels*, on the principle of the axiom above enunciated. And whereas this power of producing fire, hail, snow, &c., is, as well as human power, derived from God, and is exercised under conditions which He has ordained, it is, in fact, God's power, and we reasonably regard these natural phenomena as coming from God. Thus, operations which we ascribe to *Nature*, and those which Scripture ascribes to angels, are identical entities. This is all that I meant by what is said about angels in sec. 33. Of course, I only refer to angelic agency as concerned in the ordinary circumstances of natural phenomena: the extraordinary appearances of angels in human form mentioned in Scripture come under the category of miracle.

I little expected that I should have to say anything on the subject of *Spiritualism* as having relation to the contents of my paper; but as Mr. Row asserts that expressions in the Paper brought this class of phenomena to his mind, and spoke upon them at considerable length, I ask permission to state certain decided views which I have for a long time entertained on this subject. I begin with quoting a very pregnant passage in the Book of Ecclesiasticus (xxxiii. 14, 15): "Good is set against evil, and life against death: so is the godly against the sinner, and the sinner against the godly. So look upon all the works of the Most High; there are two and two, one against another." In conformity with this law God and Satan (the adversary) are contrary one to the other, and the power of Satan, always delegated and conditioned (see Job, chap. i.), is opposed to the power of God. Now, as miracles are spoken of in Scripture as being primarily wrought by God, the Creator of heaven and earth, so Satan, "the prince of the power of the air," has the power of working miracles; and just as the miracles which God performs by the agency of man demand *faith* on the part of the agent, so Satan works miracles under condition of the faith of an operating *medium*; but in this case the faith is that of an operator who is *under delusion and believes a lie*. The quality of the faith is shown by the character of its fruits. Mr. Row justly asserts that the phenomena of Spiritualism are "prodigiously grotesque and absolutely unmeaning," but at the same time he admits that "it is impossible to deny that the whole subject has a very intimate bearing on the question of miracles." Certainly the phenomena cannot be referred to any kind of *physical* causation, and must, therefore, be ascribed to a certain mental, or spiritual state, which, although it has its foundation in *error*, is permitted to display miraculous power, in order, apparently, that by the character of the manifestations the existence and source of the error may be exposed. The miracles of Spiritualism are so utterly opposed in character to the beneficence and dignity of the miracles of the Gospel, that a Christian should have no hesitation in deciding that they are *miracles of Satan*. It is no proof of weak-mindedness that some persons should be influenced, however mistakenly, and others perplexed, by these strange manifestations. Although I have never at any time witnessed any of these phenomena, I am yet unable, in common, I believe, with many others, to resist the evidence of their reality which has come from all quarters of Christendom. Personally, I have been as much convinced by the evident unfairness of what has been done by those who deny them, as by what has been testified by those who affirm them. It now only remains that I should state what I believe to be the source and root of all this evil. On this point I shall only say what I said as long ago as 1863 in a letter to the editor of the *Clerical Journal*, inserted in page 58 of the number for July 16th of that year. I have there said that these "signs of the times" have their origin in a wide-spread and persistent belief of a great untruth, the reality of a *spirit-world*, of which Scripture, rightly interpreted, says not one

word, but rather gives distinct intimation that consciousness of existence consists only with union of body and spirit. I said also that these evidences of the prevalence of an unsound spiritual condition are on the one hand a refutation and a rebuke of the modern scepticism relative to miracles, false miracles being sent to those who reject the true, and, on the other hand, they are answers to fools according to their foolishness for believing beyond what is written, this being only another form of unbelief. I ventured, moreover, to predict at that time, that "the evil would grow" if the source of it were not recognized and acknowledged; which has come to pass. I refrain from saying more now on this important subject, except to avow my concurrence in the opinion expressed by Prebendary Row, that this is a matter which deserves to be investigated by an institution like the Victoria Institute. I beg to refer the members who may desire to know more of my views upon it to the letter above mentioned.

I admit that Prebendary Row and Mr. McCaul have not without reason taken exception to the statements made in art. 38 respecting the Septuagint and Hebrew texts, which, as having been incautiously expressed, require to be farther explained. I had in mind the known facts that all extant MSS. of the Hebrew text are comparatively recent, and that translations from strictly Hebrew originals are all later by many centuries than the rendering by the Seventy Interpreters of the Hebrew original of their time. Then, considering that every translation is in degree an interpretation, and that the difficulty of interpreting increases with lapse of time from the date of the primary document, I spoke of the improbability (not impossibility) that any translation should as nearly express the primary sense of the Hebrew text as "that ancient interpretation," assuming always the purity of the text. On the principle here laid down it may, for example, be asserted that difficulties are now met with in interpreting St. Paul's Epistles, which could not have been felt by those to whom they were addressed, simply because they were his contemporaries. My meaning will, perhaps, be made clearer by the following instance. The transition from the first to the second verse of Gen. i. is made by the particle *δὲ* in the Septuagint, and by *autem* (probably the translation by Jerome of the Greek particle) in the Vulgate. Supposing verse 1 to signify the original creation of the primordial elements of the inorganic world, the usage of Greek or Latin would allow of taking the connecting particle as indicating an *immediate* transition to the statement in verse 2 of the composition, and primary order of arrangement of the components, of the world *so created*. Then would naturally follow accounts of steps in the unfolding of the inorganic creation by the physical forces, and of successive creations of organized bodies. All this agrees well with the view I have been led to take of the facts of creation by reasoning on scientific principles. But some modern Hebraists say that the transition particle (the same, I presume, as that rendered by the Septuagint) may be taken to imply that a long course of

time and a *bouleversement* of the original creation intervened between the creation of heaven and earth declared in verse 1, and the state of the earth described in verse 2. Which interpretation, then, ought to be adopted? I have no hesitation in saying that, for the reasons I have given above, the older interpretation is to be preferred.

I think I have sufficiently taken account of Mr. McCaul's criticisms relative to the translation of πνεῦμα Θεοῦ by what I have already said on this point. With respect to the translation of καλόν, the instances adduced by Mr. McCaul prove that the same latitude of application prevails in the use of this word in Greek as in the use of "good" in English. Both words are applied in very various ways with reference to what is excellent in quality or quantity. We speak, for instance, at Cambridge of "a good man," meaning a *clever* man; the familiar expression, "a good deal," means a large quantity, and property is called "goods." The different applications seem to be all referable to the idea of excellence commonly attached to beauty and goodness. But in Gen. i., where the word καλόν is applied to *all* created objects of the heavens and the earth when first created, it cannot have any such secondary meaning, but must be taken in its *proper* sense, which is, "beautiful." Accordingly, in Gen. ii. 1, the beauty and order of the whole creation is named ὁ κόσμος.

Having referred to the passage in the Second Book of Maccabees (xii. 35) cited by Mr. McCaul, I find that it is an instance of the well-known usage of a verb in passive form having a middle signification: ἐπενεχθέντος αὐτῷ, "being borne against him of his own will and act," that is, "attacking him." This is quite consistent with giving to the verb a passive sense in Gen. i. 2 and Gen. vii. 18.

There are three reasons why I think that the Chairman, Mr. Brooke, should have abstained from applying the word "imagination" to the hypotheses which I make the foundation of my physical researches. First, they have due regard to the antecedents of physical science, neither theorist nor experimental physicist having been able to dispense with the conceptions of an ether and of atoms, which Newton himself admitted into his philosophy, although he said, *hypotheses non fingo*. This dictum, of which the emphatic word is *fingo*, means that Newton disclaimed having *made* the hypotheses which he pronounced to be "the foundation of all philosophy," regarding them as abstractedly true and necessary. Secondly, only such hypotheses are admitted as are perfectly intelligible, being capable of enunciation in terms derived from the indications of sensation and experience. This condition places them in direct opposition to what is merely imaginative. Thirdly, they are capable of being tested by comparison of results, derived from them by calculation, with experimental facts, inasmuch as they satisfy the condition of being proper foundations of mathematical reasoning. Such being the character of the hypotheses, I am under no necessity to give attention to any mere expression of opinion as to their quality, and am only required to conduct, as I best can,

the mathematical arguments required for testing their truth by the explanations they give of natural phenomena. In this difficult and indispensable research, in which I have made some advances, I might have expected the aid of some of my junior contemporaries; but unhappily those who would be capable as mathematicians of taking this part have so let their imagination run wild on "doors," and "demons," and "vortex-atoms," that they have no thought left for sober theoretical reasoning. In my opinion, nothing so much at this time stands in the way of the progress of true physical science as the propensity of physicists to disregard the strict rules of philosophizing, and betake themselves to those creations of the imagination which Newton calls "*somnia*." It is a little hard that, having laboured much to counteract this tendency, I should be charged with advocating an imaginative course of philosophy.

With respect to the remarks in the concluding part of Mr. Brooke's speech, I beg to say that I have ascribed gravitating attraction, and magnetic and electric attractions and repulsions, to action of the ethereal medium only so far as by mathematics I arrive at consequences of my hypotheses which are counterparts of the *observed* effects of these forces. One word in addition respecting Mr. Brooke's reference to the phenomena of crystallization. I make a distinction between an atom and a molecule, considering a molecule to consist of a congeries of atoms, having sometimes, but not generally, an arrangement in accordance with strict geometrical figures. Such arrangement is the theoretical basis of crystallography. The aggregate of the ethereal forces emanating from the atoms so arranged, may well be conceived to give rise, simply by reason of the arrangement, to the existence of molecular forces having axes of maxima or minima, and therefore poles, in two or three rectangular directions, and consequently recognizable experimentally by spheroidal or ellipsoidal forms. But all this is quite consistent with a spherical form of the individual atoms.

The remarks by Mr. Walter Lea are mainly concerned with defending a passage in *The Unseen Universe*, in the censure of which I am supported by the opinion of Prebendary Row. I think I may appeal to views which I have expressed in communications to this Institute and elsewhere, that I can quite agree with the position maintained by Mr. Lea that there is no real incompatibility between religion and natural philosophy, but the philosophy of which this is affirmed must be *true* philosophy, which, I believe, cannot be said to be the character of much that passes for philosophy in the present day.

ORDINARY MEETING, JUNE 19TH, 1876.

REV. R. THORNTON, D.D., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBERS :—Major-General Sir H. C. B. Daubeney, K.C.B., London ; J. C. Southall, Esq., United States ; Rev. Prebendary R. Snowden Smith, M.A., Northwold.

ASSOCIATES :—Rev. Canon J. R. T. Eaton, M.A., Whytes Professor of Moral Philosophy, Oxford ; Rev. A. R. Hogan, M.A., T.C.D., and Oxon., Watlington ; Rev. J. C. Watts, Ranmoor College.

Also the presentation of the following Works for the Library :—

“ United States Geological and Geographical Survey of Colorado.”

From the Survey.

“ Archaic Dictionary.” W. R. Cooper, Esq.

From the Author.

“ History of New Guinea.” Lieut. Armit.

Ditto.

Hessey’s “ Moral Difficulties of the Bible.”

From T. Barber, Esq.

“ Finch on the Fathers.”

Ditto.

A small work from Captain F. Petrie.

The following Paper was then read by the Rev. T. M. GORMAN, M.A., the Author being resident in the United States :—

*THE THEORY OF UNCONSCIOUS INTELLIGENCE,
AS OPPOSED TO THEISM.* By Professor G. S.
MORRIS, M.A., Michigan University, U.S.

IN a previous paper read before the Victoria Institute, I had occasion to defend the principle, "*Ab cognito ad incognitum*" ("From known to unknown"), as one of those which govern all progress in knowledge, and which must control all our speculation. It is the principle of continuity in thought and in the objects of thought, parallel with the physicist's continuity of physical existence, and implied in the scientific postulate of the uniformity of nature. Positive science, proceeding on the indispensable basis of this postulate, testifies to the truth that, if knowledge is to advance, the newly-known, whatever its specific differences, must still be fundamentally of a piece with the old. The simplicities of being, and hence those of truth, are universal in their reach—such is the faith of science. This faith is confirmed in experience. Were it without foundation, all things would stand unrelated to each other, except in the mere fact of their existence, and orderly knowledge, science, would be impossible. Having, therefore, once fairly apprehended the simplest facts and laws of being, in any sphere of their concrete manifestation, the investigator goes on, using them as guiding threads in the labyrinth of existence, discovering and conquering new fields of scientific truth. Guided by the same principles, the philosopher, whose work differs from that of the man of "exact science" only in that it is less directly susceptible of sensible verification, seeks to arrive at the formulation of the most fundamental truths of being—truths which must be apprehended rather with the eye of the mind than with the eye of the body. It ought to be, but is not,

ridiculously superfluous to add, that the results sought by a true philosophy will not disagree with the facts of internal and external experience, since, the rather, the former must be an expression of the underlying truth of experience, what experienced fact should suggest and in its measure illustrate, and in which the various experimental sciences should find their connecting link and the element of their life. I argued, further, in the paper alluded to, that the surest elements of our real knowledge are furnished by self-consciousness, in the cognition of ourselves as spiritual agents. In the present paper, it will be necessary to bear these principles constantly in mind, using them as the touchstone of truth or falsehood in theory.

What is now to be discussed is the theory of unconscious reason, spirit, or intelligence (otherwise denominated also, or denominated as, force, rational power), as accounting in part or in whole for the facts of the universe. In what sense is the theory rationally intelligible? In what measure may it be objectively possible? What is the testimony of fact with regard to it? What place, if any, is, or may be, granted to it in the philosophy of Christian idealism?

Let us glance first at the history of the doctrine in question, premising, however, that the two following applications of the term "unconscious" are to be kept carefully distinct; first, as denoting the principle or being on which man and nature are supposed partly or wholly to depend; second, as covering those states, powers, possessions, or processes in the human mind (or the animal soul) of which the individual possessing them is not, but under appropriate conditions may become, conscious. The conditions, extrinsic and intrinsic, of self-conscious, spiritual existence, of conscious knowledge and will, have been a subject of study and discussion pre-eminently in modern times. The result has been an intensified, if not always a clarified and more adequate, sense of the reality and nature of those conditions as exhibited in the mental life of man. Traces of a theory of unconscious rational power in the history of ancient thought may therefore be expected not to present themselves in that definite form, or with that distinct reference to the standpoint of human consciousness, as now more fully understood, which is found in modern hypotheses. The traces, however, are unmistakable and numerous, amounting often in form to distinct statement, and confirming anew, in the matter of speculative theory, the dictum that there is no fundamentally-new thing under the sun. All the systems of strict pantheism or naturalism must necessarily contain, virtually, the doctrine of unconscious reason. The so-called God of modern pantheism,

the universal, omnipotent Reason, being substantially undistinguishable from the world, and attaining to self-knowledge only in man, and the "Nature" of naturalism, an equally impersonal abstraction, must of necessity be deemed, by those who believe in them, to do all the mighty works of the universe, not knowing what they do. Even materialism, in its less consistent forms (and when was materialism ever perfectly self-consistent? how can it be?), is found introducing the same principle in its unguarded utterances, practically merging itself (as in some ancient instances) in naturalism, or alleging (through the mouth of certain of its distinguished modern votaries) a natural "Instinct of Necessity," or that "Necessity, or the enchainment of causes in the world, is Reason herself."

The undisciplined and unenlightened fancy of the ancient Orient revelled in imaginings, serious and ingenious, but also often grotesque, concerning a universal and original nature, at once spiritual (or spiritual and material, or else transcending spirit and matter) and unconscious. Thus the absolute being of the Vedas is reported to be pure cognition, which yet neither knows nor is known. The Hindoo Kapila, in the Sankhya, tells of a cosmic nature which is at once unbegotten and all-begetting, which works rationally, as in view of definite ends, and yet unconsciously. It may be that the early theogonic and cosmogonic speculations of other nations expressed or implied a similar fancy, as in the divine Night of Egyptian belief, or the original Chaos of Grecian mythology.

We need not seek for vestiges of the doctrine in question in the pre-Socratic philosophy of Greece, partly because of the fragmentary nature of our knowledge of that philosophy, and partly because it was not until the time of Socrates and his disciples that the notion of mind and its functions became clearly and emphatically defined. In the system of Plato there is, on the one hand, the evident tendency and endeavour to raise the idea of God (the idea of Good) to the highest degree of abstract perfection. The good is the king in the realm of being (*i.e.* of ideas), the cause and distributor of all true being, to which it is itself superior; it is a thing ineffable. On the other hand, in the mythical and more popular (or, as he also terms them, the "probable") expositions of Plato, the position is firmly held, that the universe is the product and exhibition of mind, that God was good, and willed that the world should be as nearly as possible like Himself. To whatever conclusion the dialectical reasoning of Plato, carried out to its logical consequences, might lead, there is not the slightest reason to suppose that in his practical intention he looked upon

the Author of the universe, or His agents in the universe, as having anything less than the perfection of conscious intelligence or its equivalent. But the very different conception, of that in the endowments or innate possessions of the human spirit, of which to a great extent it generally remains wholly unconscious, is distinctly expressed in the Platonic theory of reminiscence. This teaches that "all inquiry and all learning are but recollection." The soul, in a pre-existent life, saw the forms of absolute being, in the company of the gods. All its present, real knowledge depends on the recollection of this earlier experience, and one of the main objects of Plato's dialectic is to aid this recollection. The term education is therefore, according to Platonic theory, strictly accurate: it denotes a process by which the unconscious wealth of the soul is brought out into the light of conscious possession. Nothing but the limitations of sense hinders this process.

Aristotle never tires of affirming that nature does nothing in vain. The controlling element in all natural causation, according to him, is the end in view, and if the end is sometimes not attained, this is owing to change or to material obstacles. But what is the being that has these natural ends in view? Aristotle teaches that there is a God (a first mover) on whom "heaven and nature depend." His nature is reason, and His activity is thought, contemplation. But it were degrading for Him to contemplate aught but what is best, and as this description applies to Himself alone, he thinks of nothing but Himself. Unmoved, He moves the world by that kind of attraction which the loved unconsciously and inertly exerts upon the lover. Nature is pervaded and moved by the endeavour to become like God. This indirect divine influence affects first and immediately the circumference of the world, in which it produces the most perfect, namely circular motion. It is not, then, God, who sits apart in isolated blessedness, who is conscious of the various purposes, the effort to realize which constitutes nature. They are not His thoughts, His purposes. Nor does Aristotle assume the existence of inferior divinities, super-human spirits, who have the work of nature in charge. It is true that the heavenly bodies are in his view of god-like nature, but so far are they from supervising the purposeful economy of the universe, that it is left the rather doubtful whether that most divine of all motions (revolution) in which they accomplish the natural end of their own existence, is not primarily the result of their "nature," and not of conscious intention on their own part. Nor is there any reason to ascribe to the "soul," which, according to Aristotle, is "in a certain way" present in

all things (in virtue, namely, of the "psychical heat"—the physical basis of "soul"—which is assumed to pervade all natural existence), the purposes which are executed in the world. It only remains for our philosopher to view the idea, the end, the notional nature of each organism, as also of the world at large, as in some way imminent in these objects, and to find in the idea (in Aristotelian language "form"*) the efficient as well as final cause of everything which concretely exists. And this he does. Living things he defines as those which have in themselves a principle of motion or rest. This principle is the form which they should assume and the idea which they should realize, and resting in which they have their definite or individual character. The form regarded as final cause, is immanent, exists "potentially" in matter, in this sense, that in all matter there is a *nisus*, a striving after the form which it should take on. It is true that in the Aristotelian system the lower form involves the higher, and the necessary condition (the logical, but not chronological *prius*) of all finite forms, is God, the absolute form, the form of forms. And as God is pure, thinking activity, so each natural form is fundamentally an ideal thing, a function of thought, the very notion of which is derived only from the contemplation of human consciousness. Nevertheless, Aristotle disconnects these forms, as above seen, from the divine consciousness, and in so far leaves them (as hypostatized abstractions) to shift for themselves, subject, however, to the orderly and harmonizing influence exerted upon them by the divine attraction. As forms and as being capable of experiencing a divine attraction, they are of god-like nature, and hence Aristotle can beautifully and truthfully say that "all things have in them something divine." But it is obvious that he is dealing with dangerous, not to say inherently absurd conceptions, when he treats of a rational nature working in the universe under the guise of separate (but organically related) forms, without providing a conscious, willing agent, in whose mind they originally and definitely exist, and under whose intelligent direction they attain to actual realization. "Nature," whose name is continually on the lips of Aristotle, is certainly not such an agent, for he uses this term only as a convenient symbol for the sum

* The Aristotelian "form" (*εἶδος*) is the Platonic "idea" (also termed *εἶδος*, though more characteristically *ιδέα*), stripped of that existence as an abstract entity, separate from concrete reality, which Plato attributed to it. It is the universal *present in* and giving life to the particular, the ideal in the real, mind in matter.

of natural agencies and existences, *i.e.* of potential and actual forms; and when, as is often the case, he seems to personify nature, his language is plainly metaphorical. He likens the agency of the final cause (form, idea, reason) in nature to that of art. As art works in view of an end, so also does nature. As art (in proportion to its perfection) works spontaneously, "without deliberation," so too nature. We can pardon much to the powerful mind of the former pupil of Plato, who, in opposition to the mechanical and atheistic philosophy of his day, did such valiant service in the defence of the doctrine of the ideal, as the fundamental and ruling, nay, more, the constitutive, element in the concrete universe. Yet it is evident that in his separation of the divine thought from the world, and in his practical treatment of reason (the ideal "form") as an agency independent of any clear relation to a conscious subject possessing and directly or indirectly controlling it, Aristotle early paved the way for the vague modern theories of pantheism or atheism concerning a so-called unconscious intelligence. If anything is to be said in his defence, it is that the question of the relation of the "idea," which is metaphorically said to work in nature, to consciousness could not have that significance for him, which it has for the anthropocentric philosophy of to-day, and in the light of the purified conception of God which we owe to the influence of Christianity. Notwithstanding the revolution in philosophy, through the Sophists and Socrates, whereby greater attention than before was directed to man, yet with Plato, and no less with Aristotle, the problem of prime interest was the ontological one. What is true being, was rather the question than what is the relation of natural phenomena (all of which, great and small, were held to possess a fundamental ideal aspect) to intelligent, knowing spirit. The fatal consequences of the failure duly to consider and answer the latter question, are seen in the fact that Strato, the second successor of Aristotle in the leadership of the Peripatetic school, was so far untrue to the teaching of his master, that he denied the existence of God, or identified God with nature, defined the latter as a universal force, operating with intrinsic and unconscious necessity, and sought to explain all things as resulting from the universal attributes of gravity and motion. Further, H. Siebeck (in his *Untersuchungen zur Philosophie der Griechen*, Halle, 1873) has recently pointed out in detail and with demonstrative evidence, how the materialistic pantheism of the Stoics, on its physical side, was in the most important particulars the direct child of Aristotle's physics.

Unconscious thought in nature was affirmed by the Neo-Platonists. Says Zeller (*Philosophie der Griechen*, 2nd ed., iii. 2, p. 492) "Nature [in the system of Plotinus] is, it is true, in its essence, thought, yet not conscious thought, but, the rather, simple, formative activity, without conscious purpose"; or, if it possesses a kind of consciousness, Plotinus "compares it to that of a person in sleep." This conception of nature may be regarded as a fit correlate to the Plotinic conception of the supreme "One," the ineffable source of all existence, itself so transcending the categories of human thought, that neither definite being nor thought can be ascribed to it. God is superior to thought, nature is debility of thought, the last result of a series of involuntary emanations from Deity.

Passing over, now, the Scholastic Philosophy of the Middle Ages, the reveries of German Mysticism, and the attempts to revive various ancient systems of philosophy in the Renaissance period, in all of which ancient ideas reappear more or less profoundly modified by the doctrines of Christian theology, we find Descartes, the founder of modern speculative philosophy, assuming a double realm of existence, material and spiritual. The essential attribute of the former is extension, of the latter, thought. In the former all processes are mechanical, in the latter they are expressly declared to be without exception conscious, even though the thinking agent may not always remember to have been conscious of them. The two spheres of existence, wholly incommensurable, act upon each other by virtue of the Divine assistance. Properly speaking, neither matter nor created spirit has inherent active power. God creates, and by a constantly renewed creation preserves them both, according to Descartes, such as they are and in the relations in which at each instant they are actually found to exist. Everything depends directly on His omniscient will, and is, fundamentally speaking, in itself a dead, passive product of the omnipotent Deity. But this theocentric point of view disappears in Descartes' actual and detailed treatment of the definite contents of the universe (matter and mind, or extension and thought, and their laws), and by his practical admission of the possibility of an independent material realm, the scene of purely blind mechanical processes, entirely separated by nature from the influence of thought, because utterly unideal, he opened at the beginning of modern philosophy the door for the modern theories of pure materialism, in which God, the divine thinker, is dispensed with, and thought is swallowed up in mechanism. Strange inversion of the natural order of ideas! in which the relatively unknown

(matter, phenomenal existence, laws of succession and co-existence observed, with the aid of thought, through the external senses) is made the measure of that which is directly known (namely, personal, spiritual existence, thinking being), the former containing implicitly the latter, and so being virtually, as before indicated, unconscious reason herself! Of such nature, either by express admission, or at least in tendency, were the most of the theories which (under the concurrent influence of ideas borrowed from English and other sources) prevailed in the native country of Descartes in the third half-century after his death.*

Spinoza, the logical continuator of Descartes, remains true to the position of the latter respecting the inseparability of thought and consciousness. But having pantheistically identified the substance of the world with the divine substance, making finite extension and thought modes of the divine extension and thought, and denying personality (as involving limitation) of God, it only remains for him to view the thought of God as at once conscious and impersonal. But this combination of attributes is so incongruous, that the ordinary mind, trained in the logic of plain reason and experimental fact, refuses (because unable), in spite of the much-vaunted "geometrical method" of Spinoza, to admit its possibility. It is therefore but the utmost stretch of euphemism, if, in view of this logical absurdity of its conclusion, we term Spinoza's system "the very flower of philosophical mysticism," using the language of Hartmann, the modern protagonist of unconscious intelligence, who finds in the doctrine of Spinoza a mystical presentiment of the philosophy of "the unconscious"!

Locke, opposing Descartes' theory of innate ideas, simply

* Since Descartes identified conscious thought and spiritual or psychical existence, and felt obliged to deny the former to animals, he found it necessary to deny to them also the possession of any kind of a soul, and regarded them as naturalistically speaking, mere automatic machines. The student of French literature will recall the energetic protest ("in the name," as M. Littré remarks, "of common sense") which the doctrine called forth from the fabulist Lafontaine. After adducing, in one of his Fables, instances of reasoning in animals, he adds the following verse, in which it will be observed that he holds self-consciousness to be unessential for "thinking":—

“Qu'on m'aïlle soutenir, après un tel récit,
 Que les bêtes n'ont point d'esprit.
 Pour moi, si j'en étais le maître,
 Je leur en donnerais aussi bien qu'aux enfants.
 Ceux-ci ne pensent-ils pas dès leurs plus jeunes années ?
 Quelqu'un peut donc penser, ne se pouvant connaître.”

insists on the Cartesian principle of the inseparability of thought and consciousness. Since, he argues, it is as absurd to suppose that we think, without having knowledge of our thought, as to affirm hunger, without the sensation of hunger, or extension, in that which has no parts, it follows that, unless as children, or, in the majority of cases, as men, we are consciously aware of the so-called "eternal verities," "innate ideas," these verities and ideas do not exist in us. Locke's error lay in the narrowness of his field of view, and in his tendency to substitute actual consciousness for spiritual being. The soul was for him a blank tablet, possibly material, and its spiritual life consisted in the impressions written upon it, through the senses, and in reflection. Hence the tendency to regard the soul as that which at each moment of time is actually presented in consciousness, as a succession of experienced states, and not as an active principle, possessing a rational and organic nature, by which all its operations, and hence consciousness itself, are governed—a nature which, as being rational, is necessarily a "spiritual," implicit embodiment (as the concrete universe is a physical and explicit one) of those "eternal" truths, which are presupposed by—are necessary to the very conception of—reason, but which emerge into actual consciousness only when the soul, no longer passively yielding to the impressions of sense, actively directs her view to herself, to that which, on the one hand, is implied in her own operations and in the nature of reason, the mother of the soul, and on the other, is really exemplified in the whole universe, underlies it as its hidden meaning, its truth, and is more and more discovered and demonstrated in proportion as true science advances.

Natural history treats of the organic products of nature experimentally, descriptively, recording facts as they appear to outward observation, and with only a secondary, if any, reference to all which they imply, or to their final *rationale*. If Aristotle, as (in his *Physics*) a sort of natural-historian of the universe, contents himself too much with simply reading off and recording the fact of the presence of the "idea" (the final, *i.e.* by implication, the intelligent cause) in nature, without tracing up the idea to the mind which possesses and executes it, Locke illustrates the opposite danger. Proceeding from the narrower point of view of human psychology, restricting ideal life to the sphere of actual, experimental consciousness, and viewing the latter fundamentally on the side of its dependence on sense and organs of sense, he was obliged to make concessions to matter and mechanism, of which the sensational and (at least in their

tendency) materialistic philosophers of the following century, and their successors in the present one, failed not to take the utmost advantage.

Leibnitz sought to find the right middle course. It is especially important to have a correct view of Leibnitz's opinions, for Hartmann, the father of the "Philosophy of the Unconscious," which is now under discussion in Germany, says (*Philos. des Unbewussten*, 1st ed., p. 14, 6th ed., p. 15): "I gladly confess, that it was the reading of Leibnitz which first led to the investigations here recorded." The point of departure with Leibnitz, as with Descartes and Spinoza, is the conception of substance. He defines substance as being which is capable of action. (This is the view of all genuine idealism. Compare the definition in Plato's *Sophist*, p. 247, of being as "simply power." It is well also to remember how modern physics, in finding an expression for all concrete things in terms of motion, leads directly to the notion of force as omnipresent in the universe, which force a true philosophy can only conceive and explain, as having radically a spiritual origin, and in some way an ideal nature.) No substance has parts or extension. Each is a simple centre of action. The number of substances is indefinitely great. Each is called a monad. All monads are distinguished from each other by their different internal states. These latter are, in the lowest monads, elementary states of perception and volition (or "appetition"), unaccompanied by memory or consciousness. But, "there is an infinity of degrees among the monads, some dominating more or less over the others." In the central and governing monad of a plant, the internal processes and states, although ideal, are unconscious, and exhibit themselves in effect as "formative, vital forces" (*Ueberweg*). In the animal soul they are more distinct, and are accompanied with memory. This state is termed feeling (*sentiment*). To the soul-monad of man is added the faculty of reason, which perceives the necessary connections of thought and truth; whence man is said to possess a spirit.

Leibnitz distinguishes between "perception, which is the internal state of the monad representing external things, and apperception, which is the consciousness, or reflected knowledge, of this internal state, and is neither given to all souls, nor at all times to the same soul." The perceptions or "ideas" of the most inferior monads are obscure and "insensible." Those of God, who may be termed the primitive and creative Monad, are, on the contrary, all distinct and "adequate," and extend to all things. Man, occupying an intermediate position, has ideas ranging all the way from complete obscurity, through the

degrees termed "clear," and "distinct," up to, or at least approaching, that called "adequate."

Man, then, may have "insensible perceptions" or ideas. They are too "small" or too numerous to be separately noted, or, owing to the distraction of our attention from them or the complete suspension of attention (as in sound sleep), we are not aware of them. But all of them have their effect. In virtue of them, we may be said to "know many things" (for example, the "eternal truths," whose possession by man, Leibnitz defends against Locke), "of which we have never thought in the past, and may never think in the future." The importance of these "slight" (*petites*) or "insensible perceptions," both in theory and in practice, is estimated by Leibnitz as fundamental. They are, he affirms, as essential to the theory of spirit ("*pneumatique*," psychology in the very broadest sense) as are to physics the "insensible corpuscles" (the impalpable atoms) which it assumes. By them he accounts for our indeliberate actions and tastes. In so far as it is under their form that "general principles" are practically present to our minds, they constitute the "soul and connecting link of our thoughts." "They form the tie (*liaison*) which binds each being to all the rest of the universe." Each monad is in its internal state a "representation, from its point of view, of the whole universe." The soul of man, the monad of higher order, "in view of the variety of its modifications, should be compared to the universe, which, according to its point of view, it represents, and even in some sense to God, whose infinity the soul, because of its confused and imperfect perception of the infinite, but finitely represents, rather than to a material atom." "It may even be said that in consequence of these slight perceptions the present is full of the future, and laden with the past, that all things consent together, and that in the least of substances eyes as piercing as those of God could read the whole suite of things in the universe." Matter, as extended substance, is literally unreal, is purely phenomenal, and space and time exist neither as substances nor as attributes, but simply as "relations of order."*

It is to be noted that in this theory of Leibnitz there is no postulating of an unconscious principle to perform the work

* The above account of the doctrines of Leibnitz is founded principally on his *Monadologie*, *Principes de la Nature et de la Grâce*, *Nouveaux Essais sur l'Entendement humain*, and *Réplique aux Objections de Bayle*. All citations, with the one exception indicated in the text, are from the four works here named.

of conscious Deity. Not even the central monad in an organism, be its internal processes conscious or unconscious, has power over that organism, for no created monad can act upon or be acted upon by another. It is God, who alone is the sufficient cause of all things. His mind, in which no ideas are obscure, is the "region" of the "ideal reasons" of all things, and it is He who has pre-established the harmony between mind and body, causing the latter to respond to the states and acts of the former. The whole system of Leibnitz is simply a system of concrete living idealism. Dead, brute matter, as popularly conceived, he justly rejects as an absurd, irrational quantity. Everywhere is action, life; and these are inconceivable for him without some sort of an ideal aspect. Hence the primary, monadic conception of substance as a metaphysical point, a centre of immanent action, all the changes of which have an ideal aspect, "the representation of plurality in unity," which Leibnitz defines as perception. The consciousness of perception, or apperception, belongs to monads of higher order, having practically at their service systems of inferior monads (*i.e.* bodily organisms), and even they possess this perfection imperfectly; for there remains always much in their spiritual endowments or their mental experience, which the limitations of their finite nature, or circumstances, prevent them from distinctly apprehending. Since the higher monad (the animal soul, the human spirit) may, demonstrably, have ideas ("perceptions") without discursively knowing it, Leibnitz is in so far justified by the nearest analogy in attributing "insensible perception" to the lowest monads. But the lower and more obscure the "intelligent" life of the creature, so much the more completely does he regard it as dependent, not only for its origin, but also for the law of its behaviour, on God, in whom the light of conscious intelligence is perfect.

Ueberweg (*History of Philosophy*, vol. ii. p. 108) points to the possible or partial influence on Leibnitz of "Glisson, an English physician, and the author of a *Tractatus de Natura Substantiæ energetica, seu de Vita Naturæ*, London, 1672, in which motion, instinct, and ideas are attributed to all substances—and English Platonists, such as More and Cudworth, the latter of whom assumed the existence of a plastic force." Cudworth's doctrine of a "plastic nature," or a "plastic life of nature," is expounded in book I., chap. iii., of his *Intellectual System of the Universe* (1678). Deeming it evident that nature is under rational control, and regarding materialistic hypotheses as utterly insufficient to account for natural facts, Cudworth, the Christian theist, yet finds objections to the theory which would ascribe the

processes in nature to the direct agency of God. In some of these objections he is evidently more influenced by heathen than by Christian conceptions of God and His relation to the world. He seems inclined, like the ancients, to look upon the Supreme Being as having only an extra-mundane existence, and the divine omnipresence appears to be for him relatively an inoperative truth, of little practical value. There would seem also to be a forgetting of the words of Him, who said, "My Father *worketh* hitherto, and I work," and who affirmed that God, our "Father," cares for the birds of the air and the lilies of the field, and even descends to numbering the hairs of our heads; and also an insufficient appreciation of the literal truth of Paul's declaration, that it is in God that "we live, and move, and have our being." Cudworth cites approvingly the judgment of a pagan writer, to the effect that "it is not decorous in respect of God, that He should set His own hand, as it were, to every work, and immediately do all the meanest and triflingest things Himself drudgingly, without making use of any inferior and subordinate instruments." Moreover, he continues, it seems not so agreeable to reason, that nature should be quite superseded, "God Himself doing all things immediately and miraculously; from whence it would follow also, that they are all done either forcibly and violently, or else artificially only, and none of them by any inward principle of their own." (Here Cudworth plays directly into the hands of his materialistic opponents, in admitting that whatever God, the supreme source of universal law, literally and immediately does, is done "miraculously," "violently," "artificially." Furthermore, whatever an "inward principle" in nature might do, would, in the eyes of a strict materialist, be just as strictly miraculous, violent, and artificial. What the materialist professes to see, and all he admits, is matter and blind force acting "mechanically." Any ideal principle assumed as directing the actions of matter and its "forces," whether from within or from without, is in his view miraculous and impossible.) And lastly, Cudworth argues, that the "slow and gradual process" of things in nature, "which would seem to be but vain and idle pomp, or a trifling formality, if the agent were omnipotent," and also "those errors and bungles which are committed, when the matter is inert and contumacious," are evidences that the agent is not omnipotent; such an agent "could despatch its work in a moment" (an evident absurdity; the very conception of nature is that of a process in time, and this obviously could not be despatched "in a moment," *i. e.* practically in no time), and "would always do it infallibly and irresistibly." (Here again our author shows himself under bondage to the false

notion of God's relation to His creation, which infests the speculations of so many of the "advanced" minds in science and philosophy, the world over, up to the present day. As if God and the world were two independent beings, occupying different places in the universe, and could not come into any kind of contact without detracting, on the one hand, from the absolute blessedness or infinite perfections of Deity, and without disturbance, on the other, of the self-sufficient order of nature! As if "matter" and nature could even be, much less act, except, as St. Paul says, *in and through God!*) Hence Cudworth, with constant reference to the authority of Aristotle and Plotinus, postulates a "plastic nature," "which as an inferior and subordinate instrument, doth drudgingly execute that part of (God's) providence, which consists in the regular and orderly motion of matter." This nature is subordinate to a higher providence, which "sometimes" overrules it and supplies its defects. The plastic nature is a variety of "life," it is "art embodied in matter," acting "from within vitally and magically," and never at a loss what to do. But "as it doth not comprehend the reason of its own action, so neither is it clearly and expressly conscious what it doth." It "cannot act electively and with discretion." It has "a certain dull and obscure idea of that which it stamps and prints on matter," but this is far inferior to "animal fancy." The "plastic life" of nature is the "last and lowest of all lives," but "since it is a life, it must needs be incorporeal." Cudworth's theory is simply the reproduction of a Neo-Platonic theory in a Christian's "System of the Universe."

I must not take up space by further indications of the implicit or express presence of a theory of unconscious reason in the history of English thought. I will only remind the members of the Institute of Mr. J. J. Murphy's hypothesis of an "unconscious intelligence," similar in conception to Cudworth's plastic nature, and destined to perform about the same functions, as well as to relieve our Christian theodicy of certain burdens which, without this hypothesis, it is assumed that the former could not carry. (See Murphy's *Habit and Intelligence*, 1869, vol. ii., chaps. xxvii., xxxix., and the *Theistic Conception of the World*, by B. F. Cocker, D.D., LL.D., New York, 1875, pp. 225-235, where the internal contradiction in Mr. Murphy's views, and their unsatisfactory nature on other grounds, are briefly but forcibly set forth.) In an American account of the doctrine of evolution, I find a view similar to that of Murphy attributed to the English writers Morell and Laycock, whose works I have not now immediately at hand.

The recent animated discussions in Germany have led there

to a re-examination of the works of the great German thinkers of the past century, with a view to the discovery of traces of a theory of the "unconscious." Having already unduly protracted this historical sketch, I must be permitted to refer those who desire more detailed information on this part of the subject to the German of Dr. Johannes Volkelt, who, in *Das Unbewusste und der Pessimismus* (Berlin, 1873), examines, pp. 44-77, the doctrines of Kant and Hegel. He shows how Kant, in his *Anthropologie*, alludes to unconscious mental representations (*Vorstellungen*), how his doctrine of the "forms of sensibility" (space and time) and of the "categories of the understanding," as *à priori* implicit possessions of the mind, antecedent to all experience, may be regarded as implying that these are originally unconscious, and how a similar implication is involved in his *Æsthetics*, his theory of genius, &c. Of the Hegelian system, Dr. Volkelt, himself an Hegelian, reaffirms the most common interpretation, namely, that it represents the universe as the gradual evolution of an unconscious, ideal principle ("the unconsciously logical," as Volkelt very abstractly terms it), which attains to self-consciousness only in man (and most perfectly, it may be presumed, in Hegelians of the school of Volkelt). (The latter, it may be remarked, does not point out the capital difference between the "unconscious" with Kant and Hegel, namely, that with the former it is confined to the finite spirit of man, while with the latter it is a predicate of the mind which inhabits the universe.) Hartmann, on the other hand, makes much of the authority of Schelling, in whose works (the mingled outcome of ancient philosophy, mediæval mysticism, and German thought), he finds the clearest expression, before his own time, of the unconscious in the world and in man. Hartmann has himself called forth defenders and imitators in plenty, who seek to explain the world without the aid of a personal God. I will name only two, Moritz Venetianer (*Der Allgeist. Grundzüge des Panpsychismus im Anschluss an die Philosophie des Unbewussten*, Berlin, 1874), and Ludwig Noiré (*Die Welt als Entwicklung des Geistes*, Leipzig, 1874). According to Noiré, the fundamental attributes of being are motion and sensation. These suffice him for the construction of the universe. The "unconscious" in the human mind, apart from the theory of the unconscious principle underlying and causing the universe, has occupied, and still occupies, the attention of psychologists and physiologists. It is sufficient at present to refer to Dr. Carpenter's theory of "unconscious cerebration" (see *Mental Physiology*, chap. xiii., and other authorities there cited), and to the writings of Helm-

holtz, Fechner, and other German investigators, and to such monographs as Dr. Ludwig Strumpell's on Dreams (*Die Natur und Entstehung der Träume*, Leipzig, 1874).

We come now to Eduard von Hartmann. An account of the life and "development" of this author, up to date, is furnished by himself in the first three numbers of *Die Gegenwart* for 1875 (Berlin: Paul Lindau, editor). Born February 23, 1842, he published his *Philosophy of the Unconscious*, a heavy volume of 678 pages, in 1869. It will be seen that the work could not be precisely the fruit of the ripest meditations. The book at once attracted unusual attention and became immediately, in the "land of thinkers," the sensation of the hour. New editions followed each other in rapid succession, with additions, but "no changes," the sixth edition (1874) containing, with the index, 846 pages. (Seventh edition, enlarged, with preface and a supplement on "The Physiology of the Nerve-Centres," 2 vols., 1875.) Reasons for this extreme popularity may be found in the writer's unusually clear and facile style, and in his combination of idealism with what may perhaps be termed moral materialism. For in Germany the number of persons is, unfortunately, large, who, while they are too penetrating not to see that philosophical materialism (as a theory of the nature of things) is utterly superficial and untenable (the "mechanism" to which materialists reduce all, being, so far from opposed to teleology, the rather just what teleology implies, and denoting, as Hartmann himself forcibly points out in his critical work on Darwinism, not only etymologically, but also really and only, a system of means to ideal ends), are yet in bondage to a moral and religious scepticism, or to a sort of intellectual vanity, which largely blunts their spiritual and even their philosophic perceptions. Such persons welcome a theory which combines some sort of idealism with the negative results of religious criticism and of scientific research. The logic of the speculative portion of the *Philosophy of the Unconscious* is remarkably unlike the literary style, being neither clear nor cogent, but full of obvious fallacies. Hence the lament, among the more sober-minded Germans, at Hartmann's popularity, as at a sign of widespread degeneracy in the logical thought of Germany.

The title-page of the *Philosophy of the Unconscious* bears as a motto the phrase, "Speculative results following the inductive method of natural science." By this method the author naturally does not claim to reach results having apodictical certainty. He only claims the ability to show the overwhelming probability, amounting to practical certainty, of his conclusions.

And yet, notwithstanding the methodological proclamation of the title-page, the last part of the book is avowedly metaphysical, being entitled "The Metaphysics of the Unconscious," and containing, in the 6th edition, precisely 100 pages more than the two other parts put together! This ending, however, has in it nothing which need surprise any one who is conscious of the true import and conditions of the problem involved. The fundamental query with Hartmann is really, What is the nature of things? Now this nature can only be *known*, and not directly *seen*. The method of natural science is the result of the investigation of phenomena, of "things which do appear," and can only fulfil a secondary, confirmatory function in the inquiry concerning the fundamental truth or abiding reality of things, or, in other words, concerning the things which are not seen, but eternal. Here, as pointed out in my former paper, the true starting-point is man, self-consciousness, with all that it includes, and the true method comprehends experimental analysis and synthesis—the latter, which involves the firm grasp of rational principle, dominating but not distorting the former.

It must cheerfully be confessed that the first two-fifths of Hartmann's work are a powerful statement of the experimental argument for design in nature—only, the designer is here not God, but "The Unconscious." Under this name Hartmann points out the presence and agency of ideal causes in the development of organisms, in organic processes, in instinct, in the curative power of nature, in the human mind, in the love of the sexes, in feeling, in character and morality, in æsthetic judgment and artistic production, in the origin of language, in thought, in the origin of sensible perception, in mysticism, and in history. In all these cases the ideal agency is alleged to be unconscious, but *the argument at most only proves it to be unconscious to the subject in which its works are wrought*. Yet it is on the basis of the facts related in these chapters that Hartmann founds the experimental demonstration of the existence of "The Unconscious," a substitute for the personal God of Theism, an ideal abstraction, the source, sum, and end of all things, an ideal *quasi* substance, of which man and the universe are, not in any sense spontaneous, but strictly determined, necessary phenomena, in which latter, as its name implies, it works "unconsciously." This is the fundamental fallacy of our author. From the (partial) unconsciousness, of the finite phenomenon (the universe and its inhabitants) is inferred the total unconsciousness of its infinite cause! Because *we* are not

conscious of the operations which that entity *called* the "Unconscious" carries on in us, therefore that entity is itself unconscious!

The "Unconscious," we are told, is not subject to disease or fatigue, is independent of sense in its thought, does not hesitate and doubt (like Cudworth's plastic nature, it is "never at a loss"), being provided with a sort of intellectual intuition which enables it without reflection to foresee and provide for the end from the beginning. Hence, also, it never errs; it neither possesses (since it is without a brain!), nor has it need of, memory; in it will and idea exist in inseparable unity, so that as "nothing can be willed without being thought," so also "nothing can be thought without being willed." It is omnipotent, omniscient, omnipresent, and possesses perfect wisdom. This is that *homine majus* to which in all times and climes men have turned as to the constant source of their life. But it is not God. It is not personal, nor free, nor endowed with moral perfections. It is the purest abstraction, and the attempt to derive the world from it is the most patent attempt to combine natural realism with an utterly vacant idealism, which modern times have witnessed.

Hartmann had asserted,—namely, in the first edition of his work, p. 607, that before and after the world there was and will be nothing. This was calculated to impress a Philistine understanding, attached to the logic of common minds, and which had followed in good faith the author's account of the successive processes in the ante-cosmic "will," whence the universe was alleged to have resulted, as in flat contradiction with the implied sense of that account. Ante-cosmic processes would seem to imply, as existing before the universe, a real being of some sort, in which the processes could go on. But the fancied discoverer of contradiction would have shown himself at fault in not appreciating Hartmann's ideas, and in supposing that where descriptive language is used there must necessarily be something described. This is not disproved by the new form given to the passage referred to in the sixth edition, p. 724. Here we read that before and after the world there neither was nor will be "anything actual whatever, anything but passive (*ruhende*), inactive, self-included essence without existence (or, a nature without entity,—*Wesen ohne Dasein*)"; so that, after all, before and after the world is nothing, *i.e.* "nothing actual," only non-existing essence, or, as it is elsewhere termed, a "metaphysical essence." And this is the august source of the universe! The most extreme personifier of abstractions among the Neo-Platonists, when the

Greek mind had long passed the zenith of its virile power, did not, to my knowledge, reach any such extreme of nonsense as this. If the original One was made transcendent above all categories of human thought, it was because of a reverent and ecstatic feeling of the utter impotence of human language to express the blessed perfection of the Eternal. But here the modern announcer of a "new gospel" (as one of Hartmann's admirers has in substance termed him), the child of what the Germans term "the city of intelligence," out-doing the grossest fetish-worshipper, adores, instead of the living God, an abstraction utterly dead and without existence, possessing only a potential will and an inactive intelligence. And what is the attempt to explain the derivation of the world from such an abstraction but flying directly in the face of the favourite maxim of physical speculators, "*ex nihilo nihil*"?

And yet the motive of Hartmann in his speculation concerning the genesis of the world is in so far philosophically justifiable, as he aims to show the primacy of the ideal over the material. This view is expressed in the Bible in the assertion that God made the world out of nothing, *i.e.* there was no pre-existing material, co-eternal with God, out of which God could frame the world. First in the order of existence is spiritual substance, not material. But when we thus speak of spirit, we mean self-possessing intelligence, a rational agent, a supreme personality, however much, by reason of its exaltation above the limits of human personality, it may transcend the latter in degree and perfection. Unless the stream may be greater than the fountain, unless motion may exist without a mover, or an effect without a cause, philosophy must always insist that the Cause of all causes shall possess at least the equivalent of what is known to men as conscious personality. Now Hartmann, stripping off the conscious and personal elements, has nothing left but the abstract form of spiritual life, a potential will and a blank idea.

Will is conceded by Hartmann to be inseparable from idea. The ante-cosmic will was vacant, hence inoperative, hence no true will. Uneasily it sought to assert itself, but, having no ideal content, guided by no idea, its action could only be irrational. The will translates the ideal into the real, and so the will of "the Unconscious" forced the idea into reality, brought the world into existence by its own irrational self-assertion. This result once accomplished, the idea awoke to the necessity of self-assertion on its part, and set about to make the world as logical, *i.e.* as good as it may be. It were better that the world, the product of the illogical action of the will,

should not exist. But since it exists, the "idea" goes to work to redeem it from its evil. This it is that operates everywhere, as organic force, instinct, as the "inspiration in man," the founder of societies, &c. It develops on the earth the various species of animals in ascending series, to the end that at last consciousness may come into being with man. In human thought idea is emancipated from the embrace of will, and consciousness is "the surprise and confusion of the will in view of this emancipation" (!).

In the various consciousnesses of men the original (metaphysical, ante-cosmic) will is dispersed and robbed of somewhat of its tyrannical power for evil; for the exertion of will is followed, according to Hartmann, by a preponderance of evil (or pain) over good (or pleasure). Hence the benevolent "idea" (the logical element in the Unconscious) which seeks only the good of the world, can only seek by indirect means to destroy will, or, in other words, to bring back the world into its original nothingness. To this end the race of mankind is now progressing in the direction of a more perfect development of consciousness, *i.e.* to a more complete emancipation of idea from will or to the completed ascendancy of reason. When this end shall have been attained, it is presumed that the universal recognition of the pessimistic results of willing will lead to the final act in the drama of the world, the complete suppression of will, which is the same thing as annihilation of the world. (There is, in Hartmann's opinion, nothing in the concrete universe but force. But all force is will. Manifestations of force are acts of will. The annihilation of will is, therefore, the annihilation of the universe.) Then space, the creation of the will of the "Unconscious," will be no more; time will be no more, and not God, but the "metaphysical essence," which "inhabiteth eternity," will be all in all.

The speculative views of Hartmann (*rudis indigestaque moles*) are in part the result of the attempt to combine in one synthesis what is supposed to have been true in the philosophical systems of predecessors. Hartmann expressly intimates the belief that he is a truer Hegelian than Hegel himself. Schelling he reveres, and cites often with approval from his earlier works. Schopenhauer he would correct. But the positive (negative?) conception of the Unconscious and its speculative application are that on which he founds his special claim to originality. This conception he derives partly from the observation of well-known and admitted facts, and defends and amplifies on the ground of abstract arguments. The facts simply show that there is more reason in man and in all the

contents of the universe than he or they are conscious of. But these facts (the wonderful instincts of man and animals; unerring accuracy and perfect adaptation of means to ends in the whole ordering of the forces of the universe, &c. &c.) by no means show that the agent to which they point is unconscious, or possesses anything less than the perfection of conscious mind. It should be remembered that Hartmann is so impressed by them that he ascribes all events and all things to the "One Unconscious," utterly denying the reality of any subordinate agencies or forces. Thus, the soul of man is defined by him as "the sum of the activities of the One Unconscious which are directed upon one bodily organism." All things are but manifestations of the Unconscious. Now, I assert, and no remarkable degree of logical sagacity is required to perceive the justice of the assertion, that it by no means follows that because the manifestation is unconscious, therefore the agent which manifests itself is unconscious. It is just as simple in point of theory, and far more reasonable, to suppose that it is by the everlasting "I Am," the personal God of religious faith, that "the heavens drop down their dew," that "the inspiration of the Almighty giveth," not only to men, but also to animals, and in the broadest sense to all things, "understanding," as to ascribe all the wonders of creation to an unreflecting abstraction. To do this latter is really but to reintroduce upon the scene, under another aspect, the irrational conception of blind force, which materialists employ with such miraculous effect.

As to the arguments intended to prove the conceivability of unconscious ideas, and hence of unconscious spirit or "intelligence," the two following are the principal ones. First, we know experimentally of no consciousness which is not associated with a brain. *Ergo*, no consciousness is possible without a brain (*Ph. d. Unb.*, 6th ed., p. 391: "Cerebral vibrations, or, more generally speaking, material motion, is the *conditio sine qua non* of consciousness"). The simplest answer to this is that which Ulrici (*Gott und der Mensch*, 2nd ed., 1874, 1. Theil, p. 146) makes to the materialists, who regard the soul as a function of the body. If their arguments were correct, says Ulrici, then might we reason that "since nothing is visible without the presence of light or of a luminous body, therefore sight is only the function (effect) of light"! Because man's present consciousness depends on a brain, it does not follow that it always will, or that all consciousness depends on the presence of such an instrument. And further, positively, the considerations which render it probable that the human mind uses the brain, and is hence distinct from it, go directly to

favour the inference that an infinite mind not only might exist without a brain, but that, so far from needing one, it would be positively hampered and limited, *i.e.* rendered finite, by the presence of a brain.

The other argument reads as follows (*loc. cit.*, p. 392): "Material motion determines the content of an idea; but the attribute of consciousness is not necessary to this content, for the same content may, apart from the forms of sense [in which human ideas are clothed], also be thought unconsciously [which is but begging, on the basis of a previous defective induction, the very point in question. What we wish to know is, whether an idea (Hartmann's word is *Vorstellung*, representation) is, in any other than a metaphorical sense, possible without a conscious mind possessing it—whether that is a true "representation" which is not made to a mind that consciously perceives it]. But if, now, consciousness can be found neither in the content nor, as we have previously seen, in the sensuous form of the idea, it is not at all necessary to the existence of an idea [or "mental representation"] as such, but must be an accident, which may or may not be joined with the idea." Consciousness, then (conscious knowledge, possession of ideas), is not identical, whether in whole or in part, with either the form or the content of our ideas; therefore it is an accident. By parity of reasoning, I argue in reply: Sight is neither in the form nor in the content of the eye; hence it is an accident of the eye, non-essential to its due operation, natural function and use! There might be an eye which performed all the functions of an eye without seeing! The absurdity of this is doubtless obvious enough. Who needs to be told that although sight is neither in the form nor in the content of the organ of sight, yet the organ, the eye, is not an eye in any sense which makes it practically different from a clod of common earth, except as through it some one really sees? So an idea, psychologically speaking, is nothing but a dead unreal abstraction, except as it is an instrument of conscious knowledge to its possessor.

One of the admissions made by Hartmann in his second argument, it may be remarked in passing, destroys of itself all the force of the first argument. If the relation of consciousness to the forms of sense (in which the ideas of all brain-possessing terrestrial beings are clothed) is accidental, we may obviously, reversing the order of terms, say that the relation of sense to consciousness is accidental, or non-essential; whence the conclusion that consciousness (contrary to the assertion in the first argument) does not depend on the presence of a brain. For the brain, as a physical organ, is nothing but the chief

centre of all the organs of sense. If it be true, then, that sense is not intrinsically necessary to consciousness, neither can the brain, the organ of sense, be thus necessary.

To the sixth edition of his book Hartmann adds a chapter not contained in the first (the intervening editions I have not seen) on "The Unconscious and the God of Theism." It may be worth while to notice briefly some of the points made in it. On the first page of this chapter (535) the author declares: "It is not for me to prove that the unconscious, physical functions, which as such are sufficient for the explanation of all that needs explanation, are not, on the other hand, in the All-in-one [*im All-Einen*," i.e. in "The Unconscious"] conscious. On the contrary, those who would add to our hypothesis this supplement [the view that they are conscious functions] which is wholly valueless, and unnecessary for the explanation of the phenomena of the universe, must themselves furnish the proof of their doctrine." This is turning the tables on Theists with a vengeance. The self-complacency of the passage is certainly astounding. It has not been shown that "unconscious physical functions" are sufficient to explain what is to be explained. Take one example, our author's discussion of the origin of language. The conclusion is reached that language is the result of the operation of an unconscious social instinct, and not "the mechanical work of a conscious God" (1st ed., p. 232), and this conclusion is one of the premises from which the inference is drawn that the Being who is all in all, the first and the last, is unconscious. The facts are, following our author's account, these: an instinct, unconscious in man, accomplishing a certain result, but acting only as a secondary cause; and (as we learn in the metaphysical portion of the work) an original and Supreme Being, from whom the instinct proceeds, and who acts through the instinct, so that what the instinct is figuratively said to do, is really the work of this Being. (As above indicated, Hartmann makes man and the universe completely dependent on, simply manifestations of, this Supreme Being, "the Unconscious.") There are two distinct causes recognized: the secondary cause, in the present case the instinct, of which the beings in which it is figuratively said to operate are more or less unconscious, and the prime or real cause, an original being. The "unconscious physical functions" are the secondary causes, and when Hartmann says that they "are sufficient for the explanation of all that needs explanation," he simply contradicts himself, for they are in his own view but the modes of the manifestation of one supreme ideal cause, which is the true cause, and which there-

fore alone is adequate truly to explain the phenomena to be explained. Now, Hartmann may or may not consider the question whether what is unconscious in the effect (the secondary cause) is unconscious also in the (prime) cause. That depends on his own good pleasure. But he is not to be permitted to impose on others by so evident a sophism as that by which he impliedly passes from the unconsciousness of the former (the effect, the instinct in man) to the unconsciousness of the latter (the original being who causes and works through the instinct). This fallacy runs all through the chapter, and I shall not attempt to follow out all the indications of its presence. I will cite only one more instance. On p. 545 our author, arguing that we have no right to suppose that, because we, when we seek to accomplish a purpose, are conscious of that purpose, therefore the "Unconscious" (the God of natural and revealed religion) is conscious of His purposes, says: "We see, even in the case of individual instincts, that the individual looks out for its future, without knowing what it does, and we see likewise in the case of generic instincts, that the individual labours for the end of the genus, *i.e.* for individuals other than himself, without any suspicion as to who they are, for whom he torments and sacrifices himself." Here again the puerile sophism reappears; because the animal (or, as the case may be, man; speaking generally, the effect, the creature) is unconscious in some or all of its actions, therefore the original and universal cause is unconscious!

By a very familiar metaphor we quite properly term (not define) consciousness the light of the mind. The negative term "unconscious" then signifies simply the absence of mental light, an intellectual blank, or, really, positively, nothing. But the student of Hartmann's "Philosophy of the Unconscious" in its original form found that the "Unconscious" here treated of was far from being practically an ideal nonentity. Absolute "clairvoyance" was ascribed to it, perfect intelligence, a perfect and immediate intuition which rendered unnecessary for it the slow processes of discursive thought, and a universal presence and agency, this agency being repeatedly termed "providence," whether general or particular. Now, consciousness, as directly and immediately known to us, is the function of a finite spirit, and no sober theist, or, for that matter, philosopher, would ever think of ascribing to God a consciousness so hedged in with limitations as our own. Only, he would say, for obvious reasons, the "mental light" of God can in any case not be inferior to that of man but must be superior to it, indeed, absolutely perfect; and if he sought to form some feeble conception of it, it

would be by a process of idealization, proceeding from what is most nearly perfect in human consciousness. (*Ab cognito ad incognitum*. Hartmann follows this principle, only imperfectly. The notions of "clairvoyance," of "intellectual intuition" as opposed to discursive thought, &c., and even of the "Unconscious," are taken directly from the observation of human consciousness. It is not Hartmann who can lawfully bring against theists the charge of illogical or unjustifiable anthropomorphism!) Our supposed theist, then, seeking for a term drawn from human analogies, by which to designate the mental (spiritual) light of Him in whom "is no darkness at all," might well be supposed to make use of the word supra-conscious, designating thereby a consciousness and a mode of mental action absolutely transcending—but not opposed to—human consciousness, or the perfect, in opposition to what in us is feeble, finite, imperfect. It repeatedly occurred to the writer, while studying the first edition of Hartmann's work, and the opinion was repeatedly expressed by him, that it was the "supra-conscious" mind of Deity to which the author's inquiries and arguments pointed, and that by substituting in his pages the "Supra-conscious" for the "Unconscious," a large portion of his work would be turned into an impressive argument for the existence and actual, present agency in man and the universe of Him, of whom the prophet says: "For Thou also hast wrought all our works in us." On pp. 536, 537 of the new chapter above named Hartmann admits the propriety of this substitution. "We have seen," he says, "that this unconscious clairvoyant Intelligence is infinitely exalted above the processes of human consciousness. While the former is infallible in its purposeful action, instantaneously apprehending in its one view all ends and means, and in every instance including all requisite data in its clairvoyant vision,—the latter, proceeding by the way of discursive reflection, is lame, and goes, as it were, on stilts, is ever limited to one point, and depends on sensible perception, memory, and the inspirations of the Unconscious. We shall therefore have to term this *unconscious* intelligence, which transcends all consciousness, a *SUPRA-conscious* intelligence." (The Italics and capital letters are the author's.) Elsewhere (p. 546), the process of knowledge in the "Unconscious" is termed "omniscient and all-wise intuition . . . of the positive nature of which we can affirm nothing, and can only say that it is exalted above that which we know as consciousness, *i.e.* that, *negatively defined*, it is *unconscious*, and that, *positively undefined*, it is *supra-conscious*." The antithetic balancing of phrases in the last clauses appears to have been intended merely

for the gratification of a rhetorical fancy. It is impossible to see how the term "supra-conscious" leaves the subject to which it is applied any more "positively undefined," than does the term "unconscious"; and, on the other hand, we have in effect the repeated and earnest assurance of our author that the former epithet is equivalent to a "negative definition." We know nothing, he more than once assures us, of the positive nature of the intellection of the "Supra-conscious," but we may be certain that it is "absolutely opposed" in kind to the conscious processes of the human mind. Surely, this is of the nature of negative definition. But, mere rhetorical criticism aside, does not this exchange of terms, this substitution of the "Supra-conscious" for the "Unconscious," make patent to every understanding the logical weakness (to say the least) of the "Philosophy of the Unconscious"? There is a fallacy in reasoning, which the ancients termed *μετάβασις εἰς ἄλλο γένος*, where the conclusion reached differs from that for which the premises were professedly sought. I cannot help seeing an illustration of this fallacy in the case now before us. It existed in the earlier editions of the work under consideration, in which the word "supra-conscious" was not mentioned; so that the admission of this term into the last edition is but a result of the fallacy and, as it were, an index to it, and does by no means constitute it. The "Unconscious," of which we were to learn the "Philosophy," was named at the outset by a name which at once suggested the state known to us, and only conceivable, as mental darkness. In the "inductive" portions of the work, the physical and psychological facts and processes which were chosen to demonstrate the existence of the "Unconscious," were all instances of action in which the apparent agent, though acting, as the result in each case showed, "wisely," yet knew not what he (or it) did. The trustful reader, following with curious interest the "induction," would not be led to suppose that any other notion of the "Unconscious" was to be finally inferred, than that which the facts illustrated. Least of all would he expect this if he bore in mind the axiomatic truth, that the less cannot produce the greater, nor premises warrant conclusions which they do not virtually contain. How great, therefore, must be his astonishment on finding, as a "speculative result" of the whole inquiry, that the "Unconscious," far from suffering under a lack of mental light, apprehends "instantaneously in its one view all the means and ends" of the universe, and far from being without the knowledge of what it does, is all-knowing as well as all-wise! And this astonishment can only be increased

when we learn that, in spite of the exalted attributes ascribed to the "Unconscious Spirit," yet we can form absolutely no positive conception—hence no approximate, however imperfect, conception—of its internal state, or, in other words, of that which for it takes the place of human consciousness. Only, says our author (as if to tantalize us by taking back, just as we were about to receive it, all that was offered in the term "supra-conscious"), it is absolutely opposed to the conscious mental processes of the human mind. If these things be so, to what end was the long induction? was it necessary to heap up premise on premise of facts experimentally observable, to prove that which is not only not observable, but avowedly inconceivable? What sort of an induction is that which, instead of advancing from the known to the knowledge of the previously unknown, proceeds to the affirmation of that which is not only unknowable, but is also in nature absolutely opposed to the known; the conclusion being thus not only unlike, but absolutely opposed in kind, to the premises? Nay, in spite of all the floundering logical ineptitude of our author, as here disclosed, does not his case show that facts may prove themselves stronger than any preconceived conclusion and force the reasoner to bear witness to the truth? For the "Supra-conscious," to which Hartmann, notwithstanding his assertion of its unknowableness, ascribes such exalted attributes, is indeed that which man and nature not disclose, but to which they point. For the Christian theist may well be content to employ the above term to denote the internal state of that Divine Spirit, "whose thoughts are not as our thoughts." But he will remember that man is made in the image of God, and hence that the mind of man is, after all, an image however faint of the Divine mind. In the scale of animal life there are surely different degrees of "mind," the spirit of man far transcending all the rest. Yet all are akin, the lowest, which is most completely dependent on sense, in some sort imaging, however weakly, and pointing to the highest in the scale, the mind of man, which is least dependent on sense. So the spirit of man points to the Divine Spirit, which, however, it can no more completely comprehend, than can the lowest of animals the human mind. God and His creation are not unrelated, separate from and opposed to each other. They are akin. Were this not so, no argument from the latter, whether direct or indirect, positive or negative, to the former would be possible. Induction, as before affirmed, is only possible, when the unknown, which is to be learned, is in some sense of a piece with the known.

Notwithstanding his admission of the term supra-conscious, which properly signifies that which possesses not merely consciousness, or a bare equivalent for consciousness, but more and better than that, Hartmann employs it as an appellation for his Supreme Being not more than five or six times, and continues to make use of the expression "The Unconscious." This may not be of so much consequence after the explanations that have gone before. Yet this course savours at least of literary error, if not of an intention to deceive, for the word "unconscious" will continue naturally to suggest what it in the first instance and properly denotes; viz. that which, possessing some or all of the conditions of consciousness, is yet not conscious, *i.e.* is less than conscious—a sense far different from that admitted in the use of the term "supra-conscious."

In the chapter on the "Unconscious and the God of Theism," Hartmann repeatedly shows himself under the influence of an error which has unhappily confused the ideas of too many Christian thinkers. It is the error of thinking of the Infinite and Absolute solely under the negative aspect which is suggested by the composition of those terms. Thus "infinite form," we are told (p. 539), is the same as pure formlessness, and "absolute consciousness is identical with the absolutely unconscious." No! the terms infinite and absolute, apart from the meanings which they suggest to sense, express the perfect and the independent. Human consciousness, for example, is finite, *i.e.* restrained by the limitations of sense, and rendered in a thousand different ways ideally incomplete. An infinite or absolute consciousness is simply a perfect one, independent of all checks and limitations. But if infinitude, absence of limitations, means formlessness, then it is easy to see how the God of Hartmann should be, after all, as above indicated, nothing but a vain abstraction, "nothing actual whatever," not a living personal spirit, the true fountain not only of physical, but also of eternal life.

Hartmann regards human consciousness as resting in and supported by "The Unconscious," as, in fact, but a finite manifestation of the Unconscious. The best Greek philosophy, similarly, referred the pure reason in man to the Divine reason. The best thinker among the Apostles of Christianity asserts our inability "to *think* anything as of ourselves, but our sufficiency is of God." The most philosophical psychology of to-day (by which I do not mean that which is most purely speculative, much less fanciful, but that which is most comprehensive in its hold upon facts) reaffirms the same view. But this view is in Hartmann's estimation inconsistent with the

theory of a personal and conscious Deity. Were there in God an absolute consciousness, then, in consequence of the above view concerning the relation of the human to the Divine Spirit, we should, he says, necessarily expect the Divine consciousness so to "shine into" the individual consciousness, that "the individual would find himself completely illuminated by the absolute consciousness, and the latter would lie open to his view." But this, says our author, is contrary to experience. This reasoning seems too puerile to receive an answer. No one knows better or emphasizes more expressly, than Hartmann, the fact that the human consciousness is beset at all points with limitations. Being finite, how can it contain the infinite? being imperfect, how can it completely reflect the perfect? The human mind is, indeed, illuminated by the Reason, the Word of God, "which lighteth every man that cometh into the world." The light of the Absolute does shine into it, however faintly, and it catches, as in the far-off distance, glimpses of the "Absolute Consciousness." But the reasons why it does not fully take in, and is not thus practically identical with the latter, are so obvious, that one wonders that any writer should dare expect of his readers sufficient simplicity to be imposed upon by his facile ignoring of them. This is only less wonderful than the attempt to derive the light of human consciousness from the darkness of the unconscious.

Many modern speculators, and among them Hartmann, evince a painful fear lest any other philosophy than what they are pleased to term "Monism" should be received. The principle of the universe must be one, they say, and all things derivable from it. To this Christian idealism heartily assents. But Monism, we are told (p. 541), is utterly incompatible with the assumption of a conscious Deity. Such a being were necessarily a "transcendent God," separate from the world (Dualism), and not an "immanent" one, present in the universe, and related to the latter as substance to manifestation. Further, such a being could not be immanent in the world and in man "without a collision of consciousnesses." It will require but little reflection to meet these difficulties, and I may justly leave the task to the reader. I will only remark that it is, to say the least, interesting to find a metaphysician of Hartmann's pretensions fearing a "collision" between the finite and the infinite, the dependent and the independent, to the detriment of the latter (!); and, further, that the "God of Theism" is at once transcendent and immanent, being omnipresent, though we may rightly prefer, with Saint Paul, to say

that the world is immanent in Him,—“in Him we live and move, and have our being,” “of whom are all things, and we in Him.” God is the principle of the world’s being—the world has its nature from God—“in all things” (we are not afraid to say with Aristotle above) “there is something divine”—there is unity, not only in the nature and order of the universe, but also (be it said with reverence) in the world *and* God. Hartmann’s Monism, on the contrary, is the unity of an abstraction (a “metaphysical essence”) and reality. And the principle of this Monism, the Unconscious, has not the merit of that unity which consists in internal harmony, the merit of self-mastery, of oneness with itself—as is shown by the conflict within it between “will” and “idea,” which is alleged to account for the creation of this (in Hartmann’s view) thoroughly evil world.

This discussion of the Philosophy of the Unconscious has, however, gone already too far. Enough, I trust, has been said to indicate somewhat of its weakness, its absurdities, its contradictions. I will close with a few positive statements of opinions and points of view in regard to this whole subject, which, I think, sound philosophy requires us to maintain and which a true religious faith will heartily accept.

An idea is a living function, not a dead product. It is the function of active mind. Through it, possessing it, mind is said to know. An idea is thus an instrument of knowledge. This its relation to knowledge is essential to the definition, to the very conception of an idea. Its “content” is the real or fancied thing known in and through the idea. Its “form” is, that it is a part of the inward mental state and activity of the knower. Form and content of an idea, in this the primary sense of the term, are inseparable; so are idea and active, living, knowing mind. Through memory an idea seems, but only seems, to become a fixed inert product in, or possession of, the mind. In reality it is not that the idea is lying somewhere at rest in the mind, ready to be looked at and recognized when the owner pleases, but that the conditions necessary to our “having” it, or, more correctly, to our thinking it, are less numerous than they were before the occasion when we first thought it. But the actual reappearance of the idea on the inward scene of our mental activity is really a case of our actively thinking it anew. The original thinking of the idea was a removal of at least one of the original limits of our consciousness. The more ideas one thus has, so much the more are these limits removed. When we speak of ideas put into execution, outwardly realized, or recorded, we use the

word "idea" in a secondary, metaphorical sense. We have no more occasion to ask whether an idea, taken in this sense, is conscious or unconscious, than to inquire whether sound is cold or warm.

"Intelligence" is a synonym for "knowing." It differs among different beings, and in the same being at different times, both in degree and in the nature of what is known. In the lowest case of simple sensation, intelligence, if (as taking the word in its broadest sense, we must) we extend the word to this case, is confined almost exclusively to the feeling experienced. The being here is said to know its feeling, its sensation, without reflecting that it knows it. This is the poorest form of intelligence, but it is not conceivable without some feeble degree—a degree, perhaps, which would be inappreciable for us—of mental light. Man, whose mental life begins at this lowest step in the scale of "intelligence," rapidly ascends to the highest step of which we can have direct knowledge, when along with (*con*) knowing (*scientia*) goes consciousness, the knowing that *he* knows, and, in the last and highest resort, the knowing that *he* knows, or self-consciousness. All these stages must be implicitly contained in the lowest. Only in the highest are they explicitly, and then, even, only imperfectly, developed.

These data are taken from the sphere of "the known," from that which is observed or experienced; and if, as is believed, they are correctly stated, it follows that no intelligence is explicitly unconscious, while even the lowest possesses implicitly, or in germ, the attributes of perfect consciousness. In so far, however, as any "intelligence" can be said to be unconscious, it is only that lowest stage of sensation, which is illustrated in the embryonic mental life of man and in various degrees (through all of which man rapidly passes in the growth of his consciousness) in the different orders of the organic creation inferior to man.

What, more particularly, consciousness positively is, is known, and can be known, only through consciousness. First it exists, and then it asks, What am I? Consciousness reveals itself. It is known to us as a necessary attribute of our intelligence, or what amounts to the same thing, of ourselves as *persons*. For, when we call ourselves "intelligences," or "intelligent beings," we imply more than is expressed in the above literal definition of the word "intelligence." We are aware that knowing is but a part, and by no means the major part, of ourselves as spiritual beings. We not only know, we also act. Intelligence is itself an act or complicated series of actions, and points to a knowing, spiritual agent, of which intelligence is but one of the functions. Further, we are in our action self-possessing

intelligences, agents, who act in virtue of, and guided by, our conscious intelligence. Not only in our intelligence are we living, active agents, but also in our willing and in the concrete or actual realization of our voluntary purposes. Consciousness thus does more than to reveal itself and our ideas, it reveals us as living beings, willing and acting in conformity to our ideas. It discloses to us our inward life as consisting in a series of synthetic acts, of living acts, in which idea (intelligence) and will are, in proportion to the perfection of our spiritual beings, co-operant to an uninterrupted succession of definite ends. And we find these acts to be, not indifferently separable from each other, but indissolubly bound together in an order, which, when once fixed, is indestructible, and by their common relation to the one agent, whose identity throughout the whole series is manifested through consciousness. The latter, in other words, reveals personal identity, the self, the spiritual being. This being does not consist in thoughts, or in other mental functions, whether conscious or unconscious, for these are all acts, effects wrought by the agent-cause, and hence different from the latter. Besides, the identity of the being is continuous, while these functions are discrete, discontinuous. The consciousness of self alone reveals to us in anything like a direct manner what we are. It gives us our ultimate conception of being. From this, as from the known, we *must* proceed in any further inquiries respecting the nature of that which is not ourselves, be it above or below us. It is not claimed that this notion unseals the whole mystery of being. But it is to be maintained that it brings us nearer to the great secret, than any other one which is derivable from the sphere of human observation.

It is the mark, not of the sound logician or of him who follows most closely in his inferences the warrant of fact, but of the illogical and fanciful speculator, to separate facts or ideas from the places which alone they occupy in the grand synthesis of living reality, and to recombine them according to the unwarranted dictates of dogma or caprice. In the only sphere of being open to our direct examination—*i.e.* in the sphere of spiritual being, or, more exactly, of the human self—we find reason, intelligence, emotion, will, not as independent entities, nor as abstractions, but as living functions. Viewed otherwise than as such functions of a self, or personal agent, they lose their character, and can thenceforth only be spoken of figuratively. Thus we may speak of “reason” and “intelligence” abstractly, having in view the general ideas which the terms convey, just as we may, in like manner and with like direction of thought only to the abstract ideas expressed, say “arm,”

“leg.” But just as the real objects which these latter terms denote cannot, except to their destruction, be separated from their organic relation to the body which they serve, so reason, intelligence, will, vanish into nothingness when isolated from their living, functional relation to the personal subject or self which manifests itself and works through them. But self cannot be without consciousness. What sort of a self would that be which did not know itself? The very notion of self is that of an ideal, self-knowing subject or agent. He, then, who separates from their relation to a personal, self-knowing subject, the realities designated by will, reason, and intelligence, and ascribes them, in a form equal or superior to that in which they exist in man, to any other kind of subject, must be pronounced guilty of violating the laws of inductive inference, and of offering arbitrary violence to the facts of existence. The griffin or centaur of the Greek imagination was not more purely fanciful in its nature than is such an “unconscious intelligence.” To expect from it the functions of intelligence would be, as far as we can judge from experimental fact or by logical analogy, not less chimerical than to expect the waggon to start off and run like the horse, when the legs of the latter have been amputated and attached to the former.

Unconscious and unintelligent are practically equivalent terms. We must therefore agree with a writer in *Johnson's Encyclopædia* (New York, 1875, vol. i. p. 1675, *sub voce* “Evolution”), that “unconscious intelligence” is “certainly an unthinkable phrase, a ‘pseudo-idea,’ when proposed as the designation of an active power in nature.” The same may be said of the phrase “unconscious will,” which is but the equivalent, in idealistic phraseology, of the “blind force” of mechanical physics.

The world, according to Christian idealism, is from God, who is a spirit, and not from matter. Not only, therefore, do the conditions of our knowledge and the laws of investigation compel, but the very nature of the case as stated requires, that we proceed from our knowledge of spirit to the explanation of matter and physical force, and not conversely, like the materialists, from a fancied knowledge of the latter to a dogmatic decision as to what the former must be. Matter must be the product of spirit; why should we not say that it is a function of spirit? for certainly spirit is not the function of matter. If the real has its origin and life in the ideal, if “matter” be the product of spirit (the universe, the creation and handiwork of God), how can the former possess a nature wholly opposed to and incommensurate with the latter? No: not to insist upon

the logical contradictions involved in the conception of matter as an inert, substantive entity, and yet making itself known, manifesting itself to man by a power of resistance, which shows it to be not absolutely inert, we may assert that the admission of the conception makes Dualism, or the acknowledgment of the co-eternity of God and matter, well-nigh inevitable: for we may well question whether it is within the compass of omnipotence to create the absolute opposite of itself, any more than it can make two and two equal to five. I for my part prefer to hold that, as God created man in His own spiritual image, and as man is the microcosm, the sum and head of nature (as far as this planet is concerned), so his highest and truest, *i.e.* his spiritual being, represents that which nature, or—let us say it boldly—matter, germinantly is. Atoms, whatever else they may be, have, as I believe, an ideal or spiritual aspect, which is their fundamental and controlling one; and all force is reducible to will-power. This involves the imputation to “atoms of a germ of consciousness.” As compared with man, they are unconscious. But implicitly and germinantly they are conscious. Whatever orderly or intelligent things they, or any other creature inferior to man, may do without the consciousness of self, we have no reason to suppose that they do otherwise than in obedience to a law or laws originating with and enforced by God Himself.

Do we then identify God and the world? By no means. The world has its being in God, but is not God; it is of divine origin and nature, but not of divine essence. God is in principle independent of the world (transcendent), but in fact not separate from it (He is immanent in it, or rather it is immanent in Him); “He is not far from every one of us.” The world, on the other hand, is absolutely dependent on God as the principle or source of its being and of its continuance. The nearest approach in the world to a form of existence in any sense independent of God, is found in finite personalities, which possess a relative freedom of the will, but the perfect use and development of whose freedom consists in complete conformity to the will of God, perceived by the reason and heartily embraced in love.*

God is a perfect, personal spirit. We can have no conception, and we are not justified by the logical laws of scientific

* The continuity, as above defined, of God and the world is impressively illustrated for Christian philosophy in the central figure of Christianity, Jesus Christ, who is, on the one hand, the Son of Man, the very principle of our humanity and of the world's existence, and, on the other, the Son of God, “in whom dwelleth all the fulness of the Godhead bodily.”

inquiry in attempting to form one of a spirit which is not a self, a person. As such God was declared to the ancient Hebrews, to whom He was designated as the "I [personally] am," and not as the "It [impersonally] is." (Note that the expression "I am" is more comprehensive than "I think" or "I will." It implies all the attributes—including the ethical ones which "the Unconscious" of Hartmann does not possess—which belong to an intrinsically and morally perfect personality.) The human personality is but "a weak imitation" of the Divine personality. The former is limited by its dependence on sensible conditions and strengthened by its relation to God. The latter is independent of limiting conditions, and loses none of its absoluteness by the relations into which its perfect love leads it voluntarily to enter with the universe it has created. The former is not an original possession, but a gift from the Father of all spirits: "What hast thou that thou didst not receive?" The latter is the eternal and most essential attribute of the Supreme Being.

We devoutly, and no less philosophically, ascribe all things to God. Yet how few of us, when it comes to definite explanation, do not shrink from recognizing and proclaiming the divine agency, and dwell the rather on secondary causes! Nay, if God exists, we must not be afraid—reverently be it spoken—to make use of Him as a principle. He is the principle of principles. God's part in the universe is the only one worth thinking of. If others, with an unhealthy feeling of the world's wretchedness, allow their sense of the world's harmony and divine government to be obscured by the perception of those minor dissonances which, as in a grand symphony, do but swell the glory of the whole, and will hence have no personal God, let us, on the other hand, have no morbid fear of taking God's part. Let us not only, as in love and duty bound, ascribe to God all glory, but also, as reason and the results of true scientific investigation of fact imperatively direct, all power, an omnipresent agency as well among the mean as among the great things of the universe; "that God may be all in all."

The CHAIRMAN (REV. R. THORNTON, D.D., V.P.).—I am sure we must all feel deeply grateful to Professor Morris for his very able and profound paper, and we are also much indebted to Mr. Gorman for the admirable way in which he has read it. I would point out the especial value of the paper. The tendency of modern infidelity is to obliterate the personality of God. That is a direction in which all scepticism has been for a long time drifting. Of course the evidence of God's power and knowledge and

wisdom in the world, and the material universe before us, is such that if a person attempt to deny the personality of God, he is met at once by an appeal to the proofs of His eternal power and Godhead, invisible things from the creation of the world being clearly understood by the things seen. The fiction by which a personal God is got rid of is this: There is a force, we argue, which may be considered as the cause of all the phenomena around us: it is an intelligent force, too, because you cannot understand that a blind force should have brought into being the beautiful and orderly universe of which we are cognizant. But here the subtle sceptic comes in and says: "Yes, I grant it is an intelligent force, but it is an unconscious force": he eliminates the fact of consciousness. The paper has very well explained that "unconscious intelligence" is in fact a self-contradictory expression. Personality, like personal identity—as I long ago learned from my Bishop Butler—is consciousness, and consciousness is personality. The two are only different forms of the same thing. If, therefore, you eliminate consciousness, you get rid of personality, and if you eliminate personality, you get rid of consciousness; so that, in spite of the universe we see about us, we are, through this sceptical artifice, reduced to the necessity of either having no object of worship at all, or else of setting up a sort of ideal of our own, which would be represented by *nihil ex nihilo*. This is the difficulty we are reduced to by the course of sceptical argument at this time; therefore I think a paper of this kind of extreme value to this Institute, because it does very logically show the impossibility of maintaining the separation of consciousness from intelligence. If we have an intelligent First Cause or Force, there must be consciousness with that intelligence, and, as a necessary consequence, there must be personality.

Dr. IRONS.—I think, sir, we are all indebted to Professor Morris for introducing to our Institute this important subject. A great deal more of the same kind will be wanted. We must remember that this theory of an unconscious intelligence at the head of the universe is now agitating all the mind of Germany. We must not try to persuade ourselves that a theory, which has occupied an intelligent nation persistently for the last twenty years, is one in which there is absolutely nothing worthy of consideration. We should be only exposing ourselves if we were to cast such an imputation on the general action of the human mind on any subject. The present paper, however, contains some expressions which I am afraid some English readers will find it difficult to appreciate, especially as we have not been much accustomed in this country to the study of metaphysics. In Germany, on the other hand, this study is almost natural to them. In England we have even difficulty in getting the least attention paid to mental science. I am grateful to think that such an assembly as this has been able to listen so carefully

and intelligently to what has been read in so clear a way, and yet is in itself so hard. The doctrine then with which the paper deals is probably new to a large number of people in this country. It ought not to be so, because it is a most important doctrine. It reminds us, that there is a large variety of mental operations which go on, like the circulation of the blood in our veins, without our will and almost without our knowledge, and it is out of the contemplation of these operations, approached from a metaphysical and not from a scientific point of view, that this theory of unconscious intelligence at the head of the universe would seem to have taken its origin. Let me put the subject in a simple form.

Whoever begins to think at all, tries to compare his thinking with something external to himself. Every operation of the mind of an intelligent being ought to be rightly conducted; and we aim therefore to compare our thoughts more or less consciously with something outside of ourselves which we take to be right. If it were a mere lesson, we should compare our thinking about that lesson with what had been put to us by the teacher or the book we had been studying; but if the subject were something more than a lesson learned by rote—if it engaged the actual operation of our own mind, of its own force—then we see at once that unless we set up every one an independent authority on every subject for himself, there arises a necessity for some standard external to the individual, with which he shall compare his thinking. Such external or abstract truth is that “absolute,” as philosophers call it, which exists always. In a treatise which I had the honour of reading here as a sort of foundation some years ago, I pointed out that this was the antecedent of all philosophical recognition of truth—viz. there is something absolutely certain, apart from ourselves. But, if eternal reason, necessary truth, the really good, with which we try to compare our own thinking and actions, be indeed absolute, then the first thought of the inquirer might be, “wherein does this ‘absolute’ reside?” I endeavoured to show (as I said in my *Final Causes*) that eternal truth ultimately implied an eternal mind. For although unconscious intelligence may be predicated very truly as to the inferior and almost instinctive operations of an intelligence, it cannot be the ultimate source of all the truths which enter into all the thinking in the universe. There must be some being ultimately in which the absolute is formally found. Just as we say, “if there always had been nothing, there never would have been a universe”; so we know from the fact that there is a universe, and that we are beings in it, that something always has been. No one rejects the proposition, that because something is, something always has been. In the same way, the existence of consciousness proves that consciousness of some kind always has been. We cannot suppose a distinct consciousness anyhow to have arisen out of unconsciousness; as surely as we cannot suppose the uni-

verse itself to have arisen out of universal nothing. This obliges us, then in the last resort, to believe that absolute truths belong to a Necessary Being, and the eternal consciousness of the world to God himself—*i.e.* a conscious Being with whom is absolute goodness, absolute wisdom, absolute power, absolute truth, and so on. Thus much, then, for our philosophical foundation.

But, with respect to the sphere of unconscious intelligence, perhaps it may assist the discussion to make a few remarks. Almost every one is aware that a great proportion of his thinking goes on, as we said, from mere habit. We do not elaborate every process of thought on every occasion, after we have once arrived at the use of our inner power. Our mental action really is, to a large extent, as habitual as our bodily action, and it is only when we come to any *crux* in our mental action that we exert ourselves to compare what we are doing with an external truth. Let us, then, attain knowledge of any number whatever of ordinary processes, and we shall but arrive at the conclusions of habitual reason, and not reach the higher movement of that active reason which is consciousness. I hope I am intelligible on this point, because, although the subject is a difficult one, there is no reason why we should speak of it in difficult words, and I am trying to use the easiest, but at the same time, if possible, correct words. Unconscious reason is, thus, I say, impossible only in the ultimate resort. In our minds, as well as in our bodies, we are partly creatures of habit, and habit in the mind is unconscious reason. Our author, then, has wisely called attention to this part of a great subject.

We are indebted to Professor Morris not only (as I said) for bringing this subject forward, but also for the brief historical sketch he has given us; with which, however, I should be, nevertheless, obliged to find some fault, if there were time. It seems an ungrateful thing to do, but I find the statement of the author as to the theory of Descartes is scarcely such as I understand to be Descartes' view. Of the three forms of idealism, one of which only the author has referred to, all three recognize the reality of intelligence. I mean by the three forms of idealism, that of Kant, that of Berkeley, and that of Descartes. They all recognize the intelligent being as really existing, and they all of them hesitate to speak of the outer world, matter, or substance, as it is put in this paper. Kant considers the outer world, the phenomenal world, as non-existent, but as a sign of something existing beyond itself. This is the critical idealism of Kant; but the dogmatic idealism of Berkeley was of another kind. He said the whole universe of things consisted only of two classes—the perceiving beings and the perceived. For my own part, speaking as a Berkeleyan, I think that this is as simple a way of putting a great truth as we could well find. His view of the outer world was, that it was nothing but a series of phenomena upheld by the power of God,—constantly sustained, however,

whether in known action or perhaps in suspension. The sceptical idealism of Descartes seemed to leave no foundation at all, not even in the Divine will, for an external world. It reduced the outer world, practically, to a kind of phantasmagoria. Now we are bound, in these days, to make up our minds (even, for the sake of our own theology, if for nothing more) on this question of where we place God and His action in this world, and say whether we adopt one or the other of these three ideal philosophies; because we must come to some conclusion on the point. Even scientific men have arrived now pretty generally at the conviction, that the mechanical universe—the physical universe—has not, within itself, the power of its own activities. Originating force cannot be detected within the physical universe. They must come to this question of force at last. The question, perhaps, next before us is, whence, or how frequently, and in what manner, does force act? Is there but one force now setting everything in motion,—all the molecules, all the atoms, and so on?—or is every force—every minor force, every molecule, and every atom—endowed primarily with some unknown faculty, such as the paper tells us Leibnitz would have called a monad? or if monads are endowed with separate powers and faculties, are we to conclude that they are always acting, each in its own way, unconsciously or consciously? If they are unconscious forces, just doing the business for which the Creator first made them, are they constructed in infinitely various ways as a part of the fabric of the outer world?—or, are they all alike? Are they atoms of various kinds, or when set in motion have they any variety of action?—These are important questions affecting the character of phenomena, because some theories would represent God as close behind every atom and acting upon it every moment throughout space. Cudworth, it is said, opposes the notion, and, although Professor Morris does not say so, it is clear to me that that is not a worthy view to take of the action of God on the universe. Into the character of these atoms, and, perhaps, monads, our scientific men are now very earnestly and praiseworthy examining. Let us wish them all success; but while they are engaged in this analysis, let us ask them on their part to look with a little more respect on those who are engaged in the really higher work of the philosophy of this whole subject. (Hear, hear.) We are thankful to them for their prior, but inferior work. It is most useful; but we are anxious that they should know that there are thinkers as well as themselves, who will at length have justice done to the larger questions involved. We must not be content to be even with them, mere collectors of the dry facts of the universe, but should be anxious to understand them and put them together; and then give praise to Him who is the ultimate Author and Doer of Creation. (Hear, hear.)

One word as to the method of the writer of this paper. He sets out with the principle that we ought to proceed "from the known to the unknown" (p. 5th from end), and then asserts, that as we know ourselves, we must

proceed "from our knowledge of spirit to the explanation of matter and physical force" (p. 3rd from end). I am afraid there is something like a *petitio principii* here; for surely it cannot be said that we do "know ourselves" in the full sense that would be requisite to support such deduction. If we had Divine knowledge, such as must appertain to the Supreme, no doubt this knowledge would be absolute, enabling us to comprehend both spirit and matter. But surely it is far different. We have not the slightest conception of the mode in which our determinations or will in our inmost spiritual being affect the material organization of our bodies; nor do we know in what manner the perturbations which arise from the bodily structure affect the well-being of our very selves, *i.e.* our most intimate spiritual "Ego"; for a knowledge, *e.g.* of the properties of matter, albeit superficial, and by no means merely derived from inner consciousness, will often enable the physician to restore serenity even to the mind. I therefore fail to perceive that we have any power to proceed from our present knowledge of spirit (which knowledge is only most imperfect, and not absolute) to the knowledge of matter and physical force, which we only accept as fact. We do *not* always proceed in the author's sense *ab cognito ad incognitum*. At the last page but one I cannot follow the Professor's argument, nor understand how "matter manifests itself to man by a power of resistance, which shows it to be not absolutely inert." I never myself had any experience of such a power of *active* resistance in matter. The ink (to take an instance suggested) flows from my pen without any but accidental resistance. Indeed, it appears to me to be just such "*an inert substantive entity*" as seems to our author (same page) to involve in the conception of it a logical contradiction.—(I only wish the printers could put types together with as simple a submission to one's will!) I cannot understand how a professor of such large acquirements could indite such a sentence as the following:—"Atoms, whatever else they may be, have (as I believe) an *ideal or spiritual aspect*, which is their fundamental and controlling one, and all force is reducible to will-power. This involves the imputation to atoms of a germ of consciousness" (same page). Such a statement is utterly subversive of all chemical knowledge—knowledge which, up to a certain point, as I have observed, is unquestionable. We know certainly how atoms will act, what powers of attraction and repulsion they will exert under certain circumstances, and that with unerring certainty, and without the shadow of possibility of any choice on their part. There never is, nor can be, anything abnormal in the play of chemical affinities; but as soon as we get to *life* we have immediately and everywhere abnormal developments, explain them as we may. Moreover, wherever there is *a being who can will*, there is also possibility of error, and the choice of that which is not for the best. This is essential to free agency; and if it is *not* free, there is no willing at all, but fate. To will (whether it be attributed to "atoms" or men, or even higher

beings), can only be depended upon to choose always the right, when in some way identified with the nature of the only One who is Good, that is God Himself.—With these criticisms, I leave to others the more grateful task of appreciating and acknowledging all that is excellent in the very able paper now read.

Rev. W. H. HECKLER.—May I be allowed to bear my humble testimony to one statement made in this paper?—"Hence the lament amongst the more soberminded Germans at Hartmann's popularity, as at a sign of widespread degeneracy in the logical thought of Germany." In 1874 the 6th edition of Hartmann's book appeared. The stir caused by it in Germany was extraordinary. In conversing at that time with many professors of German universities, I found some considered that it was really a wonderful work, whilst others were of opinion that it was disgraceful; and I cannot help mentioning a remark made by a young friend of mine at Heidelberg. We were talking about the difficulty experienced by young German students in carrying on their studies. He said, "If I wanted to make money, I should write a book on the greatest absurdities I could think of, and it would be bought by every German." Now, I cannot help thinking that Hartmann has succeeded to a certain extent in carrying out my young friend's idea. It has been said to-night that the English mind ought to be better educated in reference to these philosophical questions. How is it that the Germans, as a rule, are all more or less well acquainted with these subjects? Whenever they meet with a book or paper on matters of this kind, they take it up, read it, and thoroughly digest it in their own minds. That is because their minds are early led to take a delight in the study of philosophical questions. I only wish that this paper, and others on similar questions, could be translated and sent over to Germany and circulated in large numbers, because the Germans, as a rule, would read them. I have often heard it said why the English people do not care to think, and that that is the reason that they do not take up these subjects; but this can scarcely be said of the better-informed, who, when they take them up, do so in a thoroughly practical manner. I congratulate the Society on Professor Morris's paper.

Rev. W. M. SINCLAIR.—When any one comes to a conclusion which is repugnant to our reason, we usually take the first opportunity of finding out the logical fallacy inherent in his argument. The logical fallacy committed by Hartmann lies in the use he makes of the word "monad." What he and his school pretend to say is, that the idea was originally in the atom; but what they mean to say is something quite different—that it was not there at all—that originally the whole was blind, and that it gathers its intelligence as it goes along—as it develops itself—one particle acting upon another, and thus creating harmony, unity, and completeness. Thus, by combining these two separate logical ideas, they deceive us into

the supposition that they are singularly logical. They look from their own standpoint, with all their experience at their disposal, and then they tell us that all this has had a blind beginning. It is as if a person looking at St. Paul's should fancy that it began to be constructed at the top, and was gradually built downwards to the foundation.

The meeting was then adjourned.

PROFESSOR MORRIS'S REPLY.

THERE is scarcely occasion for me to add anything to the foregoing discussion, except to express my grateful appreciation of the courteous reception accorded to my paper. I will simply offer a few remarks on one or two points raised in the course of the discussion.

The phraseology of metaphysical discussion is of necessity in a measure technical. It would be as unfair to demand that its terms should all be familiar to every one, as to require that (for example) Prof. Huxley, as a zoologist, should in a scientific discussion avoid the use of technical terms unfamiliar to those who have no knowledge of zoology, or that the chemist should abandon his exact terminology, and employ instead inexact circumlocutions or periphrases, which should involve only words included in the vocabulary of the romancer or journalist. I think it would not be difficult to show that one reason why England has not become a greater power in philosophy lies in the attempt of many of her best thinkers, from Locke's time till to-day, to gain in popular intelligibility at the expense of scientific accuracy. Philosophical investigation, properly carried on, is serious work, and not for mere display or for popular entertainment, and those who would engage in it must not shirk the labour of mastering the ideas which it involves, and the technical words which exactly express those ideas. Thus much, not in my own defence, but for the correction of the impatient prejudice which all of us, perhaps, at times feel against metaphysical discussions carried on in the language of metaphysics. On the other hand, it must be admitted as extremely desirable that fundamental truth in philosophy should be presented in as simple a garb as possible, on account of the all-important bearing of such truth not only upon opinion, but also upon life and conduct. He who, having the truth at heart, errs through needless obscurity in the presentation of it, will be thankful for any admonition or suggestion that may tend to the correction of his error, and will seek to profit thereby.

I am criticised by one of the speakers for inaccuracy in my representation of the views of Descartes. As far, however, as I can judge from the few remarks offered in support of the criticism, my fault must consist rather in the

incompleteness, than in the incorrectness of my account. It would consist in my omission to state that Descartes "seemed to leave no foundation at all, not even in the Divine will, for an external world," and that his "sceptical idealism" "reduced the outer world, practically, to a kind of phantasmagoria." Certainly, if my critic corrects me, it is in the phrases just quoted that he does it, for they contain all that he says on the subject. But in them he is manifestly expressing his own opinion as to the logical consequence of Descartes' view, and not the view of Descartes himself. Moreover, this opinion, it appears to me, might be based on my own account of the doctrine of Descartes. Since writing the paper under discussion, I have had occasion carefully to study the works of Descartes, and to prepare an exposition of his exact teaching. On comparing my statement in this paper with the independent results of the study referred to, I do not find any positive incorrectness in the former. I regret all the more that my critic, after intimating that my statement "as to the theory of Descartes" was at least not in agreement with what he "understood to be Descartes' view," did not state explicitly the point in which he supposed me to be in error.

I have not stated that, in following the method which proceeds from the known to the unknown, we proceed from a complete comprehension of spirit to a similar comprehension of matter. I maintained, and still maintain, that what knowledge we possess of spirit is more original and absolute than any fancied knowledge which we may seem to have of matter, however incomplete the former may be; and, further, that our ideas concerning matter are hypothetical (as every philosophical scientist admits), and must be framed, in as far as we attribute to matter any substantive existence at all, after the analogy (near or remote) of that which we directly know of ourselves as spiritual entities. In this I differ from Descartes, and avoid what I conceive, and have in my paper indicated to be, a dangerous error of his. I agree, on the other hand, in so far with Leibnitz and the greater number of philosophical idealists known to history, whether pagan or Christian. My critic seems to agree with Descartes in virtually admitting "as fact" (apparently inexplicable), the existence of really inert matter and blind force. Absolutely inert matter would be a substance which does nothing, which has no power; hence no power of resistance (such as is universally ascribed to matter—and it makes no difference whether you call this resistance "active" or passive), and which therefore manifests itself to us by no impression made by it upon ourselves. Such a conception I call logically absurd, because (among other reasons) it is in contradiction with the universal conditions of knowledge. From the point of view of positive science it is also false, since science knows nothing of matter apart from force. To prove, on the other hand, the irrationality of the conception of blind force (which conception my critic seems to admit), I can advance no arguments which are not virtually contained in the two papers which I have had the honour to present to the Victoria Institute. How the force called "chemical" is related to conscious will, I cannot exactly state. I maintain only that an exhaustive and exact analysis must

end by tracing it back to the intelligent will and power of a personal God. If the Divine agency, "invariable and without shadow of turning," is not incompatible with the so-called rigorous necessity of natural laws, I cannot see that my hypothesis is "subversive of chemical laws." If experience proves, as my critic admits, that unconscious ideality (an impersonal ideal nature) is possible, and that it acts with the wise and unerring certainty of fixed and divinely-given law, then there is nothing absurd in the attribution to atoms (chemically or otherwise considered) of an "ideal or spiritual aspect," as their fundamental and characteristic one. But I would not, from this impersonal though ideal quality of "force" and "matter," argue, like Hartmann, that God is impersonal. On the contrary, I cannot account for the less but by reference to the greater. The "unconscious" implies the conscious, from which it derives its own inferior nature, and receives the law of its action and being. Nor would I, as my critic virtually does, argue on the same ground, that force and matter are utterly unideal, and have nothing to do with spirit. For this would be at best but a guess, and seems to me opposed to all true principles of reasoning. Had my accomplished and indulgent critic paid attention to the distinction enforced by me in a previous paper* (on Final Cause) between real knowledge (of being) and phenomenal knowledge (scientific knowledge of co-existences and sequences), perhaps he would have judged my views less adversely, seeing that no argument from the latter (phenomenal knowledge) can overthrow the former. Our "chemical knowledge," it is quite true, is "up to a certain point," "unquestionable." But it is so only within the limits which circumscribe all *phenomenal* knowledge. It is "unquestionable" in all that it affirms concerning the appearances of things and the *laws* of their action, in as far as these laws are open to *sensible* observation. But it quits its proper sphere, and is absolutely valueless, when it is made the principal or only basis of inferences concerning the intrinsic nature of things. I consider my position the only tenable one for those who would not be landed in, what I deem, the inherent absurdities of a doctrine of universal mechanism. It is also the only one which, in my judgment, rests on a basis of anything like solid reasoning, whether deductive or inductive. The doctrine of the primacy of spirit over "matter," in the order and in the substance of human knowledge; and the other doctrine, that all created things bear the impress of the spiritual nature of the Creator, and in some degree, no matter how faint, by their own intrinsic essence, bear witness to that nature; these doctrines I hold to be fundamentally true, and of the highest consequence in any philosophy of theism. I must therefore stoutly protest against any tendency to make concessions to the dilettante, mechanistic philosophers of our day, by admitting that the knowledge of which positive Science boasts, is or can be primary, and that its mechanical conceptions and methods are to be accepted as fundamental and axiomatic in all philosophical inquiries. It is not that mechanism is false, or

* Vol. ix. page 176.

that, rightly understood, it is not the law of the whole created universe ; but rather that its principles are derivative and subordinate to a higher law of intelligence, by which latter mechanism is to be explained, and not intelligence by mechanism. In my reply to the discussion upon a previous paper (*Journal of Transactions*, vol. ix. p. 203) I expressed myself as follows :—"The error of scientific men too generally is, that they identify the results of their investigations in the region of the phenomenal with knowledge of the real. All positive science which is duly confirmed by observation, comparison, and experiment, is to be accepted as true. But this true science of the phenomenal is not to be confounded with science of the truly real, or of the true cause, the underlying truth of the real." I repeat these words as conveying a lesson suggested by the present discussion. I would only add a reference to Aristotle, *Metaphysics*, xi. 6, 12, where a wholesome warning is expressed against seeking in the reports of our sensible experience a criticism of ontological truth. Stripped of the local colouring which they receive from the *idola* of Aristotle's pagan mind, the words of this master contain a truth at once old and new, and worthy never to be forgotten.

I would, finally, more expressly call attention to two points indirectly implied in my foregoing remarks. First, that I do not say that all force is directly identical with conscious will. When I say that it is "reducible" to conscious will, I mean that it is derivable from it, and that in some way (however unintelligible to us) both it and "matter," in which it is said to reside, partake in some one or more of the attributes of ideal or spiritual existence. I do not identify the world with God. With the utmost strength of rational conviction, I acknowledge the unique divinity of the personal God of Christianity. But I would make the world in some sense His child, rather than a dead product of His creative power, utterly unrelated to the Creator. The other point is, that the alternative is by no means between variable "will" and "fate." A good will is invariable, and such surely is the will of God, which can show no change in that part of its government where unchangeableness is better—namely, in the government of the inorganic universe. For the ascription to atoms of an "ideal or spiritual aspect" does not imply that they are conscious personalities, capable of independent volition. Their whole action is, in the words of my paper, "in obedience to . . . laws originating with and enforced by God himself." Their action is, therefore, the expression of God's will, but not on this account subject to variation, nor (on the other hand) ascribable to "fate."

I now dismiss the subject with one supplementary bibliographical reference to St. George Mivart's *Contemporary Evolution*, in the first chapter of which some interesting facts are pointed out concerning the substitution, in certain directions of English thought, of the idea of "unconscious intelligence" for that idea of personal intelligence which is essential to all Theism.

ORDINARY MEETING, DECEMBER 4TH, 1876.

THE REV. R. THORNTON, D.D., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced:—

LIFE MEMBER :—J. E. Briscoe, Esq., Wolverhampton.

MEMBERS :—Professor J. S. Porter, D.D., Belfast ; Rev. C. Bullock, B.D., London ; Rev. G. T. Perks, M.A., London ; J. S. Dismorr, Esq., Kent ; R. Davies, Esq., M.P., London ; T. W. Greenwell, Esq., London ; J. Slater, Esq., B.A., Cape of Good Hope.

ASSOCIATES :—Revs. A. Brook, M.A., Lincoln ; R. W. Dawson, M.A., London ; A. F. Field, B.A., Buxton ; E. W. S. Kingdom, Birkenhead ; F. W. C. Rigby, Birkenhead ; A. M. Rendell, M.A., Melton Mowbray ; T. Scott, M.A., Kent ; J. Chaffers Welsh, Everton ; J. Johnstone, Esq., Edinburgh ; F. Mulliner, Esq., Birkenhead ; W. E. Stanford, Esq., J.P., Cape of Good Hope ; Miss A. Dixon, London.

Also the presentation of the following Works for the Library :—

- “Proceedings of the Royal Society,” Parts 170 to 174. *From the Society.*
 “Proceedings of the Royal Geographical Society.” Part V. *Ditto.*
 “Proceedings of the Colonial Institution.” Vol. VII. *The Institute.*
 “Proceedings of the United Service Institution,” Parts 34 to 87. *Ditto.*
 “Proceedings of the Geological Society,” Parts 127-8. *The Society.*
 “Proceedings of the American Philosophical Society,” Part 97. *Ditto.*
 “Proceedings of the United States Geological, &c., Survey.”
 Vols. IX. and X. *Ditto.*
 “Proceedings of the Warwickshire Natural History
 Society.” Vol. 1876. *Ditto.*
 “Alleged Discrepancies in the Bible.” J. W. Heley, U.S.A. *From the Author.*
 “True Materialism.” By Rev. T. H. Barker. *Ditto.*
 “Memorials of J. Beeston.” *Ditto.*
 Smaller Works from T. W. Masterman, Esq., and C.M.S.

THE CHAIRMAN.—Before this paper is read, I wish to make a few remarks upon the present state of the conflict, for so I must call it, between unbelief and those views which the Institute endeavours to represent and disseminate. During the past four months, I think, there has been no new form of onset

against Christianity. The various scientific meetings at which people sometimes air their new theories, antagonistic to Christianity, have this year been productive of a rather better spirit towards revealed religion. The papers read and the speeches made have been, upon the whole, characterized by a spirit of fairness, and I may say that, generally speaking, they have been upon the side of revealed religion. In fact, there seems to be a kind of lull in the conflict; but such a calm sometimes precedes a storm; I must, therefore, strongly urge all friends of the Institute and of Christianity not to suppose that because the enemy is a little quiet he is therefore vanquished. On the contrary, he may be merely going back for a spring, in order to make a more fierce onslaught, and therefore we must keep on and still exert ourselves. We must keep our weapons bright and always ready, or else we shall fail in our duty as defenders of the Truth which God has given to His people. I am sorry to say that there is an advance, in the position taken by unbelief among the lower orders. There is a decided increase in the amount of that form of infidelity which I may characterize as the "know-nothing" form. The active opponents of Christianity, those who set up their whole philosophy against revealed religion, have been quiet; but there is a growth in the number of those people who say, "All you advance may be very true, and I do not deny that Revelation may be true; in fact, that there may be a God, and a Bible, and a Saviour, as you say; but, to tell you the truth, I do not consider it to be clearly proved: and therefore I do not care a bit about it, I intend to go on living for this world, and to take my chance of the future." This is a form of infidelity which is only too common, and which I am afraid is rather increasing in the lower stratum of society. For this we should be prepared, as well as for the philosophical form, and we should muster together all the arguments we can in order to combat it. I will now call on Mr. Gorman to read Mr. Cooper's paper, merely premising that it touches on a very important branch of the infidel argument against revealed religion. One mode in which infidel teaching has lately been given has been that of dissertations on what is called Comparative Religion. Now Comparative Religion is a science, just as much as comparative philology, and I do not object to the title; but there are various forms of that science. One form, that which we hold with, lays down that God gave a revelation to man; that that was possessed at first by the Jewish nation, and that now it has become the inheritance of the Christian Church. Another form is that which contends that Christianity is only one among many religions, perhaps in some respects purer than others, but not entitled to any higher respect than Buddhism, Hinduism, or Mahommedanism. It is just that form of comparative religion with which Mr. Cooper's paper deals; for with his large knowledge of Egyptology and Egyptian myths, he points out that those myths contained in themselves the germs of the primeval revelation, which is seen in its purity and its force

in the Old and New Testaments. We have here a strong protest against believing that the Egyptian religion is one of a number of religions of which Christianity and Judaism are others, and that all are to be put on the same level.

The following paper was then read by the Rev. Mr. GORMAN, the author being unavoidably absent :—

THE MYTH OF RA (the Supreme Sun-God of Egypt), with copious Citations from the Solar and Pantheistic Litanies. By W. R. COOPER, F.R.A.S., M.R.A.S., Sec. Soc. Bib. Archæology.

ONE of the most certain results from the present advances of the science of comparative mythology is the discovery of peculiar points of contact, of parallels and analogies, in the earlier forms of all the religions of the world. Starting, as we are naturally willing as Christians to believe they did, from a basis of primeval revelation, these very soon diverged from the simplicity of a faith which rested on the Divine Word alone and originated a theology dependent upon second causes, and sustained by a philosophical theory, in which hypothesis upon hypothesis took the place of reason and induction. In theology, quite as much so as in every science, the tendency of the human mind is to exalt subordinate corollaries into the place of demonstrated first principles, to substitute second causes for original motors, and to rest satisfied with so doing, or, if at last any obvious inconsistencies arose from this process, then by a remarkable system of inverted argument to merge both primary and secondary causes into one, with still a preference to the latter as the more manifest evidence or indication of the former. It was thus that Sabaism was perverted out of and took the place of Monotheism, that Anthropomorphism led to Polytheism, and that both in turn by gradual descent became lost in Pantheism, which, when mingled with philosophy by which its inferences were found fallacious and its dogmas untenable, caused faith to decay away at last into Atheism and Nihilism. The history of religions proves to us that nearly all existing faiths, and

certainly all the extinct ones, have passed through their several phases of thought; some have been for a long time arrested at one period of their development and some at another; a powerful genius or an original thinker has written treatises or composed formularies which for many generations fixed the religion of his country at a particular point; at various times, roused, doubtless, by some monition of that divine instinct which never wholly leaves the heart of man, some fervid reformer, bold in his zeal and confident of his truth, has by his energy and teaching given prominence to certain special doctrines of his religion, and so to a great extent modified or explained away the errors or the difficulties of his creed; but still the religion, being simply a human, and so far a natural* one, retrograded in its simplicity, and gradually sank into decay. More and more distinctive teaching, and more rigid dogmas, were introduced to retain within the orthodox Church the hearts of men whose faith was waxing cold, and an excess of ritual and ceremony not unfrequently burst forth at the moment of inanition when, wearied by doctrines that could not profit, and ceremonies which had no regenerating power, the people, as a body, sank into animalism as the only practical good; and the wiser few of higher intellect, but unconvinced judgment, turned with sorrowing scorn to the barren consolations of philosophy, and painfully asked themselves, as Pliny did, "Is there a God?"† and the fool made answer in his heart, "There is *no* God."‡ There is probably nothing more painful to a Christian than to note with what sublime theories the ancient sages were endued, and yet to see to what contemptible depths of atheism and bestial folly their teaching gave rise; between the recorded sayings of Sakya Muni and St. Paul, between the discourses of Milinda§ and many an earnest preacher of the present day, there is ostensibly but little to choose, yet the one has for its ultimatum the infinite Nihilism of Nirvana, and the other finds its climax in the rapture of Corinthians xv. and the chastened confidence of the Epistle to Timothy. The maxims of Confucius and of Solomon are in strong parallelism, but the one concludes with the admonition, "Respect the gods,|| and keep out of their way";

* *Natural*; that is, of course, only in the sense of an *unrevealed* doctrine.

† Pliny, *Nat. Hist.*, lib. ii. cap. v., "of God." Bohn's ed.

‡ Psa. liii. 1.

§ See Hardy's *Manual of Buddhism* for further particulars.

|| See Martin, *The San Kiau, or the Three Religions of China*, in Dickenson's *Theological Quarterly*, No. 7, p. 371.

while the other inculcates the fear of God, and the obedience of His commandments, as the whole (*duty*) of man. It would not be easy to find a more detailed code of moral observances than the Institutes of Manu (unless, indeed, the Talmudic regulations of the Sephardim Jews may be supposed to afford a parallel), but the result of such a religious system is the gross licentiousness of modern Sivaism. The proverbs of Pthah-hotep, the oldest proverbs in the world * (having been written before the call of Abraham), express the highest reverence for sacred things, and the language of the *Ritual of the Dead*† has no equal except in the Psalms of David. Yet who will not glory in the life of the upright men, many of such as whom Christianity has produced and is producing, rather than in the remote practical morality which was the outcome of the Egyptian faith? And, finally, for it is simply as a prelude to this issue that these reflections have been introduced, scarcely any human phraseology could be found to convey a nobler idea of deity than the vocative addresses of the Myth of Ra, echoing, as they almost do, the tones of the harp of the Hebrew prophets in a lower octave; and yet, as we proceed to examine the logic of that myth in detail, we shall find its most glowing epithets to convey merely abstract ideas, and the issue of its divine ascriptions to be a metaphysical Pantheism, without life, and without the power to become vivified, or even to save itself from that religious decrepitude which ends in practical atheism.

2. The MYTH OF RA is, perhaps, one of the oldest component parts of the national mythology of the Egyptians, since some of the earliest events in the mythical history of the country are connected with it. It commences and permeates the whole of the theology of the *Ritual of the Dead*, and it was one of the last principles of the ancient faith which became lost in the Grecian and Perso-Grecian philosophies. The deity Ra was himself a hero and a god. As a hero he was a monarch of Egypt, and reigned for a thousand years;‡ while as a god he was the father of the deities Shu and Tefnu,§ and, by personal hypostasis, of

* Chabas, *Le plus Ancien Livre du Monde. Etude sur le Papyrus Prisse, Revue Archéologique*, 1857.

† Especially that section or book which is called *The Egyptian Faith*, extending from caps. xvii. to xx.

‡ Birch, *Guide to the Egyptian Vestibule*, Brit. Mus., p. 7.

§ Pierret, *Dictionnaire Archéologique*, in loco.

Horus Ra, his only begotten son.* He was self-existing, and self-produced, and, according to his various manifestations, he became (1) Amen Ra, as the spiritual supreme being *par excellence*; (2) Har Machu, as the mid-day sun; (3) Tum, as the sun in the under-world, in which form he is more especially venerated in the formulæ of the *Ritual*; and (4) Aten Ra, as the deity of the solar disk. The deity Pthah, of Memphis, as the demi-urgus, derived his power from him; and Osiris, the god and judge of the dead, was in some mysterious manner identified with this god also. He was, as the sun, the author both of life and death; and by parity of reasoning, the greater always including the latter, of good and evil alike. While yet a male deity, he was, like Brahma, endued with the feminine principle as well, and thus he became an Androgyne. Since the visible luminary, the sun, his symbol, and in some mysterious manner his body also, rose and set, the god, in a manner, thus passed through infancy, maturity, and decay; and as he was the soul of the Kosmos itself, and thereby identical with Knuphis and Khneph, so he was also the author of the being of, and the source of the power of, all the other eight great gods,† and was merged in them, and their personality in turn lost in his.

3. Since Ra played so important a part in the celestial hierarchy, it naturally followed that he was one of the chief deities whose statues and representations have come down to our day. The sarcophagi and papyri abound with representations of the god Ra in his heavenly boat canopied by the great serpent Mehen traversing the hours of day and night, and attended by the deities of the under-world.‡ Sometimes, inasmuch as the god Pthah was considered to be his father, Pthah being the deity of Material Fire, he was conjoined with that god also; and sometimes, like his children Shu and Tefnu, he was figured with the head of a lion. The most general representation of the god was, however, that of a man with the head of a hawk, choosing,

* See the previous paper by the author on the Myth of Horus, and the references there cited.

† These eight deities being in *Memphis*; 1, Pthah; 2, Shu; 3, Tefnu; 4, Seb; 5, Nut; 6, Osiris; 7, Nis and Horus; 8, Athor; while in *Thebes* the order was: 1, Amen Ra; 2, Mentu; 3, Atum; 4, Shu and Tefnu; 5, Seb; 6, Osiris; 7, Set and Nephys; 8, Horus and Athor.

‡ See especially the sarcophagus of Seti I. at the Soane Museum, and the two basalt sarcophagi, that of Nebsemi and the so-called Tomb of Alexander, in the Egyptian Gallery of the British Museum.

according to Horapollo,* that bird on account of his "being prolific and long-lived, or perhaps rather because it seems to be an image of the sun, being capable of looking more intently towards his rays than all other winged creatures." In every case the solar disk and uræus formed his head-dress, and the cucufa sceptre was in his left hand, the right holding, in common with all the Egyptian deities, the handled cross or symbol of life.† Another but a less distinctive form of representing Ra was simply by the figure of the solar disk without uræi or wings, thus distinguishing him from Har-hut,‡ but with the scarabeus of the god Kheper, the creator, in the centre, and pendent from the edge, the handled cross and cucufa; this would more properly apply to Ra as the midday sun-god. When figured as Tum, the solar disk was placed in the hollow of the western mountains, and in the place of scarabeus a small sitting figure of the deity proper occupied the centre of the disk. This latter symbol was generally wrought in carnelian or yellow jasper, and worn by the Egyptian children as an amulet, in which case it was supposed to preserve the vital warmth of the soul.

4. The oldest mythological work in which the worship of Ra is distinctly formulated is, of course, the *Ritual of the Dead*, the earliest portions of which are found in the coffin of Queen Mentu-hotep of the XIth dynasty, with a self-contained reference in the text itself to an earlier edition of one of the chapters, the LXIV., to the period of King Menkeres, the founder of the third Pyramid, and one of the chief monarchs of the Vth dynasty.§ This to a certain extent fixes the great antiquity of the doctrine, which we have generally to examine, and the great *Ritual* itself may be regarded as dedicated to the sun, as Ra or Tum, Amen Ra, and many of the better known divinities of later times receiving far less notice than is devoted to the various attitudes of Ra. The *Ritual* almost commences with an address to Ra as Tum of the under-world:—"O Tum, O Tum, coming forth from the great place within the celestial abyss,

* *Horapollo*, by Cory, book i. sec. vi.

† A form of Horus as the good spirit, or *Agathodæmon* of the Greco-Egyptians.

‡ Wilkinson, *Materia Hieroglyphica*, pl. iv.

§ Bunsen, *Egypt's Place*, vol. v. p. 127. Introduction to the *Book of the Dead*.

|| The chapter of coming forth as the sun, and living after death, cap. iii.

lighted by the lion gods.* The blessed Osirian (the deceased) have come from their corner doing all thy words ordered. Oh ! workmen of the sun, by day and by night, the Osirian lives after he dies like the sun daily ; for as the sun died, and was born yesterday, so the Osirian is born, every god rejoices with life, the Osirian rejoices, as they rejoice, with life." This simile is of great value, because it proves that the cardinal doctrine of a resurrection of the soul and body was the chief cause of the Egyptian adoration of the sun as the visible creator and resuscitator of the inanimate world. Nor was this adoration paid to the solar deity simply by virtue of his vivific force, for the Ritual goes on to declare, "Hail, O Sun, Creator, Self-created ! perfect is thy light in the horizon, illuminating the world with thy rays, all the gods rejoice when they see the King of the Heaven. I have reached the Land of the Age where thou hast ordered every god, O Sun." † The remainder of the chapter, from which this extract is taken, describes the glories of the youthful god Horus-Nets, the destruction of the evil serpent Apophis, ‡ and the identification of the Osirian by virtue of his faith and religious performances with the various divinities whom he adores. The next chief section of the *Ritual*, the "Egyptian Faith," is also devoted to the glorification of Ra ; a few extracts from this will, however, suffice.§

"I am Tum, the only being in Nu.|| I am the Sun when he rises. His rule commences when he has done, and let him explain it.¶ The Sun is

* Shu and Tefnu.

† Cap. xv., section "The Manifestation to Light."

‡ The enemy of the sun, and a form of the evil being Set or Typhon. The contests between the gods and Apophis form the chief subject of the mystical papyrus called the "Book of the Under-world," and they have been tolerably examined in a paper by the author, "The Serpent Myths of Ancient Egypt," *Trans. Vict. Inst.*, vol. vi.

§ Cap. xvii. The chapter of conducting the spirit, of coming in and going from the Hades, and being among the servants of the Osiris, fed with the food of Osiris, the good being, the justified, coming forth from the day, making all the transformations he has wished to transform himself into, ploughing with a plough (P), being seated in the hall a living soul, as the blessed, by the great gods of the west after he has been laid to rest. The glory of doing it on earth is for mortals to declare.

|| The heavenly firmament personified as a deity.

¶ This phrase, which is of frequent occurrence in this chapter, appears to be a rubric to the worshipper which has crept into the text. There are many such in the *Ritual* and *Hermetic Books*.

in his rising when the rule which he has made begins, rising in Suten Khen.*

I am the Great God creating himself. It is water, or Nu, who is the father of the Gods. Let him explain it. The Sun is the creator of his body, the engenderer of the gods, who are the successors of the Sun.

I am (the one) never stopped by the gods. Let him explain it. Tum, or the Sun, in his disk, when he shines from the eastern horizon of heaven.† O Creator, dwelling in his bark, forming his own body, or forming his body eternally, save thou the Osirian from those who are the guardians and judges placed by the Lord of Spirits as he wishes to guard his enemies. Khepera in his boat is the Sun himself, the gods, guardians and judges are the Apes, Isis, and Nephthys."‡

The whole of the long section from which these extracts are taken is full of obscurities; much of it is written in a precatory style, interrupted with many rubrics and interrogations, to which not a few of the sentences are designed as a reply. Obscure, however, as the whole is, still there is no uncertainty in the general import of the paragraphs which are addressed to Ra.

5. Passing over many intermediate chapters, in two of which the Osirian entreats the god to give him "the delicious breath of his nostrils," § a petition which strongly reminds one of the time when the Supreme Being breathed into his nostrils the breath of life, and man became a living soul,|| we come next to that magnificent address to the midnight sun in Hades, which has been often quoted, and which forms the CXXXth chapter of the *Ritual*, and is supposed to belong to the period when the soul of the deceased, justified by Horus the Deliverer from all his sins, is prepared to commence its passage to the Sun, and to take its place among the gods of the orbit.¶

* A name of the city of Bubastes, or Buto, in Lower Egypt.

† In this figure the sun is supposed to shine over the entrance of Hell, which was situated in the east, as the Ker-Neter, or land of the gods, was in the west.

‡ The goddesses of the upper and lower firmament respectively, and the sacred apes or cynocephali, the avenging ministers of Thoth, the recorder of the deeds of the dead.

§ Caps. liv. and lvi., the chapter of "Receiving the Breath in Hades."

|| Gen. ii. 7.

¶ "The Passage to the Sun. The book of vivifying the soul for ever; of letting it go to the Boat of the sun, to pass the crowds at the gate. Done on the Day of the Birth of the Osiris." This birth is the resurrection of the soul to a new and purified life, a spiritual post-mortal regeneration.

"The Heaven is open, the earth opens, the south opens, the north opens, the west opens, the east opens, the southern zenith opens, the northern Nachi opens, the valves of the door open, the gateway of the Sun opens. He proceeds from the horizon, he has unclosed the doors of the ark.....

"The Osirian serves the Sun. He has received his due reward at his shrine. Like Horus he goes to the recesses of (his dwelling) place, to the sanctuary of his chest.*.....

"Glory to the Sun, Lord of the Horizon ; Osiris, Lord of the West.

"Hail thou who purifiest mankind, who soundest the heaven at the great place, making the boatmen to go along.†.....

"He has prepared millions ; he has passed his billions.....

"The circle of the ministers of the Sun is before him. His blessings are after him. Come.

"Truth exclaims, She approaches her Lord ; Glory is given to the Universal Lord."

The Rubric to this chapter declares that, this chapter having been duly recited, the soul lives for ever. His word is true against his enemies, and his food is off the altar of the Sun to the end of every day.

In Chapter CXXXIII. we are told that † "The Sun rises from his horizon, his gods are behind him. When he comes forth from the Amenti, the despisers fall down in the eastern horizon of the heaven at the words of Isis.§ She has prepared the path of the Sun, the great chief." This is one of the more mystical chapters, which the Rubric prescribes is to be seen (that is, the vignette to it) by no one but the man for whom it was prepared. "Do not let any one see it except thyself, or thy father, or thy son. Having kept it well, prepare the dead, the delight of the Sun. It makes him prevail as the gods, for the gods look upon him as one of themselves ; the dead fall on their faces when they see him. He is seen in Hades as the boatman of the Sun."

* Or innermost shrine, analogous to the holy of holies of the Jews.

† Or in less idiomatic phraseology, "Who measures the depths of Heaven at the source of its great river, and maketh the rowers of thy bark to go forth in triumph."

‡ "The Book of instructing the Dead to be in the Heart of the Sun, made on a Day of the Month."

§ Or the evil are thrust into hell by Isis at the rising of the Sun, when the goddess prepares to make his paths straight.

6. The last section of the *Ritual* which we shall cite is that called "The Orientation." It, together, with Chapter CLXIII., is written in a still more ambiguous style than the preceding, and it practically concludes the *Ritual*. In the Orientation the god Thoth is described as opening the gates of the four winds of heaven to the deceased, and of each of them it is written, "The Sun lives; the Tortoise, or the evil one, dies"; and the nature of the abodes of the deity is an unknown and an unutterable mystery, which is not known to rustics or the uneducated, and is to be rigidly kept as a secret from every living soul.

7. The chief work, however, in which the esoteric authors of the Myth of Ra is contained, is that great litany which is called the Litany of the Sun, which ascribes to that divinity the paramount superiority over all the gods, and which, next to the *Ritual of the Dead*, is the longest of the sacred writings of the Egyptians. Unlike the *Ritual*, the Litany of Ra is not found complete on any one papyrus or on any one mural inscription, while as a composition the date of its compilation must be ascribed to that of the XVIIIth dynasty, or 1,700 years B.C.* Although litanies on papyri exist yet, the chief copies now extant are those which are engraved on the walls of the tombs of Ramesside kings of the XIXth dynasty in the Beban el Moluk. These extensive catacombs, which take their rank among the most stupendous monuments ever executed in honour of the dead, are, in many of the chambers and along the corridors and staircases leading to the final vault where the royal sarcophagus was deposited, completely covered with chapters from the Litany of Ra, illustrated by a variety of symbolic vignettes containing many figures of the deities, often of life size, and richly adorned with coloured and incised decoration. The royal tombs which are more especially thus embellished are those of Rameses III., IV., VI., and IX., of Seti I. and II., and of Menepthah I. of the XXth dynasty. Of these the texts in the tomb of Seti I. are the most complete, and have been taken as a standard copy, while the tomb itself, commonly called Belzoni's Tomb, after the name of its energetic discoverer,† is perhaps the most splendid, as it is certainly the

* Lenormant, *Histoire Ancienne des Peuples de l'Orient*.

† It was discovered by Giovanni Belzoni on the 16th October, 1815, and a facsimile of one of the chambers, that then known as the Chamber of

best preserved, of all the funeral excavations in the royal valley. The text of Seti I., therefore, is that which we shall now cite, using the translation by M. Edouard Naville, which has just appeared in the *Records of the Past*,* and referring occasionally to the more elaborate edition of the same work, which stands as a monument of erudition, research, and candid criticism.†

8. The Litany of Ra consists of four chapters—the first and third being litanies properly so called; the second and fourth, on the contrary, being mystical prayers and invocations, having, as will be seen, a strong affinity to certain chapters in the *Ritual of the Dead*. Chapter I., it will be seen, enumerates the seventy-nine phases or manifestations of Ra.

CHAPTER I.

Title. The beginning of the book of the worship of RA in the Ament of the worship of TEMPR † in the Ament. When any one reads this book, the porcelain § figures are placed upon the ground, at the hour of the setting of the Sun, that is of the triumph of RA over his enemies in the Ament. Whoso is intelligent upon the earth, he is intelligent also after his death.

- 1 Homage to thee, RA! Supreme Power, the master of the hidden spheres who causes the principles to arise, who dwells in darkness, who is born || as the all-surrounding universe.
- 2 Homage to thee, RA! Supreme Power, the beetle that folds his wings ¶ that rests in the empyrean, that is born as his own son.**
- 3 Homage to thee, RA! Supreme Power, TONEN †† who produces his members, ‡‡ who fashions what is in him, who is born within his sphere.

Beauty, was exhibited at the Egyptian Hall, Piccadilly, in 1821. See Belzoni, *Narrative of Discoveries in Egypt and Nubia*, 1822.

* Vol. viii.

† Naville, *La Litanie du Soleil*. 1875. Leipzig.

‡ Or the Universal Being.

§ The Shabti mummy figures, whose use is described in the *Ritual of the Dead*, cap. vi.

|| Or, "under the form of."

¶ The sacred Scarabeus. The simile is that of Deity resting after creation, as a beetle closes its wings after its eggs are laid.

** Horus Ra. From a similar idea the early Gnostic Christians originated the Patripassian heresy.

†† The material earth.

‡‡ His members, *i.e.* the gods.

- 4 Homage to thee, RA! Supreme Power, he who discloses the earth and lights the Ament, he whose principle has (become) his manifestation, and who is born under the form of the god with the large disk.*
- 5 Homage to thee, RA! Supreme Power, the soul that speaks, that rests upon her high place, that creates the hidden intellects which are developed in her.†
- 6 Homage to thee, RA! Supreme Power, the Only One, the courageous one, who fashions his body, he who calls his gods (to life) when he arrives in his hidden sphere.
- 7 Homage to thee, RA! Supreme Power, he who addresses his eye, and who speaks to his head,‡ he who imparts the breath of life to the souls (that are) in their place; they receive it and develop.§
- 8 Homage to thee, RA! Supreme Power, the spirit that walks, that destroys its enemies, that sends pain to the rebels.||
- 9 Homage to thee, RA! Supreme Power, he who shines when he is in his sphere, who sends his darkness into his sphere, and who hides what it contains.
- 10 Homage to thee, RA! Supreme Power, he who lights the bodies which are on the horizon, he who enters his sphere.
- 11 Homage to thee, RA! Supreme Power, he who descends into the spheres of Ament, his form is that of TUM.¶
- 12 Homage to thee, RA! Supreme Power, he who descends into the mysteries of ANUBIS, his form is that of CHEPRA.**
- 13 Homage to thee, RA! Supreme Power, he whose body is so large that it hides his shape,†† his form is that of SHU.
- 14 Homage to thee, RA! Supreme Power, he who leads RA into his members, his form is that of TEFNUT.
- 15 Homage to thee, RA! Supreme Power, he who sends forth the plants in their season, his form is that of SEB.‡‡
- 16 Homage to thee, RA! Supreme Power, the great one who rules what is in him, his form is that of NUT.§§

* Aten Ra.

† Again a Gnostic theory, all the heavenly intelligences being simply emanations from the Divine soul. See Mansell, *Gnostic Heresies*, and King, *The Gnostics and their Remains*.

‡ Idiom; "he who speaks to himself alone," *i.e.*, having no equal to consult with.

§ The creator of the pre-existent souls of mankind.

|| "For thine incorruptible spirit is in all things."—Wisdom xii. 1.

¶ The god of the under-world.

** Atmu.

†† According to Brugsch Bey, Ra was also the god of the air, the analogue of the Anu of the Assyrian theology. See the Author's *Archaic Dictionary*.

‡‡ The most primæval of the Egyptian deities. He was the analogue of the Chronos of the Greeks, and was represented with the head of a crocodile.

§§ The heavens personified in a feminine form.

- 17 Homage to thee, RA! Supreme Power, he who goes always towards him who precedes him, his form is that of ISIS.*
- 18 Homage to thee, RA! Supreme Power, he whose head shines more than he who is before him, his form is that of NEPHTHYS.†
- 19 Homage to thee, RA! Supreme Power, the urn ‡ of the creatures, the only one, that unites the generative substances, its form is that of HORUS.
- 20 Homage to thee, RA! Supreme Power, the brilliant one who shines in the waters of the inundation, his form is that of NUN.§
- 21 Homage to thee, RA! Supreme Power, he who creates the water which comes from within him, his form is that of REMI.||
- 22 Homage to thee, RA! Supreme Power, the two vipers ¶ that bear their two feathers, their form is that of the impure one.
- 23 Homage to thee, RA! Supreme Power, he who enters and comes forth continually from his highly mysterious cavern, his form is that of AT.**
- 24 Homage to thee, RA! Supreme Power, the spirit that causes his disappearance, his form is that of NERT.††
- 25 Homage to thee, RA! Supreme Power, the spirit that sets up (those whom he has created), that creates‡‡ his descendants, his form is that of NTUTI.§§
- 26 Homage to thee, RA! Supreme Power, he who raised his head and who lifts his forehead, the Ram, the greatest of the creatures.||||
- 27 Homage to thee, RA! Supreme Power, the light that is in the infernal regions, its form is that of Ament.
- 28 Homage to thee, RA! Supreme Power, the penetrating spirit who is in the Ament, his form is that of Kerti.¶¶
- 29 Homage to thee, RA! Supreme Power, the timid one who sheds tears,*** his form is that of the afflicted.
- 30 Homage to thee, RA! Supreme Power, he who raises his hand and who glorifies his eye,††† his form is that of the god with the hidden body.

* Or the Moon.

† The sister of Isis and the goddess of the lower firmament.

‡ Crater, the receptacle of all life.

§ The Heavenly waters personified as a male deity.

|| The weeper, a title of Isis.

¶ The sacred uræi of Harhut.

** A fish, most likely the *phagros*, the appearing of which is connected with the inundation.

†† The divine eye of Osiris.

‡‡ Vivifies.

§§ The meaning of this name is doubtful.

|||| The Ram was the emblem of the god Kneph, the spirit of the heaven and of the soul of the world.

¶¶ The god of the spheres.

*** The god whose appearance causes the dew. ††† Glorifies himself.

- 31 Homage to thee, RA! Supreme Power, the spirit who is raised upon the two mysterious horizons, his form is that of CHEHT AMENT.*
- 32 Homage to thee, RA! Supreme Power, the god with the numerous shapes in the sacred dwelling, his form is that of the beetle.†
- 33 Homage to thee, RA! Supreme Power, he who puts his enemies into their prison, his form is that of the lion.‡
- 34 Homage to thee, RA! Supreme Power, the ray of light in his sarcophagus,§ its form is that of the progenitor.
- 35 Homage to thee, RA! Supreme Power, the covering of the body, which develops the lungs, its form is that of TEB-ATI.||
- 36 Homage to thee, RA! Supreme Power, he who calls the bodies into the empyrean, and they develop, who destroys their venom, his form is that of the transformer.
- 37 Homage to thee, RA! Supreme Power, the being with the mysterious face,¶ who makes the Divine Eye move, his form is that of SHAI.
- 38 Homage to thee, RA! Supreme Power, the supremely great one who embraces the empyrean, his form is that of the spirit who embraces (space).
- 39 Homage to thee, RA! Supreme Power, he who hides his body within himself, his form is that of the god with the hidden body.
- 40 Homage to thee, RA! Supreme Power, he who is more courageous than those who surround him, who sends fire into the place of destruction, his form is that of the burning one.**
- 41 Homage to thee, RA! Supreme Power, he who sends destruction, and who causes the development of his body, in the empyrean, his form is that of the inhabitant of the empyrean.
- 42 Homage to thee, RA! Supreme Power, the wonderful one who dwells in his eye,†† who lights the sarcophagus, his form is that of SHEPI.‡‡
- 43 Homage to thee, RA! Supreme Power, he who unites the substances, who founds§§ AMTO, his form is that of one who joins substances.||||
- 44 Homage to thee, RA! Supreme Power, he who invents¶¶ secret things, and who begets bodies, his form is that of the invisible (progenitor).

* A title of Osiris, literally, "He who resides in the West."

† Kheper Ra. ‡ The god of Force or the god Peh.

§ The Shekinah of the tomb.

|| The covering of Ati, the air (?).

¶ This is the same idea as that of Job iv. 16: "A spirit passed before my face; it stood still, but I could not discern the form thereof."

** "Our god is a consuming fire" (Heb. xii. 29; Deut. iv. 24; ix. 3).

†† The solar disk. ‡‡ The splendid one.

§§ Gives abody to. |||| Who unites all things with himself.

¶¶ Creates.

- 45 Homage to thee, RA! Supreme Power, he who furnishes the inhabitants of the empyrean with funeral things, when he enters the hidden spheres, his form is that of APERTO.*
- 46 Homage to thee, RA! Supreme Power, his members rejoice when they see his body, the blessed spirit who enters into him, his form is that of the joyful one.
- 47 Homage to thee, RA! Supreme Power, the adult who dilates his eyeball, and who fills his eye, † his form is that of the adult. ‡
- 48 Homage to thee, RA! Supreme Power, he who makes the roads in the empyrean, and who opens pathways in the sarcophagus, his form is that of the god who makes the roads. §
- 49 Homage to thee, RA! Supreme Power, the moving spirit who makes his legs stir, his form is that of the moving one. ||
- 50 Homage to thee, RA! Supreme Power, he who sends forth the stars and who makes the night light, in the sphere of the hidden essences, ¶ his form is that of the shining one.
- 51 Homage to thee, RA! Supreme Power, he who makes the spheres and who creates bodies; from thy person emanating from itself alone, thou hast sent forth, RA, those who are and those who are not, the dead, the gods, the intellects; his form is that of creator of bodies.
- 52 Homage to thee, RA! Supreme Power, the mysterious, the hidden one, he whom the spirits follow as he conducts them, he gives the step to those surrounding him, his form is that of AMENI.
- 53 Homage to thee, RA! Supreme Power, the horn, the pillar of the Ament,** the lock of hair that shines in †† its form is that of the horn.
- 54 Homage to thee, RA! Supreme Power, the Eternal Essence who penetrates the empyrean, who praises the spirits in their spheres, his form is that of the Eternal Essence.

* Perhaps Anubis.

† The solar disk.

‡ Or the old one, *i.e.* the perfect man; or, perhaps, the Adam Kadmon of the Gnostics.

§ This is in more ambiguous terms the idea of Jacob's ladder as applied to the Son of Man (John i. 51); or the god Ra makes a pathway from earth to Heaven for his adorers to ascend thereby. A similarity of ideas will often beget a similarity of expression, but it must be strictly borne in mind that the converse does not apply, and that a similarity of expression does not convey always, or even oftentimes, a similarity of ideas.

|| Is the spirit which broods over the universe to hatch it into life.

¶ The region of the purest spirits, or the heaven of the pure essences. See *Iamblicus and Porphyry*, by Taylor. This was a theory which the Platonists borrowed from the Egyptians.

** The glory and the support of the heavens or Amenti. †† Lacuna.

- 55 Homage to thee, RA! Supreme Power, when he arrives in the good Ament, the spirits of the empyrean rejoice at sight of him, his form is that of the old man.*
- 56 Homage to thee, RA! Supreme Power, the great lion that creates the gods, that weighs words, the chief of the powers inhabiting the holy sphere, his form is that of the great lion.†
- 57 Homage to thee, RA! Supreme Power, when he speaks to his eye and when he addresses his eyeball, the bodies shed tears; his form is that of the being who speaks to his eye.‡
- 58 Homage to thee, RA! Supreme Power, he who raises his soul, and who hides his body, he shines and he sees his mysteries, his form is that of HERBA,§
- 59 Homage to thee, RA! Supreme Power, the high spirit who hunts his enemies, who sends fire upon the rebels, his form is that of KABA.||
- 60 Homage to thee, RA! Supreme Power, the substance which hides the intestines and which possesses the mind and the limbs, its form is that of AUAI.¶
- 61 Homage to thee, RA! Supreme Power, the great eldest one who dwells in the empyrean, CHEPBI who becomes two children, his form is that of the two children.**
- 62 Homage to thee, RA! Supreme Power, the great walker who goes over the same course, the spirit who anoints the body, SENEKHEB, his form is that of SENEKHEB.††
- 63 Homage to thee, RA! Supreme Power, he who creates his body and who detaches his members by the sacred flame of AMTO, his form is that of the flame of AMTO.‡‡
- 64 Homage to thee, RA! Supreme Power, the master of §§ the hooks (who struggles) against his enemies, the only one, the master of the Aynocephali,||| his form is that of ANTEI.¶¶
- 65 Homage to thee, RA! Supreme Power, he who sends the flames into his furnaces, he who cuts off the head of those who are in the infernal regions, his form is that of the god of the furnace.***

* The Ancient of Days.

† The Gnostic idea of the Dynamic Theurgos.

‡ Who speaks to himself.

§ He who raises his soul. || The high spirit. ¶¶ Flesh, or substance.

** Shu and Tefnut. †† Literally, the shining face.

‡‡ He who is on the ground.

§§ Cf. "I will put my hook into thy nose and my bridle into thy mouth" (Isa. xxxvii. 29).

||| The sacred monkeys of the god Thoth. ¶¶¶ Doubtful meaning.

*** The Lord paramount even of Hell. See *Ritual of the Dead*, caps. xlvi. and cl., "the Mystical Abodes."

- 66 Homage to thee, RA! Supreme Power, the parent who destroys his children, the only one who names* the earth by his intelligence, his form is that of TONEN.
- 67 Homage to thee, RA! Supreme Power, he who sets up the *urshi*† themselves upon their foundations, no one sees their mysteries, his form is that of the *urshi*.
- 68 Homage to thee, RA! Supreme Power, the vessel of heaven, the door of the empyrean,‡ he who makes the mummy come forth, his form is that of BSR.
- 69 Homage to thee, RA! Supreme Power, the monkey the being in his nature, his form is that of the Ape of the empyrean.
- 70 Homage to thee, RA! Supreme Power, he who opens the earth, and who shows the interior of it, the speaking spirit who names his members, his form is that of SMATO.§
- 71 Homage to thee, RA! Supreme Power, he who is armed with teeth, who consumes his enemies, the flame that lights the wick, his form is that of NEHI.||
- 72 Homage to thee, RA! Supreme Power, the walker, the moving luminary, who makes darkness come after his light, his form is that of the Walker.¶
- 73 Homage to thee, RA! Supreme Power, the master of souls who is in his obelisk, the chief of the confined gods, his form is that of the master of souls.
- 74 Homage to thee, RA! Supreme Power, the double luminary, the double obelisk,** the great god who raises his two eyes, his form is that of the double luminary.††
- 75 Homage to thee, RA; Supreme Power, the master of the light, who reveals hidden things, the spirit who speaks to the gods in their spheres, his form is that of the Master of the Light.

* Creates, fashions. † The genii of the watches of the night.

‡ Again a Christian parallel, "I am the door of the sheep" (John x. 9).

§ He who opens the earth.

|| He who is armed with teeth.

¶ The active spirit which superintends all things in space.

** The obelisk was specially devoted to Ra, as the pyramid appears to have been to Tum. There are no pyramids to the east of the Nile, and no obelisks to the west of the same river. Pierret, in his *Dict. de l'Archéologie Egyptienne*, has shown that the obelisk was honoured with divine honours, but it is more than doubtful if, as is often asserted, it was ever regarded as a phallic emblem. The illustrations given by Inman in his *Christian and Pagan Symbolism*, are misleading, as they represent the obelisk with a conical apex and a curved outline, &c.

†† Or the sun and moon combined(?).

- 76 Homage to thee, RA! Supreme power, O RA of the sphere, O RA who speakest to the spheres, O RA who art in thy sphere, homage to thee, RA KESCHI, four times.* They sing praises to the spirit KESCHI,† the spheres honour his spirit, they glorify thy body which is in thee, saying, Homage to thee, great KESCHI! four times. They sing praises in thy honour, spirit KESCHI in thy 75 forms which are in thy 75 spheres. The royal OSIRIAN knows them by their names, he knows what is in their bodies, all their hidden essences.‡ The royal OSIRIAN speaks to them in their forms, they open to the royal OSIRIAN, they display the hidden doors to his spirit which is like thy spirit, thou createst them, thou createst the royal OSIRIAN, the development of his body is like thine because the royal OSIRIAN is one of thy companions, who are in their spheres, and who speak in their caverns, those who are blessed through thy creation and who transform themselves when thou commandest it. The royal OSIRIAN is like one of those who speak in their hidden spheres. Hail, he has arrived, he advances in the train of the spirit of RA. Hail! he has completed the journey from Chepri.§ Hail! he has arrived. The royal OSIRIAN knows all that concerns the hidden beings.|| Hail! he has arrived in the midst of you; homage to his spirit KESCHI! four times.
- 77 Oh! RA of the Ament, who hast created the earth, who lightest the gods of the empyrean, RA who art in thy disk, guide him on the road to the Ament, that he may reach the hidden spirits; guide him on the road which belongs to him, guide him on the Western road; that he may traverse the sphere of Ament, guide him on the road to the Ament, that the king may worship those who are in the hidden dwelling, guide him on the road to the Ament, make him descend to the sphere of NUN. Hail, RA! the royal OSIRIAN is NUN. Hail, RA! the royal OSIRIAN is thyself and reciprocally. Hail, RA! thy spirit is that of OSIRIS, thy course is his in the empyrean. Hail, RA! he dwells in the empyrean, he traverses the good Ament. Such as thou art, such is the royal OSIRIS.¶ Thy intellect, RA, is his. OSIRIS worships the hidden gods, he praises their spirits, these latter

* The plural of Honour, a common Egyptian phrase.

† Doubtful meaning.

‡ This refers to the king in whose tomb the inscription was written, in this case Seti I.

§ Ra under the form of a scarabeus.

|| *Ritual*, cap. cxlvii., "The commencement of the gates of the House of Osiris in the Fields of the Aahlu," said by the deceased.

¶ This phrase occurs frequently also on the coffin of Seti I.; see Bonomi, *Sarcophagus of Oimenephthah I.*, 4to. 1862. Lond.

say to one another that thy course (Ra!) is that of OSIRIS, that thy way is his, great god who dwellest in the empyrean. Hail! god of the disk with the brilliant rays, praise be to the spirit KESCHI! four times.

- 78 Hail to thee, universal covering, who createst thy soul and who makest thy body grow; the King traverses the most secret sphere, he explores the mysteries contained in it. The King speaks to thee like Ra, he praises thee with his intelligence, the King is like the god* and reciprocally. He moves by himself, he moves by himself. The all surrounding universe says: Ah, guide him into the interior of my sphere; four times.
- 79 This chapter is said to the most mysterious god, these words are written like those upon the two sides of the door of the empyrean this book is read every day, when he has retired in life, according to custom, perfectly.†

9. Thus far run the first seventy-nine clauses, or the first chapter of the Ritual of Ra; each of them commences with the same formula of devotion, and contains an inscription to the deity of his personal identification with the other divinities, and even with the more abstract deities of Heaven, water, air, and space. That this sublime conception was very different from the vulgar idea of the god is self-evident, and the votive stele and hymns to Anubis, Horus, Isis, Osiris, and Amen, which exist in abundance, prove that to the bulk of the people the State creed was a mystery, and the national religion was a polytheism, full of the most irreconcilable contradictions. They did not appear to have regarded their deities, however, as having antagonistic prejudices to each other, but rather as being eponymous to particular districts, or, as the essential local deities of the different towns, taking their rank according to the commercial or political grade of the place where they were adored, and rising or sinking in importance as that town fluctuated in the political scale. Hence, therefore, like the Roman, the national religion became sufficiently eclectic to admit any other well-established divinity into its hierarchy, when the exigencies of the case

* This was one of the earliest of the Egyptian theories, the adoration of the deceased monarchs dating from the IVth dynasty. Chofo and Teti were thus adored, and were interred in pyramids which had a service of priesthood attached to it, analogous in idea to the chantry chapels for the souls of the deceased which abounded in our English cathedrals, and which only ceased at the Reformation.

† This chapter is evidently a rubric interpolated into the text.

demanded it. The conquests of Thothmes III. and Rameses II. added Anaitis, Reseph, and many Syrian deities to the Pantheon;* others, such as Malooli and his consort, were introduced from Nubia. The Persians, a modification of sun-worship; the Greeks, Canopus and Serapis; and the Romans Antinous, who was adored as a god at Antinopolis. Not that the name Serapis, or the dead Apis, was unknown before, but that, like Canopus and Harpocrates, his worship was developed into such a new form that it found its graphic symbolism in the erection of a figure which soon became to be regarded as a distinct divinity.† The same theory which originated the deification of a Pharaoh, admitted the deification of that Pharaoh's favourite likewise, as in the case of Antinous, the companion of Hadrian, in whose honour the town and temple of Antinoopolis was founded.‡ As the male sovereigns were assimilated while living to Ra and when dead to Osiris, so the queens were adored as Isis while living, and as Hathor when deceased, till, in later times, every woman was called an Hathorian in her funereal papyri.§ In the Litany of Ra, while the germs of all these deviations from the more ancient Faith are traceable, still the whole composition is infused more with the idea of Eternal Essence than with that of an Eternal Personality, and while the grosser forms of idolatry were tolerated, and indeed excused, by the teaching of such a litany, the more philosophical mind would try to believe that—

“ All are but parts of one stupendous whole,
Whose body Nature is and God the soul.”||

A very sublime idea for a Pagan, but a most unworthy one for a Christian poet, and one that it is inconceivable should be selected in our schools, together with other Pantheistic passages from the poems of the same author, for the religious education of our youth.

10. The second chapter of the Litany of Ra does not present much to engage our attention. It is chiefly a series of addresses to Ra on behalf of the Osirian king when he enters heaven to take his place as one of the spheric gods—the gods of the orbit of the *Ritual of the Dead*.¶ Ra is entreated to “give eyes to the royal Osirian; to give a heart and divine eyeballs to him;” to command him, by virtue of his word, to be like the various

* Birch, *Rede Lecture*,

† Lenormant, vol. i. p. 326.

‡ Sharpe, *History of Egypt*, vol. ii.

§ See many instances of this in De Rooge's *Cat. des Manuscrits Egyptiens du Musée du Louvre*.

|| Pope, *Essay on Man*, book i., sec. 9.

¶ Caps. cxxvi. to cxxix.

blessed spirits which inhabit Elysium; and even to be "like the destructive spirit which comes from the place of destruction." He is entreated to deliver the Osirian from "the crocodiles of Hades,* from the gods armed with swords, the avenging Cabereii in the abodes of Osiris,"† "from the agile demons furnished with legs, from the cruel gods who pluck out hearts and who throw them into their furnaces," because the Royal Osirian is Ra himself, and "his soul is in the disk of the sun; the soul of Ra shines in his shape (and) his body rests amid the invocations which are addressed to him." The gods of the stars are entreated to receive him with acclamations; the two heavenly sisters, Isis and Nephthys, are besought to place the crown of justification upon his head,‡ as "that of a spirit worthy of adornment; and the chapter concludes with this petition:—

17 Oh, RA, place the royal OSIRIAN in thy train; he is the divine key which opens his haunts, he knows admirable means of obtaining the great victory over his enemies; OSIRIS is powerful through thy two eyes; walking god,§ the course of OSIRIS is thy course. RA, the journeys of OSIRIS are thy journeys, OSIRIS makes thee rule over thy enemies, thou makest the OSIRIAN rule over his enemies, by means of the great splendour which is the splendour of RA in the empyrean, they cry to him: Bull of the country of the dead, thou art RA, thy body rests in peace, thou art blessed in thy mysteries.

11. Chapter III. is a short one, and consists of fifteen invocations beseeching Ra to come to the Royal deceased in truth or completely. The addresses are almost identical with those which, in the Ritual and mythological hymns, are addressed to Tum, Osiris, Amen, and Horus. The last invocation declares that the supplicant has already, by the favour of Ra, become one of the nine gods.||

CHAPTER III.

- 1 Oh, RA, come to the King! truly. Highly glorious TEB TEBT.
- 2 Oh, RA, come to the King! truly. Thou makest thy soul young again and thou givest birth to thy body.

* Cf. *Ritual*, cap. xxxii., the chapter of stopping the crocodiles coming to take the mind of a spirit from him, in Hades.

† *Ritual*, cap. cxlvii.

‡ Cf. *Ritual*, cap. xix., "The Crown of Justification."

§ Idiom; the deity who is never resting, but is in eternal progress through his creation.

|| Either as an extra deity beyond the eight great gods, or because nine was the Egyptian perfect plural, especially as applied to things divine.

- 3 Oh, RA, come to the King! truly. Lead him into the holy dwelling.
 4 Oh, RA, come to the King! truly. Guide him on the good ways.
 5 Oh, RA, come to the King! truly. Guide him on the roads of NUN.
 6 Oh, RA, come to the King! truly. Guide him on the roads of NUT.
 7 Oh, RA, come to the King! truly. He restores the body of OSIRIS.
 8 Oh, RA, come to the King! truly. He places the corpse upon its foundation, in its place that no one knows.
 9 Oh, RA, come to the King! truly. He calls his body OSIRIS.
 10 Oh, RA, come to the King! truly. He sees him who it is in the sarcophagus.
 11 Oh, RA, come to the King! truly. The rays of ATEN * are upon his person.
 12 Oh, RA, come to the King! truly. He has taken the good ways.
 13 Oh, RA, come to the King! truly. He worships thy soul upon the horizon.
 14 Oh, RA, come to the King! truly. Thou speakest to him as to the god who is upon the ground.
 15 Oh, RA, come to the King! truly. He is one of thy nine gods.

12. Chapter IV., which is a long one, also, like Chapter II., possesses little special interest, having more a personal application to the deceased; it is chiefly to be read in connection with our present subject as attesting the perfect union of attributes and characteristics of Ra and Osiris, especially as Osiris Rhotamenti, or the judge of the dead in Hades. The opening verses of the chapter, which is all that will here be quoted, imply the eternal pre-existence of the soul of the king as a portion of the eternal Essence of the gods. This seems to have been more especially a tenet of the Ramesside dynasty, since there is evidence that previously the royal soul was supposed to have become divine at the moment of accession, as in the older dynasties it was so after death. The change which made the soul of the monarch from all time a divinity by eternal generation was perfectly a political one, introduced as a state measure to secure the continuance of the reigning dynasty after the interruptions which destroyed the peace, and partly the religion, of Egypt at the death of Amenhotep IV. and the Aten-Ra kings of the XVIIIth dynasty.

SECTION I.

- 1 Thou art what he is, RA, thou givest birth to the royal OSIRIAN, thou makest him exist like thyself, god of the two horizons; the birth of

*The solar disk.

the OSIRIAN is the birth of RA in the Ament, and reciprocally ; the birth of the OSIRIAN in the heavens is the birth of the soul of RA in the heavens, and reciprocally ; the life of the OSIRIAN is the life of RA, and reciprocally ; the development of his body is the development of RA's body. RA conceived, Tum gave birth to the Osirian ; it is the young CHEPRA ; NUT brings the OSIRIAN into the world, she nourishes the OSIRIAN like RA's soul which issued from her.

- 2 Oh, RA, who art in the Ament. . . . * who art in the empyrean, deliver the OSIRIAN from thy conductors who separate souls from their bodies, the agile beings who move quickly in thy places of torment. May they never seize the OSIRIAN, may they never take him, may they never quicken their steps towards him, may they never put him in their places of torture, may they never cast their toils round him, may they never place him upon their altars, may he never tremble in the land of the condemned, may he never be lost in the Ament. He walks as the god of the horizon walks, he takes steps as RA, he worships the god who is on the earth, he honours the mysterious bodies * they say to the OSIRIAN ; HU and SA ; they call him this, because he is like the spirit of HU and SA † in his creations, he makes the sacred tree grow, he is not ignorant of it. There are cries of joy in the mysterious region, for RA sets under the form of the OSIRIAN, and reciprocally. Rejoice, you the dead, render praises to RA, and RA renders praises to you. RA comes forth from the cow MEHUR, ‡ he sets in NETUR ; § the OSIRIAN comes forth from MEHUR like the sun, he sets in NETUR like TEMT. The name of the King is the name of RA, AMMEHUR, || the setting of the OSIRIAN, it is his setting, AMNETUR. ¶
- 3 The gods of the empyrean bless him, the hidden gods rejoice over him ; they say to him : Thy person is the god of the country of the dead, thy form is TEB TEMT. The hidden gods speak to the royal OSIRIAN, they rejoice on seeing him ; (they say to him :) Hail, blessed and perfect one, who comest forth from TONEN, the god who destroys the forms ; it is great, thy essence, spirit, shadow that no one destroys, that lives where you live. He knows the essences of the primitive beings, he knows the mysterious flames of the empyrean, for he attains to holy and mysterious things.
- 4 The two gods speak to the royal OSIRIAN, they rejoice on seeing him, this blessed, perfect spirit ; (they say to him :) This is one of us. The gods speak to the royal OSIRIAN, they rejoice when they see him,

* Lacuna. † Hu, the creative life : Sa, the intelligence.

‡ The water of the East. § The water of the West.

|| He who comes forth from Mehur. ¶ He who is in Netur.

the splendour of RA, the splendour of the two goddesses that appear in HÆSET,* the supplicant HÆSET addresses the guardians who watch over the doors, who devour souls and who swallow the shades of the dead; when they approach them, they are led by them to the place of destruction: Oh, guardians who watch over your doors, who swallow souls and devour the shades of the dead; when they approach you, you lead them to the place of destruction: Oh! allow this blessed, this most holy spirit, to be in the dwelling of the Akher;† it is a spirit like RA, glorious like OSIRIS. This is what HÆSET the supplicant says before the royal OSIRIS.

- 5 O HÆSET, make him come, O HÆSET, guide the royal OSIRIS, O HÆSET, open to him the empyrean, give him the lot of the god of the empyrean; he puts the veil *nems*‡ upon his head at the bottom of the dwelling of the Ament. Hail to thee, he has reached thee; HÆSET, guide him on the good way, he speaks to thee, he glorifies thee by his invocations, and thou rejoicest on seeing his spirit: HÆSET, the supplicant, opens the doors which are in the empyrean, opens his spheres to him, for the club is in the hand of OSIRIS, and he grasps his lance; his club strikes the enemies, and his lance destroys the rebels; his dwelling is that of the god of the two horizons; his throne is RA's throne; for he is the HORUS of two horizons.§ He is beautiful, this spirit, he is perfect, he is powerful in both his hands.

13. After further similar adorations to Ra, in which his identification with Osiris is still more strongly asserted, comes a passage which is almost a transcript of one of the chapters of the *Ritual of the Dead*, in which the various members of the royal Osirian are likened to those of different deities who had them under their especial protection. According to the Egyptian theology, "there is not a limb of him without his god," a conception from which the theory of planetary influences on the human body, which was so essentially characteristic of the medicine of the Middle Ages, was derived.

- 8 The royal OSIRIAN is one of you, for his diadem is a vulture; his face is a sparrow-hawk, his head is RA; his eyes are the RËHTI, the two sisters; his nose is HORUS of the empyrean; his mouth is the King of the Ament; his lungs are Nun; his two hands are the god

* One of the halls of the empyrean, which is here considered as a goddess.

† The region of the under-world.

‡ The striped headdress generally worn on the statues of the kings. See this fully described in a paper by S. Sharpe, in *Trans. Soc. Bib. Arch.*, vol. iv.

§ Horus as the planet Mars.

SECHENI;* his fingers are the gods who seize him; his body is CHEPRA; his heart is HORUS, the creator; his chest is the goddess of life; his spleen is the god FENTI;† his lungs are the goddess HETI; his stomach (?) is APU; his intestines, the god with the mysterious names;‡ his back is the corpse-god; his elbows are MAKATI; the nape of his neck, HORUS THOTH; his lips, MERTUR; his phallus is TONEN;§ the goddess of CHEB; the two hidden gods; his sitting posture, the two goddesses;|| his legs, "he who traverses the hidden places";¶ his shin-bones are a uræus.** His members are gods, he is throughout a god, no one of his members is without a god, the gods are of his substance.†† The royal OSIRIS is an intelligent essence, his members guide him, his flesh opens the way to him, those who are born of him create him, they rest when they have given birth to him. The royal OSIRIS is he who gives them birth, it is he who begets them, it is he who makes them exist; his birth is that of RA in the Ament, RA gives birth to the royal OSIRIS, he causes his own birth.

14. Still continuing in the same strain, the Litany alternately invokes all the various deities of the Elysium, and declares them subordinate to the royal Osirian by virtue of his identification with Ra, the Supreme God, and then all the deities are again thus supplicated:—

9 Oh, ye gods! oh, ye blessed! who precede RA and who escort his spirit! do to the royal OSIRIAN as to RA, tow him with you in the same way that you conduct RA and the two navigating gods in the heavens;‡‡ the royal OSIRIAN is RA himself, and RA is himself reciprocally; he is the Chief of his worshippers, who gives life to the forms.

15. The last section of the Litany of Ra concludes with a mysterious invocation to the material Heavens themselves, in that respect also being analogous to the final chapters of the

* He who embraces.

† The god of the nose. Each part of the body of the deceased becomes a god. The same is found in the funereal texts, and especially in the *Ritual of the Dead*, cap. xlii.

‡ Osiris.

§ The god Osiris was a hermaphrodite being.

|| Isis and Nephthys.

¶ The god Atum.

** The sacred serpent of eternal life.

†† Or, are of like substance with him. All these subtleties remind one of the homoiousian controversies of the early church.

‡‡ That is, the deceased monarch was hereafter to share the glories of the god Ra, to sit on his throne, and to sail with him, as himself, through the regions of the upper and under worlds as the visible sun.

*Ritual of the Dead.** This section attests the tendency which a Pantheistic religion always manifests to develop into materialism, since the Ament or Heavens invoked in it possess less a spiritual than a tangible essence.

SECTION III.

O Ament,† O Ament, O good, O good, O strong, O strong, O strong, O powerful, O powerful, O protecting, O protecting, O mysterious, O mysterious (Ament), the royal OSIRIAN knows thee, he knows thy form, he knows the name of thy companions. Ament, hide my corpse, good Ament, hide my body. O resting-place, let me rest in thee; O strong one, may the royal OSIRIS be strong with thy strength, O powerful one, may he be powerful with thy power! O Ament, open thy arms to him; O protectress, cover his body; O mysterious being, stretch out thy hand to him! Hail, holy Ament of OSIRIS with the mysterious names, the most holy of the gods, thou who art the most hidden of all mysteries! Hail! the royal OSIRIAN worships thee; he addresses the great god who is within thee. Hail! he worships thee; open thy mysterious doors to him. Hail! he worships thee; (open to him) thy hidden spheres, for he has his dwelling in the heavens like RA, and his throne is upon the earth like SEB; he is seated upon the throne of SEB, upon the seats of Horchuti; his spirit soars into the heavens, it rests there; his body descends to the earth in the midst of the gods. He walks with RA, he follows TUM, he is like CHEPRA, he lives as thou livest in truth.

16. The customary Rubric, with its usual monitions, imposing secrecy on its reader, terminates this long and, in many respects, most magnificent Litany.

2 When this book is read he who reads it purifies himself at the hour when RA sets, who rests in the Ament of the Ament, when RA is in the midst of hidden things, completely.

17. Before comparing this text with that contained in other solar addresses, and especially with a hymn to the Deity under his form of Ra Harmachis, it would be as well to recapitulate concisely the principal attributes ascribed to Ra, and the chief

* Cap. clxvi. The chapter of the Boat. Not letting it to make the body flow, and to swallow their waters.

† Amen-t, "The Hidden," from the name of the god Amen, the "t" being simply the feminine article. The heavens were always represented under a feminine figure in the Egyptian sculptures, as notably in the Zodiacs of Esne and Denderah.

developments of his character. Thus, as to his birth, he is self-created (cap. i., l. 51); he is an eternal essence (cap. i., l. 54); he is the supreme power (cap. i., each section); he is the original (cap. i., l. 6); he creates his own members (cap. i., l. 3); he is the spirit of space filling all things (cap. i., l. 38); he dwells in thick darkness (cap. i., l. 1)*; he is the invisible (cap. i., l. 52); he is both light and darkness (cap. i., l. 9); he is the creator of all souls (cap. i., l. 7); he created the heavens and the stars (cap. i., l. 50, 51); he creates the gods (cap. i., l. 56); he is the active life of all things (cap. i., l. 49); he has no equal to consult with (cap. i., l. 57); he is the destroyer of spiritual evil (cap. i., l. 59); he is the creator of the earth (cap. i., l. 66); he is the father of the eternal son (cap. i., l. 19); he creates the plants in their seasons (cap. i., l. 15); he gives breath to all souls (cap. i., l. 7); he is the greatest of all creatures (cap. i., l. 26); he rules alike in Heaven and Hell (cap. i., l. 27); he is the revealer of secrets (cap. i., l. 75); he is the cause of all his actions (cap. i., l. 78); he is the most mysterious god (cap. i., l. 79); and finally, all the deities and all things that exist, both corporeal and incorporeal, are but manifestations of himself. Although considered as one of the greater gods only, he was the son of Pthah, the God of Fire; yet, in another fire was but a principle which derived existence from him. He was both the creator, and the life, of the Cosmos. Philosophical errors are of great antiquity, and the heresy of modern scientists, who would derive all life from the sun, are but a resuscitation of the old Egyptian dogma of Ra whose visible emblem was the sun, being the life and light of the world. The metaphysical distinction of the middle ages of nominalism and realism gave no trouble to the minds of the Pharaohic clergy. They were too wise in their generation to people the universe with a multitude of distinct and often antagonistic deities, and they had too religious a conception of the fatherhood of God to assume, with the more selfish Greek philosophers, that the Supreme Being, having called the spheres into existence, left them to the irrevocable operation of immutable natural laws; who regarded neither men nor angels alike, but, calm, untroubled, and impassive, surveyed the whole of creation with apathy and contempt. Equally removed also were their religious ideas from those of the ancient Chaldeans, who filled the earth and heavens with innumerable spiritual beings,

* Cf. 1 Kings viii. 12.

good, bad, and passive, called the Zi, of every object of creation animate and inanimate, petty spirits,* or genii, which inter-meddled with the affairs of mankind, or were alternately masters of or subservient to him. The favourite theories of the Cabbalists had again no place in the Egyptian theogony. The sublimity of the god Ra disdained to co-operate, or even to control, such discordant and minor agencies. His glory might be *manifested* in another deity, but it could not be *shared* by another. While it was true the hierarchical laws declared the king to be an hypostasis of Ra while living, and Osiris when dead, yet anthropomorphism, so to speak, was foreign to the Egyptian sacred books. The actions of the gods of the Classic nations, Greek or Roman, or even the barbarian Teutonic, were in their nature as repugnant to them as to us. A Jupiter, who was a murderer, a whoremonger and a tyrant, a parricide, and a liar, who by turns threatened and cajoled; who was seduced by one goddess into injustice, and terrified by another into indiscriminate revenge; who was fond (not to put too fine a point on it) of beautiful boys; who loved to take the forms of other men, the better to violate their wives; who was frequently drunk, and often revelled in obscene amusements, such an anthropomorphic deity as that was revolting to the purer conceptions of the Egyptian theology. Amen Ra, Ra, and Atin Ra stand at an immeasurable height of purity as distinct from such a deity. Much has been said of the analogy between the Grecian Apollo and the Egyptian Horus Ra, the Redeemer; but how far does the resemblance extend, and to what few points are the parallels confined? The bitterest enemies of the Egyptian faith were never able, till the Roman period, to accuse it of an immoral tendency, or to prove that its tenets could be logically worked to an obscene conclusion; but, on the other hand, the ancient mysteries of Cybele in Greece, of the Bona Dea in Campagna, and of the Saturnalia in Rome, were essentially impure. The gross invectives of Juvenal and the Atheistical parodies of Lucian, in the Dialogues of the Dead, were but the legitimate outcome of the tenets of their respective religions, when witnessed by a mind not wholly depraved; and while the so-called religious element of the classic writers renders much of their best productions unsuitable for general or for youthful reading, there is scarcely a sentence in the whole of the Egyptian mythological or sacred texts which might not be read

* See Lenormant, *La Magic chez les Chaldéens*, cap. iv.

alike in the school playground, the historian's study, or the devotee's cell, and no story which is open to a more serious censure or ridicule than the apparently trivial incident of Pthah Nefuka playing at draughts in Hades, which has furnished the only example yet known of an Egyptian caricature.*

18. This is, however, somewhat of a digression, for the subject of the Myth of Ra is by no means exhausted yet; but the remarks already made will with equal force apply to our further examination of the sacred texts. Hitherto we have cited only adorations, or *proscyneme*, addressed directly to Ra himself, and in the first person; we shall now proceed to quote certain hymns less immediately applied to Ra, but yet at the same time equally adoring him under his personified attribute of Ra Harmachis, or Ra on the Horizon,—a title which was also given to Horus, who was considered both the son of Ra and also as Ra himself. The text in question was first published by Lepsius,† and a French translation of it was given last year by Professor Maspero,‡ and an English version has just been published by Professor Lushington in the *Records of the Past*.§ The chief point of interest to us is the complete identification of Amen with Ra, and the antithetical contrasts between the condition of Ra victorious and his foes Apophis and his conquered coadjutors.

- 1 ADORATION to RA-HARMACHIS at the front of the morning.||
- 2 *Say*: Thou wakest beauteous AMEN-RA-HARMACHIS, thou watchest in triumph, AMEN-RA, Lord of the horizon.
- 3 O blessed one beaming in splendour (?) towed by thy mariners who are of the unresting gods, sped by thy mariners of the unmoving gods.
- 4 Thou comest forth, thou ascendest, thou towerest in beauty, thy barge divine careers wherein thou speedest, blest by thy mother NUT each day, heaven embraces thee, thy foes fall as thou turnest thy face to the West of heaven.
- 5 Counted are thy bones, collected thy limbs, living thy flesh, thy members blossom, thy soul blossoms, glorified is thy august form, advanced thy state on the road to darkness.

* See Sharpe, *Egyptian Monuments in the British Museum*, page 151.

† *Denkmäler*, Abth. vi., Bd. 12.

‡ *Histoire Ancienne des Peuples de l'Orient*, cap. i. p. 32.

§ Vol. viii.

|| "At the front of the morning." Some prefer rendering the words "every morning."

- 6 Thou listenest to the call of thy attendant gods behind thy chamber ; in gladness are the mariners of thy bark, their heart delighted, Lord of heaven who hast brought joys to the divine Chiefs, the lower sky rejoices, gods and men exult applauding RA on his standard, blest by his mother NUT ; their heart is glad.
- 7 RA hath quelled his impious foes, heaven rejoices, earth is in delight, gods and goddesses are in festival to make adoration to RA-HOR, as they see him rise in his bark.
- 8 He fells the wicked in his season, the abode is inviolate, the diadem *Mehen* * is in its place, the *Uræus* hath smitten the wicked.
- 9 O let thy mother NUT embrace thee,† Lord RA, those who are with her tell thy glories.
- 10 OSIRIS and NEPHTHYS have uplifted thee at thy coming forth from the womb of thy mother NUT.‡
- 11 O shine RA-HARMACHIS shine in thy morning as thy noonday brightness, thy cause upheld over thy enemies, thou makest thy cabin spread wide, thou hast repelled the false one in the hour of his annihilation : he has no rest in the hour when thou breakest the strength of the wicked enemies of RA, to cast him into the fire of Nehaher,§ encircling in its hour the children of the profane.
- 12 No strength have they, RA prevails over his insensate foes, yea, putting them to the sword thou makest the false one cast up what he devoured.
- 13 Arise O RA from within thy chamber.
- 14 Strong is RA, weak the foes.
- 15 Lofty is RA, down-stricken the foes.
- 16 RA is living, his foes dead.
- 17 RA is full of meat and drink, his foes a-hungered and athirst.
- 18 RA is bright, his foes engulfed.
- 19 RA is good, his foes evil.

* The serpent *Mehen* here described as being worn as a diadem by RA. Usually it forms a canopy over the deity.

† Perhaps "Approach thou thy mother Nut," *Neb Ra*, "Lord Ra," seems clearly the reading of the text given in Lepsius, unless the scribe has twice put the hieratic character for *nuter* instead of the usual form of *h*; *Neb hek*, "lord of eternity," as Maspero renders it, is what might rather have been expected. In the following "Isis and Nephthys" is the version of M. Maspero; the text appears to me to give Osiris.—*Lushington's Note*.

‡ The same idea, as in the Psalm: "The dew of thy birth is of the womb of the morning."

§ *Nehaher*, "ghastly-faced," an infernal demon, sometimes represented as a serpent. Compare *T. B.* 125, 18 Bon., 11 and 31, 32; Pierret, *Et. Eg.*, 2 114.

- 20 RA is mighty, his foes puny.
 21 RA hath despoiled APAP.
 22 O RA thou givest all life* to the King, thou givest food for his mouth, drink for his throat, sweet oil for his hair.
 23 O blessed RA-HARMACHIS thou careest by him in triumph, those in thy bark exult to quell and overthrow the wicked.
 24 Cries of joy in the great seat, the divine cabin is in gladness, acclamation in the bark of millions of years.
 25 The sailors of RA are charmed at heart to see RA hailed as supreme of the order of great gods, they gain delight in doing adoration to the bark, homage in the mysterious chamber.
 26 O shine AMEN-RA-HARMACHIS self-sprung, thy sister-goddesses stand in Bech, † they
 27 receive thee, they uplift thee into thy bark, which is perfect in delights before Lord RA, thou begettest blessings.
 28 Come RA, self-created, thou lettest PHARAOH receive plenty in his battlemented house, on the altar of the god whose name is hidden.
 29 Glory to thee, Prince coming forth in thy season, Lord of many faces, diadem producing rays, scattering darkness, all lands are filled with thy splendours, apes make to thee salutations with their arms, they praise thee, they cry aloud to thee, they tell thy glories, their lips exalt thee, in heaven, in earth they conduct thee in splendid array, they open or drive back the gate of the Western horizon of heaven, they let RA be embraced in peace and joy by his mother NUT, thy soul is approved by the tenants of the lower heaven, the divine spirits rejoice at the twofold season of brightness : thou turnest gloom into repose ; ‡
 30 Thou sweetenest the pain of OSIRIS, thou givest breezes in the valley, illuminest earth in darkness, sweetenest the pain of OSIRIS.
 31 All beings taste the breath, they make to thee acclamations in thy changes, thou who art Lord of changes, they give adoration to thy might in thy forms of beauty in the morn.
 32 Gods hold their arms to thee, those whom thy mother NUT bore.
 33 Come to the King, O RA, stablish his glories in heaven, his might on earth.
 34 O RA, heaven rejoices to thee ; O RA, earth trembles at thee ; O blessed RA-HARMACHIS, thou hast raised heaven to elevate thy soul, the lower sky has hidden thee in thy enwraught forms.

* Or more properly, perhaps, in the imperative, "give thou life."

† Bech, the Eastern hill of sunrise. See Brugsch, *Z.A.*, 1864, p. 73, &c. Its opposite height was called Manu.

‡ Or, perhaps, "thou makest the adversary prostrate."—Lushington.

- 35 Thou hast uplifted heaven to the expanse of thine outstretched arms, thou hast spread out earth to the width of thy stride.
- 36 Heaven rejoices to thee at thy greatness of soul, thy terror fills earth at thy figure, princely hawk of glittering plume, many-coloured frame, mighty sailor god, self-existing, traversing paths in the divine vessel, thou roarest in smiting thy foes, making thy great bark sweep on, men hail thee, gods fear thee, thou hast felled thy foes before it.
- 37 Courier of heaven outstript by none, to illumine earth for his children, uplifted above gods and men, shining upon us we know not thy form when thou lookest upon our faces, thy greatness passes our knowledge.
- 38 O blessed RA-HABMACHIS, thou penetrest . . . * Bull at night, Chieftain by day, beauteous orb of *mafek*, † King of heaven, Sovran of earth, great image in the horizon of heaven.
- 39 RA who hast made beings, TOTANEN giving life to mankind, PHABAOH son of RA † has adored thee in thy glories, he has worshipped at thy gracious rising brightness on the
- 40 Eastern horizon, he makes tranquil thy path, he beats down thy foes before thee in his turning back all thy adversaries, he assigned to thee the *Uta* § on her seat, he makes them . . . || he assigned to thee honours . . . || he cleared the way for thee, he established thy rites in Abydos; he opens to thee roads in Rusta, ¶ he beats down evil.

19. This beautiful hymn presents us rather with the devotional than with the theological aspect of the Myth of Ra: it resembles more those sublime outpourings of adoration of which in sacred literature Psalm civ. is so characteristic a type. The beneficent nature of Ra; his sweetening or assuaging the pains of his worshippers; his giving the breath of summer in the valley; his giving breath and peace to all creatures; his causing the sun to shine for the use of his children; his holding the heavens in his outstretched arms; his power and greatness surpassing knowledge;—all these are almost inspired phrases, and are peculiar to this hymn alone. The similes are almost Hebraic in their elegance, and the idea

* Lacunæ.

† Query Mafka. The Egyptian bronze or native copper, a fitting simile to describe the colour of the setting sun.

‡ One of the Ramesside Pharaohs, name unknown, for whom this hymn was originally transcribed.

§ The mystic eye of the deity.

|| Lacunæ.

¶ One of the abodes of Osiris.

that even when the god is most visible to mankind by his merciful dispensation, yet his form and likeness are wholly unknown, is worthy of an Old Testament prophet or a New Testament saint; between the gods rejoicing in the triumphs of Ra Harmachis, and the sons of God shouting for joy at the creation of the world, according to the exquisite passage in Job, there is much in unison. Especially deserving of notice is the circumstance that this hymn dwells with reiterating fondness on the theme of the love of the deity, and applies, if the translation of Lushington is to be wholly trusted, the epithet of "blessed" to Ra, an epithet that would be ridiculously blasphemous if applied to Zeus, Diespiter, or Wodin. It was due to this exquisitely human sentiment in the worship of Ra that, together with the belief in Horus-Nets, the deliverer and redeemer, it survived nearly all those dynastic changes of Egyptian history which were so fatal to the worship of the local and Triadic divinities. The contest between good and evil, the apparent success of sin, the uncertainty attending the results of a life of virtue, were problems patent to all, and which defied the utmost energies of an uninspired philosophy to explain them away or to reconcile their existence with the government of an overruling and omnipotent spirit of good. As in many cases their premises were mere hypothetical assumptions, it followed that the arguments and expedients to which the priests had recourse to explain these mysteries were in themselves illogical, and they were confuted by the more analytical reasoning of the infidel philosophers of Greece and Rome. But the yearning after a god, and still more a personal god, is ineradicable, and like a belief in the future state and the immortality of the soul, it is almost a psychical principle in the constitution of men. Judged as a whole, even to the eye of unassisted reason, the works of God are great, perfect, and beautiful, and He doeth them that men may fear Him, for "The generations of the world were healthful, and there is no poison of destruction in them, nor the kingdom of death upon the earth, for righteousness is immortal."* The idea of an eternal, self-created, incircumscribable † Being, without body, parts, or passions, ‡ was too abstract a conception for mankind to grapple with; but a god who was our father, and

* Wisdom i. 14-15.

† It need hardly be remarked that this is the real meaning of the term incomprehensible in the ninth verse of the Athanasian Creed.

‡ 1st Article, C. of E.

therefore like unto ourselves, who was beneficent as He was great, and wise as He was both, came home to every heart and satisfied the desires of every living soul at a time when no clearer revelation had been revealed to man, since, let it not be forgotten, these hymns and proscynemata to Ra cannot be later than the XIXth dynasty, and that period in turn cannot well be brought lower than the fifteenth century before Christ,* an era when, if it be admitted that some of the Old Testament Scriptures had been revealed to the patriarchs, yet it is nevertheless certain that very little if any part of them had been committed to writing; or if even that be conceded, then that such writings had reached the wonderful land of Upper Egypt, where these rituals and addresses had been composed, would have been impossible. Hence to us as Christians the "immense" importance of a right understanding of the Myth of Ra, and the necessity for examining, even at a tedious length, whatever authentic materials may yet exist for its better reconstruction and analysis.

20. The last hymn which it is our intention to cite is one of the very latest of hieroglyphic texts, being a long inscription in honour of Ra Amen or Amen Ra, in the famous temple of Amen, which exists in the oasis of El Kargeh, and which was a chief centre of pilgrimage during the period of the Greek and Persian domination of Egypt.† According to Dr. Birch, who has only recently translated it,‡ this hymn "is the most Pantheistic of those yet found, and the nearest approach to the idea of the monotheism of one deity manifested by different types in the chief cities of Egypt, the ultimate or leading first manifestations being that of the god Amen. It is, therefore, no wonder that the Persians accepted his worship and honoured his fane; the more so as the attempt to reach the oasis by their armies under Cambyses had signally failed." This was the temple also which was visited by Alexander the Great, when, fascinated by the splendour of the Egyptian myths, and willing to establish his authority over the people by a recognition according to their theology, he caused himself to be declared the son of Ammon, as the Greeks pronounced the name of Amen Ra;§ although to his own personal friends and

* According to Lenormant, 1462 B.C.

† See Edmondson, *Journey to the Oasis of El Kargeh*, for an account of the present condition of the ruins of this and the adjoining temples.

‡ *Trans. Soc. Bib. Arc.*, vol. v. p. 291.

§ Very probably the Ra, being a determinative suffix, was not sounded.

Macedonian followers, who were too well acquainted with his weaknesses to be deceived, he made a joke of the honours paid to his divinity. Allusions occur in the hymn to the sacred fountain, which was supposed to restore the bathers in it to health, if not to youth,—a fallacy fondly repeated in the Middle Ages, and the belief in which led to the discovery of the Bahama Isles by Juan Ponce de Leon.* This fountain was probably a mineral spring in the oasis; but it seems to have dried up, and the temple of Amen also itself to have fallen into comparative neglect before the time of Darius and Alexander, who invokes the protection of the god against his enemies. The inscription occurs on the south-western wall of the second chamber of the temple, and is preceded by a representation of the spirits of the four elements arranged as male and female couples, † snake-headed and frog-headed alternately, holding up their hands in adoration to Amen Ra. After this the hymn commences as follows:—

- 1 Said by the adorers in praying to their father Amen Ra, Lord of Hab, ‡
 -great god, powerful with the scimitar, §
 5 in his type of Ra || to self-produced, ¶ his bones of silver,
 his skin of gold, his head of real lapis, his joints of turquoise, a
 perfect god, making his body, giving birth to
 6 it. He has not come out of a womb, he has come out ** of cycles; he has
 given light to the world, †† [and] the circle of the gods is adoring before
 him; they proclaim him to the height of heaven, [they] adore the
 one giving birth to his birth. He has passed

* See *The Companions of Columbus*, by Washington Irving.

† They are as follow:—

Nu	...	water, <i>male</i> .
Nu t	...	water, <i>female</i> .
Hehu	...	fire, <i>male</i> .
Hehu t	...	fire, <i>female</i> .
Kakiu	...	earth, <i>male</i> .
Kakiu t	...	earth, <i>female</i> .
Karh	...	air, <i>male</i> .
Karh t	...	air, <i>female</i> .

‡ The Oasis.

§ The Khopesh, or curved sword, which was given by Amen Ra to
 Ramesses II. as a symbol of his victory over the Hittites.

|| The Sun.

¶ Grebaut, *Hymne à Ammon*, p. xiii., "self-transformed."

** Or, "Thou art from everlasting."

†† This is not contradictory to the phrase in the preceding hymns,
 as it simply means no physical generation produced the god.

- 7 the secret places, they rejoice at him under their divine types, they are careful to make their adorations to the bull. We pray to him in [our abodes], we worship his words in their [places]. We adore him
- 8 in the form of hands. They acknowledge his majesty as their lord, for the greatness of his type is the greatest of all of them. He has had a title of [heaven] earth and waters, Amen the firm * in all things, that noble
- 9 god, the earth came from his devices, regulating each for the gods, old age and youth, procession, age, mystical were the causes, † acute the ‡ extended his favours, his limbs in the air of heaven upon his youthful head, the water under his
- 10 head, a child the water under his feet, § the plumes of a hawk on his head, he confines the winds under the boat of Manu || when he goes to the unknown region of the morning. The apes of Thoth ¶ adore, saying, Oh,
- 11 the god in the disk concealing himself in his body, the soul gleaming from his two symbolic mortal eyes, the type of types, the honoured, not falling to his enemies, giving light to his transformation, he supports them by the light of his two mystical eyes, unknown is
- 12 his Hail to thee in the bosom of the heaven, ordering thy divine births, the god Thmei ** is united to thy mystical throne. Honoured has been thy image by thy lovers, thou hast shone, distributing the light
- 13 in the morning, thou hast circled the two lands in thy gleaming. Thou hast touched at the hill of the land of Akar, †† the types in it adore, the light of the body producing thy beams, has been illumined †† the bosom of the jackals hauling thy boat in the hidden gap
- 14 of the land {of Sesen, §§ and the Spirits of the West, adoring thee, they tremble at thee at the light of thy disk. The spirits of the land of Pu |||| salute thee at the appearance of thy light. Thou shinest in their faces, thou traversest
- 15 thy two heavens; annihilated are thy opponents. They open the house of thy majesty; tame are the crocodiles, quiet are the herons in the waters of thy boat; thou hast the fish. Horus has pierced Set, his arrow is in him. He has conquered heaven and earth
- 16 In his destruction, and his pursuit. Prevailing by overthrowing his opponent, he a sword Akar

* This is the same title as the Jupiter Stator of the Romans.

† Heads. ‡ Lacunæ. § Uncertain phrase. || Ocean. ¶ Sesenu.

** The deity of Truth. †† A region of Hades. †† Or received.

§§ Hermopolis. |||| Buto, or the North.

- saves him, he makes his companion hidden, he him ;
his eye
- 17 gives them light from him, it feeds off flame of fire. Thou hast passed
the turns of the river, thou navigatest with a fair wind the city of Mer.
. at rest the which
- 18 they * the † those never at rest and incorruptible
constellations, thou perambulatest the earth justified. Thou joimest
to a new skin, thy mother has been embraced.
- 19 thy reception adored by all beings. Thou art at rest in the abode
Tuant ‡ during the hours of darkness, thou awakest Osiris by thy
beams, thou shinest over the heads of those who are in their cells,
thou hast traversed
- 20 their hidden buildings on purpose. Thou hast been typified by
thought, thou hast made to be illumined thy own disk, thou hast set
up the in their places. Thou hast gone against the
chambers
- 21 in the darkness, thy left eye is in the disk at night, thou shinest in the
morning out of the east of the heaven, thou hast been woven in thy
disk in Ansapt. § Thy right eye is in the essence, thou hast made
the passage, thy secret
- 22 is the depths of thy secret waters and unknown. Thou hast come on
the road, thou hast given light in the path, thou hast prevailed over
difficulties like the mysterious forms, thy type than every god
- 23 Exalted and magnified by the divine circles. Each god has assumed
thy skin, without shape is their type compared to thy form. Thou
art the majesty || which is, thou hast ruled, lord ; heaven and
earth, under thy plumes, the gods
- 24 under thy hands, men under thy legs ; where is a god like thee ?
Thou art the Sun over the gods, crowned sweet and delightful,
O soul, strong in by terrors
- 25 of the disk, thy Uræi are tall, thy horns are pointed, ¶ twisted are the
horns, ** lamps are the light of the two symbolic eyes, gold and crystal
are the decorations, turquoise the face,
- 26 gilded are the limbs. †† Thou hast placed thy throne wherever thou

* Lacuna.

† Lacuna.

‡ The morning.

§ An abode of Tum in the under-world.

|| Lacuna.

¶ These are the symbolical horns of the heavenly cow, Isis.

** These are the horizontal twisted horns of Khneph, the ram-headed
spirit deity.†† A common simile as applied to angelic beings in the Old Testament.
Cf. Dan. ii. 32 ; Cant. v. 15, &c.

delightest to multiply thy name, places and districts carrying thy beauty. Corn has never failed to be tall under thy form.* Thy place is arranged, in the time of a division

- 27 of an hour thou traversest the earth from the Manu. Thou risest from the waters as the hidden egg, the female Amen is in thy company.†

21. In a similar strain the hymn proceeds through several more series too tautologous to repeat, as we have met with their import in the texts previously cited. Verses 40 to the middle of verse 46, where the direct invocation in honour of Darius is introduced, are noteworthy, as they again prove the identity of Ra with the other deities, one of them especially being his pseudo-father Pthah.

- 39 Thou hast placed thy throne in the life of the two countries as Amen Ra. Thy soul is the ark and four pillars of the two heavens.
 40 Thy form emanated at first while thou shinest as Amen Ra and Pthah. Thy heart is at rest in thy city of Uas.‡ Thy two uræi, thy eyes, thy sceptre, thy whip § opens the doors of the heaven in
 41 Thebes; Shu, Tefnu, Mut, and Khons are thy form, dwelling in thy shrine under the types of the god Khem, raising his tall plumes, king of the gods, lifting the hand, lord of the crown,
 42 powerful by it, all fear emanates from the fear of him the Kamutef who resides in his fields, horned in all his beauty, engendering the depths. Black and crystal the ¶faces of those attached to him, the two mystical eyes, the decorations of
 43 Hor-ti || dwelling in the nome Pe¶ over his strong house. Tum the great lord of created beings. He is the hawk** created at first, Mentu Ra in Uas.†† The powerful bull, he is the arm striking.
 44 the cowards of Nahi, Pthah in Uas,†† the luminous body ever golden for an age and ever. Thou art Sekar, thy transformations are in to the Nile, the person-greater than the other gods. Thou art youthful water and old water.‡‡
 45 They repose in the merits of thee. Thou givest life to the earth by thy stream. Thou art heaven, thou art earth, thou art fire, thou art

* For form read "presence," the idea being the same.

† The same as the Ament, with the feminine article. See first note § III.

‡ The district of Thebes.

§ The flabellum of Amen Khem, the god of generation.

¶ The Coptites' nome. ¶ Buto. ** *χεπρρ*, same as the "scarabæus."

†† Thebaid.

‡‡ Or the Hannu or Ether.

water, thou art air in the midst of them. Thou hast hailed at things to be done of him who is indefatigable, the orderer of the visible and invisible.*

46 Thou givest life to them as thou increasest them, thy soul prepares them under thy type of Amen Ra, lord of all existences.

22. The text concludes by declaring, in the usual metaphorical language of the Egyptian religious texts, that the god Amen Ra has given to his son Darius victory over all his enemies, and implanted the fear of him in the breasts of the people of all the countries near and far.†

23. Independently of the Solar Litanies there is another religious document, the text of which occurs in the so-called chamber of the Cow in the tomb of Seti—which presents another feature of the character of the god Ra in a new light.‡ This document, now unfortunately very imperfect, and the style of which is mystical in the highest degree, has yet a peculiar significance to Biblical students, for it describes the destruction of mankind by the supreme deity Ra, aided by his children and coadjutors, Shu and Tefnut. The text, for the publication and translation of which we are indebted to the labours of M. Edouard Naville,§ represents a transaction so wholly at variance to the general nature of the god, that it is difficult to understand at what period of mythical history the event took place, or what precise purpose was served by its occurrence; and it has in consequence been even conjectured to have served the purpose of a mythological or allegorical account of some real battle undertaken by Seti—which may have been accompanied with circumstances of cruelty requiring extenuation. There are, as will be seen, several very strange incidents in the narrative,—the disobedience of mankind; the wrath of Ra; the resolution to destroy the sinners; the agency selected for their punishment, the goddess Hathor being commissioned to destroy all mankind; the council of Nun and the other gods who advise the massacre; the extent of the destruction; the torrents of blood, reaching

* Existent and non-existent.

† It is not known what king of the name of Darius set up this inscription, as the second or personal cartouche of the royal name is wanting; but it was most probably Darius Hystaspes, who held the sovereignty of Egypt with greater vigour than any of his successors of the same name, and who is known to have paid special honour to the shrines of the Egyptian gods.

‡ See *Trans. Soc. Bib. Arc.*, vol. iv. p. 1.

§ In *Records of the Past*, vol. vi. p. 103.

as far as to Heracleopolis; the gathering-up of the fruits of the earth, together with the blood of the slain to a sufficient quantity to fill seven thousand pitchers; the horrible liquid thus obtained being offered by the king of Upper and Lower Egypt* to the god Ra, who drinks it, and is refreshed and sated thereby; the oath of the deity that from henceforth he would slay no more men; the pouring out of the remainder of the liquid upon the plains of Egypt, which are fertilized thereby; the rise of an inundation of water, restoring plenty to Egypt; the satisfaction of the goddess Sechet, who drinks thereof; the apparent re-creation of mankind again; and the institution of a festival to the goddess Hathor—all these circumstances are totally foreign to the spirit of Egyptian mythology, and seem to partake more of the nature of an Asiatic legend interwoven into the texture of the Hamitic solar myth than a legitimate outcome from its principles. The remainder of the text, which relates to the worship and duties of the god Thoth, considered as a lunar deity, is not less curious,† and seems to point to an identification of the god Ra with Thoth, as the god Aah,‡ who was also called the good Saviour,§ on a statue in the museum at Boulaq. What renders the text of the destruction of mankind by Ra still more difficult to comprehend is the circumstance that a monarch of the XIXth dynasty, Seti, figures in it repeatedly; and hence the conjecture it may possibly even be an inflated and allegorical account of a local massacre undertaken by the priests of Ra or Sechet, at his orders, under the guise of a religious war. Without these prefatory remarks, the sequence of the text itself, which must now in part be cited, would not be understood.

24. 6 When those gods came.|| those gods in his place, they bowed down
7. before His Majesty himself,¶ who spake in the presence of his father, of the elder gods, of the creators of men, and of wise beings,** and they spake in his presence \

* Apparently Seti I.

† *Records of the Past*, vol. vi. pp. 110-11.

‡ Aah was the lunar deity properly so called. He was represented as a man kneeling on one knee and holding the lunar disk above his head. The ancient Egyptian royal names, Aah mes (born of Aah) and Aah hotep (peace of Aah) were derived from his.

§ See Mariette, *Catalogue du Musée de Boulaq*.

¶ Lacunæ. ¶ Seti I.

** This almost implies the Persian doctrine of the creation of the

- [8 (saying) Speak to us that we may hear it. Said by RA to NUN :
Thou firstborn of the gods whose issue I am, and you ancient gods,
behold the men
- 9 who are born of myself ; they utter words against me ;* speak to me
what you will do in this occurrence ; behold, I have waited, and I
have not destroyed them, until I shall have heard
- 10 what you have to say. Said by the Majesty of NUN : My son RA,
thou!god greater than he who is his father, and who created him ; I
remain (full of)
- 11 great fear before thee ; let thyself consider in thy heart (what we have
to do). Said by the Majesty of RA : Behold, they are running away
over the whole land, and their hearts are afraid.
- 12 Said by the gods in the presence of His Majesty : May thy face allow
us to go, and we shall smite those who plot evil things, thy enemies,
and let none (remain among them).
- 13 go as HATHOR. The goddess started, and she smote the men over
the whole land. Said by the Majesty of the god : Come in peace,
HATHOR, thou hast done (what I had prescribed).
- 14 Said by the goddess : I am living, that I have prevailed over men, and
my heart is pleased. Said by the Majesty : I shall prevail over
them (and I shall complete)
- 15 their ruin. And during several nights there was SECHET trampling
the blood under her feet as far as Heracleopolis. Said by (the
Majesty of RA)
- 16 I call before me my Messengers ; let them hasten, and run, and hurry
to the utmost of their strength, and the Messengers (came)
- 17 immediately. Said by the Majesty of the god : Let them begin with
Elephantine, and bring to me fruits in quantity. And when the fruits
had been brought, they were given
- 18 the Sekti of Heliopolis was grinding the fruits while the priestesses
poured the juice into vases ; and those fruits were put in vessels
(with the)
- 19 blood of men ; and there were made seven thousand pitchers of drink.
And there came the Majesty of the King of Upper and Lower Egypt,
with the gods to see the drink after he had ordered
- 20 to the goddess to destroy the men, in three days of navigation. Said
by the Majesty of RA : It is well done, all this. I shall now protect
- 21 men on account of this. Said by RA : I raise now my hand that I

Amshaspands, beings superior to men and angels, but lower and distinct
from the gods.

* Cf. the Greek myth of the Gigantomachia.

- shall not destroy men. The Majesty of the King of Upper and Lower Egypt, RA, ordered
- 22 in the midst of the night to pour out the water of the vessels, and the fields were entirely covered with water through the will of the Majesty of the god; and there came
- 23 the goddess at the morning, and she found the fields covered with water and she was pleased with it and she drank to her satisfaction, and she went away satisfied, and she saw no
- 24 men. Said by the Majesty of RA to this goddess: Come in peace, thou gracious goddess, and there arose the young priestess of AMU.*
Said by the Majesty of RA to the goddess:
- 25 I order that libations be made to her at every festival of the new year under the direction of my priestesses. Hence it comes that libations are made under the direction of priestesses at the festival of HATHOR.
- 26 through all men since the days of old †

25. These lines are all which immediately relate to the destruction of mankind. After them, verses 27 to 62 are occupied chiefly with † conversations between Ra, Nu, Seb, and Osiris, to whom was committed by Ra the care of the various regions of heaven and earth. The god afterwards seems to have taken a kind of divine progress from the heavens to the earth to behold their performance of their respective duties, and the condition of the re-created sons of men. This done, Ra then again returns to heaven, and now once more sends for the god Thoth, with whom he proposes again to visit the earth. These events carry on the mystical book to verse 74, when the usual deprecatory rubric, imposing secrecy on the worshipper, commences, and which, as similar specimens have been already cited, it is not necessary again to repeat.

- 62 said by the Majesty of the god: I call before me THOTH, and THOTH came immediately. Said
- 63 by the Majesty of the god to THOTH: Come let us leave the sky
- 64 and my abode, because I wish
- 65 to make a luminary
- 66 in the inferior sky and in the deep region

* An unidentified town. The word generally implied foreigners or Asiatics, "the detested, the impure, the vile Amu."

† This last clause is again evidently a rubric.

‡ Lacunæ.

- 67 where thou inscribest the inhabitants, and thou art the guardian of
 68 those who do
 69 evil
 70 the followers whom my heart hates.
 71 But thou art my abode, the god of my abode; behold, thou wilt be
 called ТНОТН, the abode of Ра. I shall give thee to send
 and there arose the ibis of ТНОТН. I shall
 72 give thee to raise thy hand in the 'presence of the gods, greater than
 the and there arose the two wings of the ibis of ТНОТН;
 I shall give thee to embrace
 73 the two parts of the sky, with thy beauty and with thy rays, and there
 arose the moon-crescent of ТНОТН. I shall give thee to turn thyself
 towards the Northern nations; and there arose the cynocephalus of
 ТНОТН which is
 74 in his escort. Thou art under my dominion. All eyes are open on
 thee; and all men worship thee as a god.

26. There are besides this text several still more mystical in their nature, belonging to the more strictly literal magical texts. One of these has also been recently published by Dr. Birch,* but, despite the care of the distinguished translator, but little information respecting the myth of Ра can be gained from it, except that when the sun weeps the first time "it causes strength to be doubled, and flame renewed, it is the liquid spirit the sun gives to his son." †

"When the sun weeps a second time and lets water fall from his eyes, it is changed into working bees. They work in the flowers of each kind, and honey and wax are produced instead of the water.

When the sun becomes weak he lets fall the perspiration of his members, and this changes to a liquid."

Here there is an unfortunate hiatus in the MSS., but from other passages in the same papyrus we learn that plants and fruit are produced from the sweat of the sun.

"When the sun is weak he perspires, water falls from his mouth to the earth, and changes to the plants of the papyrus." ‡

* Birch, in *Revue Archéologique—la Papyrus Magique du Musée Britannique*, and in *Records of the Past*, vol. vi. p. 113.

† Horus-Ra.

‡ Hence, possibly, its sanctity. The plant, never apparently indige-

This generation of insects and plants from the exudations of the sun-god Ra is also a peculiar feature in Egyptian mythology, and somewhat reminds one of the sacred lake which Vishnu filled with the sweat of his body after playing with the Holy discus,* and which was afterwards filled with the beautiful lotus, sacred alike in the mythologies of India and Egypt, and thus forming another of the many points of contact between the religions of the two ancient nations.

27. These texts, then, are the basis of all the facts upon which the Ra, or solar myth of Egypt, rests, and upon which must be founded all the comparisons which would analogize that religious dogma with the Agni-worship of the Aryans, the fire-worship of the Parsees, the Surya adoration of the Brahmans, and the Helios cultus of the early Greeks.† The myth of Ra, as it existed in Egypt, was evidently an adoration of the sun alone; and it did not partake of that elemental form of worship which reaches its climax in the Rig Veda. The Gandharvas, or horses of the sun;‡ the Maruts, or storm-clouds; the demon of the eclipse; the connection of the sun and the sacred intoxicant soma;§ the wheel of fire, still honoured in rustic France,||—are all foreign to the Egyptian sun-worship, which, if it originally proceeded from India, then certainly divested itself of all its naturalistic tendencies before it reached the valley of the Nile. There was to the Egyptian mind something repugnant in the familiarity with which the adjacent nations regarded their deities, with their almost affectionate companionship, and nearly irreverent invitations to the gods to share their pleasures and partake of their festivities. Addresses

nous to Northern Egypt, is now wholly extinct in Egypt proper, either Upper or Lower, and is only found in the lakes of equatorial Africa, Huleh in Palestine, and a lake in Sicily, where it was probably introduced by some of the Phenico-Egyptian colonists.

* The Chakra of the Buddhists also.

† This cultus is especially well treated in Cox's *Mythology of the Aryan Nations*, vol. ii.

‡ See Kelly, *Curiosities of Indo-European Tradition and Folk Lore*, pp. 35-6.

§ The Haoma of the Zendavesta, formed of the juice of either the *Asclepias acida* or the *Sarcostemma viminale*. See Dr. Muir's *Contributions to a Knowledge of the Vedic Theogony and Mythology*, in *Journal R. A. S.*, 2nd series, vol. i. p. 136.

|| Kelly, *Curiosities*, pp. 54, 64.

such as in the Vedas are repeatedly made to Indra* would have horrified them; and though in the Assistances of Horus the deceased presents to the god Osiris beer, wine, and oil, which he has prepared for him, and entertains him to accept thereof,† still it is evident that these offerings were presented in a mystical sense, and were almost wholly deprived of any sensual or material tendency.

28. There yet remains to be noticed a phase of the Myth of Ra upon which lately very much has been written, but about which still considerable uncertainty prevails, and of which the explanations offered are rather plausible conjectures than demonstrated conclusions. This phase is that of sun and serpent worship, a theme which Dr. Phené has almost made his own.‡ It has been already shown that a very high place in the Ra Myth was assigned to the Uræus of Immortality and the great feminine serpent Mehen; § and in almost every pictorial representation of the sun-god he is accompanied by one or other of these snakes, of which the Uræus was a most deadly species. Much confusion has arisen from the mention by careless theorists of the "solar asps," the asp being not a uræus, but a cerastes, or kind of viper. The truth is that the sun had no connection with the asp, but only with the basilisk, and that chiefly because the serpent was regarded as his *feminine sacta*, or counterpart. Antagonism between the sun and uræus there certainly was not, but antagonism between the sun and the serpent Apophis was a cardinal doctrine of the Solar and Horus and Osirian myths; and in the end the Solar deity was ever victorious. It would be an important contribution towards a settlement of the various questions arising from the Serpent myths if some painstaking student would first determine what species of serpents were known to the Egyptians, or were represented on their monuments; and, that being done, would go further and prove, theories and conjectures apart, in what relationship they stood to the great beneficent solar deity. It is by no means impossible that some of the Hellenic ideas of Helios worship were in the period of the Psammetichi transferred to the current Egyptian theology, and influenced

* See R. Hunter's *History of India*, p. 31.

† See Naville, *Le Discours d'Horus*, in *Zeitschrift f. Egypt*, 1875.

‡ See Phené, "Sun and Serpent Worship," in *Trans. Vict. Inst.*, vol. viii. p. 321.

§ See Mehen, in Pierret, *Dictionnaire d'Archéologie Égyptienne*.

the myth of Ra in the same manner as, beyond all doubt, the Horus myth was afterwards influenced. Possibly, also, in a later time, a still more Pantheistic element was introduced into the subsequent Litanies of Ra, and he then became, by an apparently contradictory process of reasoning, both a personal local god and also an embodiment of the entire visible cosmos. It is not at all improbable also that the change of religion under Amenotep IV.,* which preceded the original composition of the Litany of Ra, had as much to do with the variations of doctrine existing between it and the *Ritual of the Dead* as the conquests of Alexander the Great had with that polytheistic development of it which is attested by the inscription of Darius at El Kargeh. So much of the Myth of Ra as has come down to us proves it to have been founded on the basis of a pure monotheism with a tendency towards Sabæan illustrations, and, like all the doctrines of the Egyptian mythology, it was purest and grandest in its earliest stages of dogma. For dignity of belief and for simplicity of construction the myth is one of the noblest and oldest of extinct theologies, the least capable of corruption, and the nearest approach to the truth which was ever reached by the unassisted light of natural reason; it fell, as all other myths have fallen which were not the original product of inspiration, but it never fell so low as did the Isis myths, and it never descended into obscenity and extravagance, as did the Zoolatria of Lower Egypt and the continent of India. To some extent it influenced the surrounding religions, and, like all the various doctrines of the land of Egypt, it infused itself into Christianity by the agency of the Gnostic heresies, when for the elucidation of truth and the reasonable sustentation of faith the origin of all those heresies was more studied by Christian students. To the classical reader the myth has a special interest, for it is interwoven with the abstractions of Plato and the philosophy of the Eleatics and Alexandrians. The similes of the poet and the allusions of the historian find their explanation in it, and the jargon of the Rosicrucians and the Illuminati, the ostentatious mystery of the alchymists and astrologers, were derived from the language of its Litanies. In conclusion, the Christian student will find in the examination of the myth much to repay his labour; he will be the better able to judge of the

* See a paper by Sir Charles Nicholson on the "Disk-Worshippers of Memphis," in *Trans. Soc. of Literature*, vol. for 1868.

value of the results propounded by that newest and most dangerous and empirical of all sciences, the science of comparative theology. He will be able to separate ideas from expressions, symbols from expositions, to differentiate between things apparently similar, and to adduce congruities from practices and formulæ seemingly discordant. He will be able to measure the height of human metaphysical theology, if not to gauge the depth of human depravity and religious sin. He will bestow a pitying admiration on the wisdom of the wisest men of old, and feel the quickenings of an awakened sense of gratitude towards the Giver of all good things for the revelation of His word and doctrine. Finally, he will, if he possess the graces of humility and industry, without which a man can never become a true student with profit to himself,—finally, he will learn to value more highly the books of the Jewish and Christian dispensations, since he will perceive that they were not cunningly-devised fables nor simply scientific reveries. Grateful for the aids now given to mankind, and wiser by the narration of the failures of other and greater men, he will go on his way rejoicing that that Supreme Being whom the heaven of heavens cannot contain, nor the powers of Nature express, can dwell in his heart by faith, and has led His people through the wilderness of Jordan from the bondage of Egyptian philosophy into the glorious liberty of the children of God,—Whom be all the Glory.

The CHAIRMAN.—We have to offer our best thanks to Mr. Cooper for his valuable and interesting paper ; and to Mr. Gorman for having so ably read it.

MR. RENDALL.—I only rise to ask one question. In the fourth paragraph of the paper I find this passage :—“This simile is of great value, because it proves that the cardinal doctrine of a resurrection of the soul and body was the chief cause of the Egyptian adoration of the sun as the visible creator and resuscitator of the inanimate world.” I wish to know how it is made out, either by the writer of the passage quoted or by any one else, that the doctrine of a resurrection of the body was held at that time? I have never supposed that the doctrine of the resurrection of the *body* was held either by the Egyptians or by any other nation at that time, nor do I find how it appears in the passage referred to. It has often been treated as one of the most distinctive doctrines of Christianity, and this, if I recollect rightly, was Bishop Butler’s view in his *Analogy*. According to Herodotus, “the

Egyptians were the first who asserted the doctrine that the *soul of man* is immortal."

Mr. GORMAN.—I think there can be no doubt that the Egyptians held the doctrine of the resurrection of the body; and so clear is this, that the whole book called *The Ritual of the Dead* but which should be called "A Manifestation to the Light," is a ritual which propounds that doctrine throughout; and one important point of such papers as this is that they show that the belief in the immortality of the soul, and the doctrine of the resurrection of the body, were held ages before Moses. It becomes a very important and curious question why Moses did not bring out that doctrine prominently. The doctrine of the resurrection is taught in the Old Testament, and is not peculiar to Christianity. In the proof which our Lord gave of the resurrection, He took His argument from the Pentateuch, which was believed by the Sadducees, who did not believe in the resurrection. I hold in my hand a little book which any one interested in the subject should get without delay. It is by M. Lenormant, and is entitled, *A Manual of the History of the East*, and gives a succinct summary of all that has been done with reference to archæology in Assyria and Egypt, and it is astonishing to find the many points in Old Testament history upon which it throws light. There are many who would find a great deal of light thrown on civilization, in the time of such subjects as the journey of Joseph, and the history of his father and his brethren; and the volumes enable one to realize the state of Egypt at that time. It is also an admirable analysis of the *Egyptian Ritual of the Dead, or Manifestation to the Light*. The drift of all these investigations is to show that the further we go back into the mists of antiquity in connection with this wonderful people, the nearer we shall come to the one primeval religion.

Rev. Dr. FISHER.—If the doctrine of the resurrection of the dead was a doctrine in the East at that time, and held by the Egyptians and the Shemite races, that is one reason why Moses did not bring it out more prominently. Our blessed Lord, speaking to the Sadducees,* says, "I am the God of Abraham; not the God of the dead, but the God of the living." I never supposed for a moment that the Old Testament writers did not believe in the resurrection of the body; indeed, I have been fully convinced that it was held at that time and previously. There are some things that Moses takes for granted, and does not attempt to prove; for instance, he says, "In the beginning God created the heaven and the earth." All believed that there was a God, and therefore he did not attempt to prove it; and he acted in the same way with regard to the resurrection of the body.

Mr. DRACH.—May I call attention to one or two points in the paper? In

* See also Josephus as to the doctrine of the immortality of the soul, held by the Pharisees and Essenes (*Antiq.*, xviii. 1, 2, *et seq.*).—[ED.]

his first paragraph the author says : " It would not be easy to find a more detailed code of moral observances than the Institutes of Manu (unless, indeed, the Talmudic regulations of the Sephardian Jews may be supposed to afford a parallel)." Now the Sephardian Jews have the same Talmud—I suppose he meant the Babylonian one—but I think it is rather hard, when Mr. Cooper compares them to the followers of Siva.* In his 17th paragraph, Mr. Cooper gives it as one of the attributes of Ra that " he dwells in thick darkness." The word " darkness " in the original is deprivation of light, and it struck me as very similar in sound to עִפְפֵּל ('Araphel).

The CHAIRMAN.—The same word, 'Araphel, is rendered " gross darkness " in our version of Isaiah.

Mr. DRACH.—Then Mr. Cooper says in one of his notes : " Again a Christian parallel—' I am the door of the sheep.' " Perhaps that is alluding to the Hebrew shepherd, who used to pass the sheep through a small door or wicket, and count them, in order to give tithe. The word for the setting of the sun in Hebrew is בֹּא, which means also " to come."

The CHAIRMAN.—Is not the same word used in Joshua, where it says : " The sun hastened not to go down " ?

Mr. DRACH.—I am not sure. The word used there first is רָיוּם (be silent); and it is followed by עָמַר (the moon stayed).

Rev. Prebendary Row.—There is one passage to which I should like to call Dr. Thornton's attention, where the author of the paper speaks of the incorporation of foreign gods into the Egyptian Pantheon, and among others, to my surprise, he mentions the introduction of Serapis by the Romans. I never heard of Serapis being mentioned as a Roman god.† In Gibbon's history there is a description of the destruction of the temple of Serapis through an outbreak in the city of Alexandria; and there was a tradition that when the image of Serapis was destroyed the world would sink into nothing. The Christians, headed by the bishop, had much difficulty in getting any one to attack it. As to the resurrection of the dead, the real question at issue is the nature of the resurrection, and whether it is a pantheistic resurrection or not. The preservation of mummies shows that the Egyptians did expect a revivification of some kind, but I think it was of a pantheistic character. After all, the knowledge of Egyptology is a very select affair—it is confined to very few, and we have to take a great deal upon trust—a thing which I am not much in the habit of doing. When we have brought before us a pyramid

* I never intended to compare the Jews with the Sivaites, but only to show that the same principle of excessive Ritualism was common both to the Aryan and Semitic religions.—W. R. COOPER.

† " The worship of Serapis was introduced at Rome by the Emperor Antoninus Pius, A.D. 146, and the mysteries celebrated on the 6th of May." —Lempriere.

of theory erected upon the smallest apex of fact, it tries our patience exceedingly. In reading many works of this description I find my patience very severely tried, and that is a thing which very frequently happens in regard to these ancient records. The real questions for our consideration are, what was the purity of this Egyptian religion? Was its God a personal Being? and what was its date? When we get these questions answered, we shall have arrived at matters of fact which may enable us to form some safe conclusion.*

The CHAIRMAN.—There is every reason why we should not discuss this paper controversially or in a hostile spirit. Still there are many points in it upon which I should have liked to ask questions. As to the resurrection of the body, I confess I had always imagined that that was a purely Christian doctrine; but, on consideration, I incline to Mr. Row's view, that there are two ideas of the resurrection of the body. I want to know what was the idea held by the Egyptians? We find on mummy-cases, those in the British Museum, for instance, representations of the body, and always in the likeness of the body, but with a certain resemblance to some particular god. You have a little figure of the deceased with a sort of divine aspect.† I rather fancy that the Egyptians, having got a primitive notion of life after death, distorted it into a pantheistic sense. I am rather afraid that they believed in the resurrection of the soul and body, as a sort of mixture of the two, and as being absorbed into the existence of some god; so that they had no definite idea of the personal resurrection of each person, but imagined that the existence, after death, of each person, was brought about by his absorption into the essence of a certain god, and that personality was lost. It is remarkable that in all religions which assimilate themselves to the true revelation, we find an absence of definiteness with regard to the personality of existence after death, whether we take Buddhism or Hinduism, or any other religion.‡ In Christianity the doctrine is a cardinal one, but I fancy that, in earlier times, for certain reasons, in the providence of God, the doctrine was not insisted on: I question much, for my own part, whether the Jews had a clear idea of the personal resurrection of the body. Mr. Drach has given us some very interesting remarks on certain points in the paper, and one related to a point which bore apparently against the Sephardian Jews; but I do not suppose the author meant that they had been degraded into sensualism. This is hardly the time to discuss derivations, but I am afraid I cannot quite agree with the learned Hebraist in reference to the Hebrew word for darkness. Etymology is very tempting, but it will lead you into a morass if you don't take care. With reference to Mr. Row's point about the god Serapis, I confess I agree with him in being surprised at the passage in the paper, which grated on my ears. The word "Romans" must be a misprint; it is clearly a mistake. In con-

* See reply I.

† See reply II.

‡ See reply III.

clusion I have only to point to Mr. Cooper's closing words, in which he holds that Christianity is the revelation, and that all others were merely a degradation of that revelation which Christianity possesses in its purity. This is a point which we should hold most distinctly. There was a time when people imagined that Christianity was the only truth, and that all other religions were the invention of the Devil ; but that is not correct. All religions contain a certain amount of truth, except, perhaps, Mahommedanism, which is an invention of later times, and I conceive that this truth which they contain has been derived from the primeval revelation of God to man. The revelation was kept in its purity by the Jews, and handed on by them to the Christians. The Bible, therefore, contains the truth, and all other religions approximate to that truth more or less. The view that Christianity contains some truth, but not more than Buddhism or any other religion, is a Republicanism in religion, and a view which this Institute does most decidedly repudiate and protest against.

The Meeting was then adjourned.

MR. COOPER'S REPLY.

I. *Personality of the Deity.*—How far the Supreme Being of the Egyptian mythology possessed a personal character is a point upon which the hieroglyphic texts throw very little light. As we know from the *Ritual*, the highest and oldest form of the Deity was His manifestation under the name of Ra, of which being the sun was both an hypostasis and a type—a union of pure fire and pure spirit, something analogous to the Ahuramazda of the Zendavesta : this was especially the case in the period of the ancient empire. In the revived empire, or middle period of Egyptian history, that is from the XVIIth to the XXIIInd dynasties, the idea of a Supreme Being culminated in the nature of the god Amen Ra, a celestial rather than a purely solar god ; and hence he was always represented with a blue or heavenly body. The significance of his name was “the hidden,” or “the unseeable,” perhaps in the same way as the Psalmist writes—“If I go up to heaven, Thou art there ; if I go down to hell, Thou art there also.” He was an all-per-vading but yet an invisible essence. This refinement of cultus led the way to an entirely pantheistic conception of the Deity in the third period of Egyptian history, viz. from the XXIIInd to the XXXth dynasties, and it culminated in the identification of all the deities with Amen Ra, who was also at the same time one with Nature itself. There can be little doubt that these religious subtleties caused a development of anthropomorphic feeling in the common people, who ascribed to Ra a human personality, which was not supported, though at the same time it was not contra-

dicted, by the language of their sacred texts. Certainly the oneness of nature and feeling of God with man, which is the peculiar characteristic of the Gospel of Christ, was foreign to Egyptian thought as applied to the nature of the highest Deity itself ; but when that same Deity was identified with His "only-begotten son," Horus Ra, as the protector of mankind, and more especially of the servants of Horus, *i.e.* of the Faith, then to a great extent human feelings and human passions were attributed to Horus also, and, by parity of reasoning, to Ra his father, of whose divine nature he was a co-partner. These apparent inconsistencies are, after all, no greater than those which arise from the utter impossibility of a human mind grasping the infinite personality, and as naturally evidence themselves, even in our own times, as is proved by comparing the vague conception of the Supreme Being as formulated in the First Article of the Church of England, with the almost human Deity of the hymn-writers of popular or revival theology.

II. *Shabti or Osiride Figures*.—These generally represented the deceased under the character of Osiris, and hence they all have the plicate j-shaped beard peculiar to that deity. In the Hay collection of Egyptian antiquities now at Boston, U.S.A., there were two terra-cotta statuettes, each represented as holding a human-headed dove over the breast, with its wings expanded, —a very rare illustration of the doctrine of the revivification of the body by the return of the soul (*Ba*) to the mummy of the deceased. These objects were both of the period of the XIXth dynasty.

III. *Resurrection of the Dead*.—Although it is evident that, as Herodotus asserted, the ancient Egyptians sedulously promulgated the doctrines of the immortality of the soul and of its final resurrection, yet it is by no means certain that at the earliest period of their history they believed in the resurrection of the body ; at all events, that doctrine was not distinctly asserted in the more ancient religious books, according to Pierret :—"Les Egyptiens distinguaient l'âme, appelée *ba*, de l'intelligence, qu'ils nommaient *khou*. Les Grecs établissaient la même différence entre la $\psi\upsilon\chi\acute{\eta}$ et le $\nu\omicron\upsilon\varsigma$. Le retour de l'âme dans le corps ramène la vie pour de nouvelles existences."* But this revivification could only take place if the body of the deceased remained not only uncorrupted, but undefiled by evil spirits or improper treatment. The *ba* must, however, have possessed a species of corporeality, as it underwent, as is well known, a series of bodily duties in the *Ker-neter*, or suffered actual physical tortures or mutilations in the *Akar*, if wicked. It was to prepare the body for this its ultimate glorification that the ascriptions in the third chapter of the Litany of Ra were uttered by the priest for the deceased king. Towards the Greek period of Egyptian history, probably at the same time as the last recension of the *Ritual of the Dead* was undertaken, *viz.* in the XXVIth dynasty, the always ambiguous distinction between a spiritual and a corporeal resurrection underwent a new development ; and

* *Dict. Arché. Egyptienne.* Voyez *Ame*.

accordingly, on the triple mummy-case of *Æroai*,* as Mr. Sharpe prefers to call it, or *Harsiesi*, as it should properly be written, the latest phase of the dogma of the resurrection is represented in one of the vignettes on the outer coffin. This vignette shows three figures: one the goddess Neith, or the Heavens, in a curved attitude, resting upon her hands and feet, her face being downward, and her body being coloured blue. Beneath is a procumbent figure of an Egyptian, apparently just fallen to the ground; he is painted red. At his side, and touching the form of the heavenly goddess with his outstretched hands, is a third figure, also of a man, but smaller in stature and standing erect. This man is, like the goddess, coloured blue. Evidently, therefore, argues Mr. Sharpe, the subject of this vignette pictorially represents the advanced idea of the resurrection. The body of the dead man perishes; the soul, being itself a part of the heavenly deity, rises to the skies again.† But Mr. Sharpe does not notice what is equally obvious, that this heavenly soul was of a pantheistic nature, since its hands are extended not to Ra, the spiritual deity, but to Neith, the goddess of the material firmament. Thus, then, there appear to have been both a development and a reaction in the Egyptian idea of the doctrine of the Resurrection. First, that the soul only lived while the body remained intact; secondly, that the soul existed and reinhabited the body, and ultimately lived in a reunited condition in bliss till its own ultimate absorption into deity, while—which is to be noticed—it yet preserved its own personal consciousness;‡ then, lastly, the soul was supposed to be a portion of the great soul of nature, to be independent of the body, which it used only as a tenant, and after death and purification by purgatorial fires it then itself became merged into the abstract forces of nature itself. Of the Christian doctrine of the resurrection of the body in a glorified form, alike, and yet not alike, to the present conditions of the human frame, there is no certain evidence in Egyptian theology. A few advanced thinkers may have held the doctrine, or may have received it from primitive revelation. The future of the body and the soul must always have been to their wisest philosophers what it even now is to the ablest scientists of the present day, an inscrutable mystery—a mystery which inspiration has only partially revealed, and which faith and reason alike teach us to leave with confidence in the hands of the great All-wise, All-pitiful, and All-good.

* See Bonomi and Sharpe, *Triple Mummy-case of Aroeri Ai*.—This was formerly the chief treasure of the Egyptian museum of the late Dr. J. Lee, of Hartwell, and it is now in the collection of Mr. Tyssen Amhurst at Diddington Park.

† Figured also in Sharpe's *Egypt, Bible Texts*, and *Alexandrian Christianity*.

‡ See again *Ritual of the Dead*, section the *Gods of the Orbit*; and also Pierret, *Dogme de la Résurrection*.

ORDINARY MEETING, JANUARY 8TH, 1877.

C. BROOKE, Esq., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

LIFE MEMBER :—Rev. S. Paynter, M.A., London.

MEMBERS :—M. Bridges, Esq., Kent ; Rev. A. Castle-Cleary, M.A., Middlesex ; Rev. A. Souper, M.A., Head Master, St. Andrew's School, Reading.

LIFE ASSOCIATES :—Sir W. Maxwell, Bart., Scotland.

ASSOCIATE :—Rev. A. C. Macpherson, M.A., Bristol.

Also the presentation of the following Works for the Library :—

“Proceedings of the Royal Geographical Society,” Part 175.

“Certainties of Christianity.”	Dr. Wheatley.	<i>From the Society.</i>
“On the Apocalypse.”	By T. W. Greenwell, Esq.	<i>From the Author.</i>
“Reasons for Renouncing Infidelity.”	By Dr. Sexton.	<i>Ditto.</i>
“Winds of Doctrine.”	By Dr. Elam.	<i>Ditto.</i>

A Lecture “On Materialistic Philology” was then delivered by Dr. J. M. Winn ; a discussion ensued, in which Dr. Forbes Winslow, Mr. J. E. Howard, F.R.S., Mr. David Howard, Rev. B. Grant, Mr. M. H. Habershon, and the Chairman took part ; after which Dr. Winn replied. A paper “On the Forms of Causative Energy for Material Creation,” by R. Laming, Esq., was then read. The meeting was then adjourned. (Circumstances prevent the publication of the above-mentioned lecture and paper.—ED.)

ORDINARY MEETING, JANUARY 15TH, 1877.

THE REV. R. THORNTON, D.D., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the presentation of the following Works for the Library was announced :—

- “On a Recent Discovery of Carboniferous Batrachians in Nova Scotia.” By
 Dr. J. W. Dawson, F.R.S. *From the Author.*
 “The International Review.” *From Dr. J. W. Dawson, F.R.S.*
 “The Charing Cross Magazine.” *From T. W. Greenwell, Esq.*

The following paper was then read by the author :—

*CHRISTIANITY CONSIDERED AS A MORAL
 POWER.* By the Rev. J. J. LIAS, M.A., Professor of
 Modern Literature, St. David's College, Lampeter.

1. **T**HE never-ceasing conflict between Christianity and her assailants is continually assuming new forms. At one time it rages round the evidences, at another it busies itself with the doctrines of Christianity. One set of opponents desires to attack it through its connection with Judaism, another seeks to undermine it by disparaging the credit of the writings in which its system is embodied. Most of these attacks, however, are directed against the outworks of Christianity: the question to which I propose to ask your attention to-day is the citadel itself. If it can be shown that since the introduction of Christianity into the world a new principle has been at work which has proved itself capable of transforming the character and regenerating the nature of mankind to an extent utterly out of proportion with the effects of any other influence that has been brought to bear upon man, the position of Christianity is impregnable. For, after all, the true criterion by which a religion should be estimated is the influence it exerts upon conduct. That man, somehow or other, does not fulfil the law of his being to the same extent as other creatures, animate or inanimate, is a fact acknowledged on all sides. Whatever has an obvious tendency to produce conformity to that law must be in harmony with the purposes of the God who brought him into being, and therefore a part of the Divine scheme for the moral and spiritual education of man.

2. A part of the Divine scheme, I have said. It may be answered, that so is every other religion or doctrine which has contributed its share to man's training. And this is undoubtedly the fact. The earnest and vigorous defender of our

religion so lately lost to us* has told us his belief that the literature and philosophy of Greece was as much a part of God's design for man's elevation as the Law of Moses, and I have no wish to contradict him. But Christianity, as I believe, stands apart from any other element in the moral education of the world. The object of this paper is to show that its influence upon conduct is immeasurably greater than any other mankind has known. And we may remark, at the outset, that this influence upon conduct is precisely what Christianity professes to exert. It professes to be a divinely-revealed scheme for the regeneration of man's nature. Its greatest Apostle tells us, in the introduction to his greatest Epistle, that the Gospel is a "power of God unto salvation unto all them that believe"; and we surely do not require to be reminded that salvation, in the Scripture sense of the word, implies safety from sin as well as from sin's punishment? Nor need I stop to show from Scripture that this regenerating power of our religion is not to be violent, sudden, imperious in its operation; but that it is to be gradual, as the growth of the seed into the tree—of the infant into the man.†

3. The Christian religion, then, has challenged the inquiry into which we are about to enter. If we are concerned to defend Christianity at all, we are bound to show that she has made good her pretensions; that she has actually introduced into the world the most effective instrument for the moral and spiritual improvement of man which has ever been brought to bear upon him. And since that which elevates the individual cannot be without its effect upon the race, it will satisfy all the conditions of the inquiry if we show that Christianity has actually produced an extraordinary change in the condition of the world.

4. Now this is precisely what, in my belief, will be found to be the case. If we cast even the most cursory glance at history, we cannot fail to see that Christianity has worked a most miraculous moral revolution in the world, that it has changed the whole face of society, that it has waged unceasing war against everything which is contrary to man's true welfare, and that this campaign is still being carried on and will continue to be carried on until "the kingdoms of the world shall become the kingdoms of our God and of His Christ," or, in other words, until holiness, justice, purity, and truth shall be firmly established, and violence and oppression and sin and wickedness shall for ever cease to be.

* Canon Kingsley.

† Eph. iv. 13-15; 2 Pet. i. 5-7.

5. The proof of this statement need not be a minute or toilsome one. The evidences upon which I have to rely are not hidden in the nooks and corners of history; they are stamped in ineffaceable characters upon the broad outlines of the collective life of humanity. Cast your eyes back upon the time when the doctrine of Christ was first preached on the earth,—when the brutal and sensual Tiberius was on the throne of the Cæsars; when Imperial Rome too clearly displayed the seeds of her impending decay; when Horace, his fever-fit of youthful enjoyment past, was regretting in his maturer years the loss of those domestic virtues, that purity and integrity, that self-sacrificing bravery which had brought Rome to the pinnacle of greatness on which she then stood; * when Juvenal viewed with such loathing the iniquities of his day that he declared that should nature deny the poet's power, indignation would supply it; † when Tacitus, at a loss how to shame his countrymen into decency, holds up before them in his despair the half-naked barbarians of Germany as a model of what Romans ought to be. Cast your eyes back upon that age of indescribable depravity, and then accompany me in fancy to that upper chamber at Jerusalem, where “they that believed were of one heart and of one soul, neither said any of them that ought of the things which he possessed was his own, but they had all things common.” Follow the fortunes of that little band as they entered upon the apparently hopeless task of regenerating a world so steeped in vice and debasement, and you will find that you are following a triumphant march—the march of Christ's soldiers under the ever-victorious banner of His Cross.

6. It was a bold attempt; *that* has been confessed on all hands. It was undertaken, as the once famous, but now unduly discredited Christian apologist ‡ reminds us, without any of those aids of external influence and power which on all human principles were absolutely necessary for success. And it was opposed by all those engines of authority which have usually been so successful in stamping out new beliefs. At first with a mixture of lenity and severity, afterwards with a rigour ever on the increase, and at last with the full weight of the Imperial power, did the Roman State endeavour to enforce the laws prohibiting the existence of secret and foreign corporations. Yet, in just three centuries from the first promulgation of its doctrines, the Christian Church found herself triumphant over her enemies,

* Horace, Odes, iii. 5, 6.

† Juvenal, Satires, i.

‡ Paley.

and had enlisted on her side, instead of against her, the whole power of Imperial Rome. To what cause is this victory to be attributed? I say, without doubt to the moral influence of Christianity. It was not so much the attractiveness of Christian doctrine, nor the cogency of Christian argument, as the purity of Christian life which decided the victory in favour of Christ's Church. The evident sincerity of the Christians, their fortitude under trial, their mutual love, the earnestness with which they vindicated the purity of their lives, and the agreement of their practice with their professions—not the apologies of Justin and Tertullian, nor the laboured treatises of Origen—were the weapons with which they conquered the world. It was by these that they forced even their adversaries to admit that a power had come into existence which could enable mankind to rise superior to temptation, and to soar to a height of purity and virtue which had never before been reached by mortal man. Justin Martyr has left it on record that it was the contempt of death manifested by the Christians which made him feel that the common report of their impiety and impurity must needs be false.* Eusebius reminds us how on two several occasions the pious care for the sick and suffering exhibited by the Christians, as contrasted by the selfish indifference of the heathen for anything but their own safety, attracted the attention of the heathen, and caused them to glorify the God of the Christians, and to acknowledge that these were the only genuine worshippers of God.† The cry, "See how these Christians love one another," and its persuasive influence upon those who uttered it, has long since passed into a proverb, nor could any heathen deny the truth of the martyrs' repeated cry, "I am a Christian, and with us no evil is done."‡

7. It was thus, and thus only, that Christianity conquered Imperial Rome. Not by argument and dissertation, not by the logic and dialectic of the schools, but by the simple argument of facts, the practical manifestation of the truth that God was in Christ, reconciling the world unto Himself, were the rulers of the civilized world constrained to bow their necks to the mild yoke of the Gospel. But the triumphs of the Christian Church were far from being at an end when the Roman empire acknowledged her superiority. Now for the first time did Christianity begin on a large scale its work of regeneration. The Church of Christ set herself in earnest to reform the utterly depraved

* 2nd Apology, c. xii.

† Eusebius, *Hist. Eccl.*, vii. 22 ; ix. 8.

‡ *Ibid.*, v. 1.

morals of the empire, to introduce a better and a holier spirit among those who had been accustomed to the unrestrained indulgence of their passions. Christian bishops like St. Ambrose dared to shut the church doors in the face of the all-powerful Emperor when his hands were stained by a barbarous murder of his fellow-creatures.* A Christian monk braved the fury of the multitude by his bold denunciation of the brutality of the scenes of slaughter continually enacted in the Roman circus; and though he paid the penalty of his boldness by his death, the result was the final and absolute abolition of those cruel acts of bloodshed by the decree of the Roman Emperor.† Nor was the Christian Church altogether unsuccessful in her conflict with a more insidious enemy. It is impossible to express in our English language the frightful excesses of licentiousness which were openly indulged in in the days of heathen Rome. But if licentiousness has not been subdued by Christianity, it has at least been kept within bounds. Shameful as was the profligacy, disgraceful as were the crimes, of the Byzantine court, there was at least a marked difference between heathen Rome and Christian Constantinople. Crimes which were not even offences at all in the eyes of Paganism, were punished with death by the code of Justinian.‡ An historian whose impartiality will not be called in question—I mean the late Dean Milman—has remarked that “the courts of the Christian emperors, notwithstanding their crimes, weaknesses, and intrigues, had been awed, even on the throne, to greater decency of manners.” “Neither Rome, nor Ravenna, nor Byzantium,” he continues, “had witnessed,—they would not have endured, a Nero or an Elagabalus. The females (believing the worst of the early life of the Empress Theodora,”—which, by the way, I do *not* believe, resting, as such a belief must, solely upon the malignant *Anecdotes* of Procopius) “were more disposed on the whole to the crimes of ambition and political and religious intrigue than to the flagrant licentiousness of the wives and mothers of the early Cæsars.”§ Or if the statement

* Neander, *Ch. Hist.*, vol. iii. sec. 2.

† Theodoret, *Ecl. Hist.*, v. 26. St. Augustine (*Confessions*, vi. 8) is sometimes quoted to show that these games still continued after the date fixed by Theodoret. But he is speaking of an earlier period, when he and his friend Alypius were young.

‡ Milman, *Hist. Lat. Christianity*, book iii. c. 5; Gibbon, *Decline and Fall*, c. 44.

§ Milman, *Latin Christianity*, book iii. c. 2. Theodora is not accused, even by Procopius, of disgracing the Imperial throne with the vices of a Messalina, as described in revolting terms in the 6th Satire of Juvenal.

of so honest an historian be discredited, on the ground that he is a believer in Christianity, at least that objection will not apply to the passage I am about to cite from Lecky's *History of Christian Morals*. "In some respects," says that author, "Christianity had already effected an improvement. . . . The vast schools of prostitution which had grown up under the name of temples of Venus, were suppressed. . . . Under the influence of Christianity the effrontery of vice had in a great measure disappeared. The gross and extravagant indecency of representation of which we still have examples in the paintings on the walls, and the signs on many of the portals at Pompeii; the banquets of patricians, with their indescribable and revolting accompaniments; the hideous excesses of nameless abomination in which some of the Roman emperors had indulged with so much publicity,—were no longer tolerated. Although sensuality was still very general, it was less obtrusive. The presence of a great Church, which amid much superstition and fanaticism still taught a pure morality, and enforced it by the strongest motives, was everywhere felt, controlling, strengthening, or overawing."*

8. Such, then, was the influence of Christianity upon the Pagan civilization of ancient Rome. But the time soon came when, with the exception of the ever-narrowing area of the Byzantine Empire, that civilization was overthrown. Hordes of fierce barbarians, of almost every nation under heaven, overran Europe, and trampled under their feet the Roman patricians, now so enfeebled by their vices that neither their civilization nor their wealth could save them from subjection to those who, in every respect save two, were their inferiors. Yet, if the barbarians in their native forests had preserved their domestic purity,† their frugality and temperance, and thus the bravery which continence and temperance can alone keep alive, these virtues for the most part ceased to exist when, in the license of uncontrolled power, the Frank and the Lombard, the Goth, the Vandal, and the Hun were exposed to the corrupting influence of Roman luxury. The hardy self-restraint, the barbarians' only virtue, soon disappeared; the fierceness and brutality were retained. Therefore, the history of the centuries immediately

* Lecky, *History Christian Morals*, vol. ii. p. 163. I have been obliged to soften the language even of the English historian of these abominably depraved times. It is too gross, at least for oral delivery before a mixed audience.

† Milman, *Latin Christianity*, ii. p. 67; Tacitus, *Germania*.

succeeding the fall of the Western Empire is, perhaps, the most frightful record of atrocious crimes that the world has ever known. The barbarians had not yet imbibed the precepts of Christianity, while they united the vices of savage and of civilized life. Therefore, murders, parricides, fierce and bloody wars undertaken without any adequate provocation, adulteries, divorces, acts of gross oppression and cruelty followed one another in terrible succession. There was scarcely a single break in the dark uniformity of colouring spread over the whole picture of these times. Few characters in history display more cruelty, arrogance, and perfidy combined, than the famous Clovis.* Yet, even his crimes are surpassed by those of the members of his family, and nowhere can we find greater monsters of iniquity than a Clotaire or a Chilpéric, a Frédégonde or a Brunehaut. Four hundred years passed away, and even in the tenth century pious Christians, shocked at the violence and wickedness that reigned around them, and had now continued to reign for centuries, believed that the world was approaching its end, and that a just God intended to require of their generation the accumulated sins of the ages which had elapsed since Christ came to save the world. Yet, dark as that tenth century undoubtedly was, we can see that some influence had been at work which had already produced a mighty change for the better. If we compare the age of Charles the Great with that of Clovis, we cannot fail to observe a marked improvement. A still more visible advance is to be found when we compare the age of the Great Charles with that of the saintly Louis IX. Between the ninth century and the thirteenth the whole spirit of society had undergone a revolution. It would be ridiculous to compare the chivalrous warriors of the Crusades, the saintly Tancred, the unselfish Godfrey, the brave, fearless, and devout Edward of England,† the pious, but unfortunate Louis himself, with the bloodthirsty savages who had desolated Europe five or six centuries before. What had brought about the change? What had tamed these fierce barbarians, had taught them obedience to law, had intro-

* Gibbon, *Decline and Fall*, c. 38, admits that Clovis was sometimes restrained by "the milder genius of Rome and Christianity," though four pages further on he asserts that "he was incapable of feeling the mild influence of the Gospel."

† Pearson, *Hist. Eng.*, vol. ii. p. 490, speaks of the religious character of Edward I. in the highest terms. He is generally acknowledged to have been a good son, a clement and just monarch, a man of the strictest integrity, and a devout Christian.

duced among them the principles of social order, had bridled their passions, had led them at least to show some sort of reverence for duty and for God? What, if it were not Christianity? Corrupt as the Christian religion had become in the Middle Ages—and this corruption was no more than might be expected from the state of society in which it existed—it was still, even in its worst days, a power for good. We may take exception to the principle of monasticism, but the virtues of monasticism were precisely those which were best calculated to strike the imaginations of the rude people in those uncultivated times. Lingard has told us how, to the rude barbarians, “in whom the opportunity of gratification had strengthened the impulse of the passions, a life of chastity appeared the most arduous effort of human virtue,” and how “they revered its professors as beings of a nature superior to their own”;* and Hume † and Gibbon, ‡ though in the contemptuous mode of speaking of mediæval piety which was in their days the fashion, admit the truth of the statement. We may object to the doctrine of Papal supremacy, but few will venture to deny that in times of ignorance it was the only possible counterpoise to brute force, that it supplied the place of that enlightened sense of truth and justice before which ambition and violence are wont in our times to bow their heads. § We may complain, and justly complain, of the evils attendant upon superstition, yet we may admit that in those times even superstition had its uses; that an abject terror of the powers unseen was at least better than no belief whatever—than the absence of all which might keep violence and wrong in check by the fear of a future retribution. One bright feature marks a vast distinction between the worst of mediæval times and those which had preceded them. The Christian religion in mediæval times was at least able to produce the grace of penitence. Remorse, that which in ancient times supplied its place, had almost ceased to be heard of during the later ages of the Roman Empire, and the greatest monsters of iniquity descended to their graves without the least sign of the

* Lingard, *Anglo-Saxon Church*, vol. i. p. 181.

† Hume, c. 2, Edred, and c. 3, Edward the Confessor.

‡ Gibbon, *Decline and Fall*, c. 37. “They soon acquired the respect of the world which they despised, and the loudest applause was bestowed upon this Divine philosophy, which surpassed, without the aid of science or reason, the laborious virtue of the Grecian schools.”

§ Southey, a very anti-Papal writer, has an eloquent passage in his *Book of the Church* to this effect, vol. i. c. 10. The fact is now generally admitted by Protestant historians of the highest reputation.

dread of the world beyond. Such was scarcely the case even with the worst criminals in the mediæval annals. The most guilty seldom failed, if not before, at least when death stared them in the face, to admit their guilt, and then they did their best to avert the punishments in store by the restitution of their ill-gotten plunder, by works of piety and charity. The infamous Brunehaut trembled before the rebukes of Columbanus, and suffered him to go his way without let or hindrance.* Even Frédégonde, whose wickedness far surpassed hers, was known, under the pressure of sorrow and remorse, to recall some of her violent acts.† Agilulf, king of the Lombards, at the instance of Gregory the Great restored what he had plundered from the churches, replaced the bishops in their sees, and raised them from a condition of the deepest degradation to dignity and power.‡ We may complain of the penitential system of the mediæval Church, but it at least served, however feebly, to keep alive the remembrance of two truths which heathenism could not be said to have grasped—the justice and the mercy of God; His justice, in that He must needs punish sinners; His mercy, in that He was willing to forgive them. A moral standard of some sort was thus kept up before men's eyes, while at the same time they were not allowed altogether to forget that God was “not extreme to mark what is done amiss.”§ Thus, imperfect as was the Christianity of the Middle Ages, far as it had declined from the doctrine proclaimed by Christ and His Apostles, it was still the salt of the earth. External as religion too often was, it produced at least, to use the words of a German writer, “submission to law and the acknowledgment of spiritual inferiority,” it “implied self-subjection, self-conquest, self-sacrifice.”|| In fact, it has been as true since the promulgation of Christianity as it was before, that “the law is our schoolmaster to bring us to Christ.”

9. Nor must we, in carrying on, however briefly, an inquiry such as this, fail to remark on the influence of the Crusades upon the mind of Christian Europe. At first sight a war carried on professedly for Christ's sake, and it alone, would seem to be a dangerous infraction of the spirit of His saying, “My kingdom is not of this world.” But on a closer examination of the facts, we find that here as elsewhere the rule holds good, that whatever is done for conscience' sake, however ill-

* Milman, *Latin Christianity*, book iv. c. 5.

† Guizot, *Hist. France*, c. 8. The story is told by Gregory of Tours.

‡ Milman, *Latin Christianity*, book iii. c. 7.

§ See some remarks in Milman, *Latin Christianity*, book iii. c. 5.

|| Cited in Milman, *Latin Christianity*, book iii. c. 5.

informed that conscience may be, will in the end be productive of good rather than evil. The final result of the Crusades was to temper war with the spirit of Christianity. Clemency to the vanquished, principles of honour, a high sense of the duties which attached to the knightly character, have made war ever since those times quite a different thing to what it was before. The fantastic institutions of chivalry may provoke a smile; its code may have been sullied by sensuality; its literature may often have ministered to vice; but at least it raised the standard aimed at by the warrior; it introduced a spirit other than brute force into the world, it made tenderness to the weak no longer a reproach on manhood, but, on the contrary, the highest and noblest duty of a man. True, in the Middle Ages this ideal was confined to those in high station, but at least it was something to have produced among the descendants of the rude barbarians who had made England their own by conquest, whose highest virtue was ferocity, whose most contemptible weakness was soft-heartedness, an ideal of the "very perfitte, gentile knight" which describes him, brave as he was, as "of his port as meeke as was a mayde," and notes among his chief characteristics that he "no vilanye ne sayde."* Again I ask, what produced this ideal in Chaucer's age if it be not Christianity?

10. But we can best see what influence Christianity has had in moulding men's lives and characters by confining our observations to a more limited space. The history of our own country shows in a very remarkable manner the effects of the introduction of Christianity. The Saxons and English when they first invaded this country were what I have just described them, pitiless and ferocious beyond description. War was their chief delight, peace the one thing which was intolerable. They sacked the cities, massacred the inhabitants, and reduced the few whom they did spare into the most cruel and degrading servitude.† When they had done fighting with the natives they turned their arms against each other; and for the first hundred and fifty years of their sojourn here we read of nothing but battles, conspiracies, assassinations, and disorders. Mark the change which was effected by Christianity. It was not until the West Saxons had become Christians that they effected

* Chaucer, Prologue to *Canterbury Tales*.

† Mr. Freeman adopts the view that the massacre was almost universal. Mr. Pearson inclines to the idea that the Britons were frequently enslaved. I cannot, I confess, understand the introduction of so many British words into the English language except on the latter supposition. But if the former be the correct view, it only strengthens the argument in the text.

the reduction of Devonshire.* And then we find that the conquerors, instead of slaughtering the vanquished without mercy, allowed them equal rights with themselves, so that in a few years the victors and vanquished were blended into one people. Again, while England was still divided into six or seven kingdoms we find the genius of Christianity, ever tending to unity, had already created a National Church under the great Archbishop Theodore, and had thus anticipated the time when the people of these islands should dwell peaceably together under one sceptre.† The Penitentials of Theodore and Bede were the forerunners of the laws of Ina and Offa; and the spectacle now often seen of kings renouncing the vanities of pomp and power for a life of contemplation and piety, paved the way for the highest ideal of all, the saintly monarch who practised renunciation of self without relinquishing the kingly crown. The life of Alfred, a life simply impossible to Hengist or Horsa, to Ælla or Cerdic, is itself a proof of what just four centuries of Christianity had done for this country. At once unaffectedly pious and severely just, as free from superstition or prejudice as he was from ambition or selfishness, he not only rid his kingdom from foreign foes, not only restored learning and protected religion, but he displayed to the world the first example it had ever seen of a community in which the first object was the maintenance of peace, and in which equal justice was secured between man and man, on the foundation of the best and highest of all moral codes, that which was proclaimed by Jesus Christ. Nor, in the most rapid glance at our history before the Conquest, ought we to omit all reference to the marvellous transformation effected by Christianity in the character and principles of Cnut. And when England, corrupted by prosperity, and needing purification, had fallen under a foreign yoke, what was it once more that lightened the burden of the Conquest, and made Normans and Saxons feel that there was a common bond which united them together? It was the Christian Church. "The clergy," says Professor Stubbs, "felt their vows and spiritual relations to be a much more real tie than mere nationality."‡ They had in former

* Freeman, *Norman Conquest*, Introduction.

† The Saxon Chronicle records how Synods of the whole Church were to be held yearly. See also the Canons of the Council of Hertford, in Haddan and Stubbs' documents. See also Stubbs, *Constitutional History*, vol. i. p. 245.

‡ Stubbs, *Constitutional History of England*, vol. i. p. 223.

days striven to supplant provincial jealousies by a feeling of nationality; now they quickened the national religious life, which was dying out in its isolation, by new and worthier ideas from without, and by their fearless opposition to royal lawlessness they did much to improve the condition of the enslaved English people. It was the succession of patriot prelates in mediæval English history that did most to organize a national feeling, to convert the "*sic volo hoc jubeo, stet pro ratione voluntas*" of the kings into the rudiments of our present English Constitution.*

11. But I must hasten to bring this historical review to a close. The time would fail me were I to attempt to enumerate all the triumphs Christianity has achieved over the lawless passions of humanity. But what Christianity did for the Middle Ages she is doing still. Then she evolved order out of chaos; she tamed the savage, she imposed laws on him who knew no law but his own will. And she has not ceased in her mission of mercy. Nothing is more remarkable, more startling in our own time, among much to sadden and depress us, than the extraordinary strides which the love of our neighbour has made among us here in England within the last century. We have seen slavery abolished, duelling put down, drunkenness banished, at least from among the upper and middle classes. If war exists, it has lost half its atrocity. The spirit which once was confined to nobles has seized on the common soldier; and pity for the helpless and the vanquished, moderation in the hour of triumph, a respect for law and order even in times of war, are elementary principles of humanity recognized by all Christian nations, though, it must be confessed, they are as yet but imperfectly carried out. Where the wounded were once left to groan in misery upon the field of battle, to seek such succour as chance might afford, the Society of the Red Cross is now to be found, tempering by its gentle influences the horrors of war, enlisting in its service man's skill and woman's tenderness and sympathy. And we may add to this the reluctance which nations now feel to enter into deadly conflict. War, which at one time could be produced by causes of the most insignificant kind,—the ambition of one king, the jealousy or irritability of another—is now avoided wherever possible, and nothing but the clash of opposing principles, as held by large masses of men, principles which seem to permit of no other arbitrament than the sword, are capable in our times of precipitating the strife which all men

* Stubbs, *Constitutional History of England*, vol. i. p. 632.

dread so much. It is impossible to deny that Christianity, which has implanted in our breasts a strong repugnance to the infliction of suffering, has brought about a strong feeling of the guilt of war, of the crime and sin of being responsible for the frightful amount of misery which the most humanely conducted war is sure to produce.* And if we grant that a part of the indisposition to war is produced by the commercial pursuits to which mankind are now for the most part addicted, to an impatience of the expense, the burden of taxation, the interference with trade, which are its invariable concomitants, we may still place these facts to the credit of Christianity. For what else has weaned mankind from those warlike pursuits in which from the earliest ages it has taken delight, but the influence of the Christian religion? Hume tells us, almost in a tone of complaint, of the decline of military enterprise produced by Christianity among our Saxon forefathers;† and no candid person can deny that the weight of Christian influence from the first century of the Christian era to the nineteenth has been, on the whole, exerted in this direction.

12. Were we to stop here, we should have enumerated no small number of triumphs which Christianity has obtained over the passions and weaknesses of mankind. But the list is not yet exhausted. We should not be justified in leaving the subject without alluding to the immense growth of mutual kindness and consideration which it is the object of Christianity to produce, and which it has produced to so amazing an extent among us at the present day. Compare the state of our prisons now with their state as described in Goldsmith's *Vicar of Wakefield*, or at the time when Howard and Sarah Martin and Mrs. Fry devoted themselves to an amelioration of the condition of prisoners. Compare our penal code now with the penal code of fifty years back, when men were hanged for forgery and sheep-stealing. Can we help acknowledging in these facts the working of such Christian principles as were laid down by Sir Thomas More in the beginning of the sixteenth century,‡ though

* It is interesting to observe how this spirit works, even among those who are hostile to Christianity. A newspaper well known for its sceptical tone has lately been deprecating the warlike tendency shown by many of the clergy. But its arguments are entirely Christian in their tone and spirit, and it succeeds best in pointing out the deep antagonism between Christianity, properly understood, and the infliction of pain and suffering.

† *Hist. of Eng.*, c. 1. The Kingdom of Wessex.

‡ Sir T. More, *Utopia*, book i. "There are dreadful punishments enacted against thieves, but it were much better to make such provisions as would

they hardly bore fruit till nearly the middle of the nineteenth? Study the condition of the workhouse poor as depicted in Crabbe's poems,* and compare his stern and almost hopeless tone of indignation with the state of things in the present day, when, if a pauper be deprived of his daily allowance, or is huddled with indecency to his grave, all England rings with it, and an immediate reform is imperatively demanded.† We remarked on the care of the sick and dying displayed in early ages, but what was that compared to our organizations for their care in these days, when not only the utmost attention, the tenderest consideration is shown them, but every appliance for their comfort is provided, and that by the voluntary offerings of Christian people? Look, again, at our arrangements for the relief of the poor. Not only are our workhouses—there were no workhouses, remember, in heathen times—abodes of comfort and almost of luxury compared to what they were, but every parish has its district visiting society, which strives to supplement by voluntary offerings and voluntary efforts the provision made for the relief of the poor by the State. So far has this been carried that the complaint of the indifferentist has even taken the form, that Christian charity violates the laws of political economy by removing the punishment by which the order of nature herself is wont to punish extravagance or idleness. The country is studded, again, with reformatories, refuges, lunatic asylums, orphanages, and innumerable other institutions for the temporal, moral, spiritual well-being of the people. Even our political system is dominated by the principle enunciated by Christ—"Love thy neighbour as thyself." Whatever some may think of the tendency of legislation in the present day, of Reform Bills and

enable every man to gain his own livelihood, and so be preserved from the fatal necessity of stealing." "If by the Mosaic law, though it was stern and severe, men were only fined, we cannot imagine that in this new law of mercy, in which God treats us with the tenderness of a father, He has given us greater liberty to be cruel than He did to the Jews." Sir T. More's practice, like that of many other Christians, was far below the standard set up in the "law of mercy," which in his conscience he believed to be the law of God.

* Crabbe, *The Poor and Their Dwellings; The Parish Workhouse, &c.*

† As an instance of this, I may remark on the complaint of "Veta" in the *Times*, during the month of October, 1876, and the care taken in investigating and refuting it by the Secretary of the Charity Organization Society. The assailants of Christianity would find it difficult to produce a parallel to this state of things in a non-Christian country. The *Times* of November 24th gave an additional column and a half to "Veta," on no other ground but that he was poor and friendless, and was bringing a charge against an organization established for the relief of the poor and friendless.

Ballot Acts, of the disestablishment of Churches and the legalization of Trades-Unions, we are forced to admit that the motive force of such legislation, whether rightly or wrongly applied in any given instance, is the desire to do to others as we would have them do to us, the desire to remove any grievance which is supposed in any way to press unfairly upon any member or members of the body politic.

13. And if it be denied that this growth of kindly feeling and mutual consideration is due to Christianity, we may safely ask the question to what else is it due? Not to civilization, for a high civilization existed in a very early period of the world's history; and it ever tended, not to progress, but to decay. Not to philosophy, for ancient philosophy found its highest realization in the doctrines of Plato, and they have been found incapable of regenerating the world; while modern philosophy owes the best of its doctrines to the Christianity which it endeavours so vainly to supersede, while it has only just begun to attempt to emulate Christian beneficence. Not to a law of progress impressed upon humanity, for the onward movement in Egypt, in Assyria, in Persia, in Greece, in Rome, carried with it the seeds of its own destruction, and the last collapse, that of the Roman Empire, seemed the most final and fatal of all. Not to any rival form of religion, for Buddhism, Brahminism, Confucianism, Mohammedanism, have all had their turn of regenerating the world, and they have all been conspicuous failures. Men may sometimes for their pleasure maintain the paradox that Christianity has failed to produce better men than heathendom; but we may safely ask them whether it is to China or to Japan, to India under Akhbar, or to Turkey under her present rulers, that they would point us for an example of what humanity should be. Heathendom has, at best, produced but the stagnation of the whole and the wretchedness of the many;* at its worst, it has produced vice in its most hideous aspects, and misery in its saddest and most degrading forms. Whereas Christianity has never for a moment faltered in its onward advance. From the moment when it assumed the control of man's destinies to the present time—a period of eighteen centuries—it has never ceased to produce a steady progress in everything which tended to the true welfare of man. But, at last, it is threatened with a rival. Positivism, or, as it is called, the religion of humanity, has ventured to contend with Christianity on its own ground. It is the first system of doctrine beside Christianity which has made the welfare of

* As in China.

mankind its object. But at present Positivism has promised much, and performed little. It is not likely as yet to drive Christianity from the field. For, first, its motives to action must be feeble, since they are derived from a world which, as far as we are concerned, soon ceases to be; next, it depends upon conceptions external to the man himself, not upon an influence within him to impel him to self-sacrifice and love; and lastly, while Positivists have been talking, Christians have been acting. Positivism, so far, has been content with creating an ideal; Christianity has translated that ideal into fact. In every city, in every parish, have Christian hearts been devising and Christian hands executing the numberless schemes for the benefit of their fellows which now exist among us. Sceptics and infidels may, and do, join in the good works that are being carried out. But can they tell us how much or how little of the principles of beneficence they avow is due to the religion which they affect to despise? They find a ready audience for their schemes of political and social improvement. Will they explain to us from what source that readiness is derived? They appeal to the maxims of benevolence and justice among their hearers. Where did their hearers learn those maxims, and under what sanctions have they come to be recommended to them with a force confessedly unknown except where Christianity is received and believed? Even of the sceptic himself we may well believe that his heart is better than his head, and that the heart often responds to the teaching of the Master Whom the head fancies itself called upon to reject. It was a significant confession which fell from the lips of the well-known unbeliever lately dead, in his latest work, that a man who made it a rule to think, say, and do what he believed Jesus Christ would have thought, said, and done in his place would have realized the true ideal of human perfection.* We may depend upon it that John Stuart Mill was near the truth. Consciously or unconsciously, the standard of perfection not only theoretically taught, but practically exemplified, in the life and death of Jesus Christ is the real source of every good thought, word, or deed to which men are inspired.

14. In what I have said I have been looking rather at the corporate than at the individual life of Christianity. I might have taken altogether a different view. I might have enlarged upon the immense influence of Christianity upon the individual. I might have referred to the grand array of saints which

* Mill, *Three Essays*, p. 255.

Christianity has produced, and have asked whether any other influence could be potent for well-doing as this. I might have pointed out the effect of our religion in the conversion of the worst and most abandoned, its power to rescue them from the lowest depths of evil to the utmost height of purity and self-control. I might have laid great stress upon Mr. Lecky's admission that Christianity has suffered from the fact that the sphere in which its superiority over other religions is most incontestable is precisely that which history is least capable of realizing.* I do not wish to underestimate the importance of this point. I believe that the influence of the Christian Church as a whole is due to the influence of the Spirit of Christ upon every individual member of it. Yet we may recollect that the Apostles would seem to teach us that even the spiritual life of the individual is to be cultivated for the general good. They teach us, moreover, that this life of the individual is no special gift, to be enjoyed and cherished by himself apart, but it is a common life—common to him and to his brethren, the life of the Son of God.

15. It has been the object of this paper to indicate—the limits to which I am confined forbid me to do more than indicate—the nature of the progress the world has made under the auspices of Christianity; I say under the auspices of Christianity, for no one can deny that since the Christian religion has been preached there has been an extraordinary change in the condition of mankind. Nor can it be denied that the condition of Christian countries at the present time is immeasurably superior to that of heathen countries. I contend that it is to Christianity that the difference is owing, and that, because the religion of Christ introduced a mighty transforming power into the world, capable of moulding men's lives into conformity with the type which Christ Himself exhibited when He dwelt upon earth. Christianity is not merely a system of doctrines, it is not merely a code of morals of the purest and loftiest kind; it is a power. A Spirit has been introduced into the world, convincing men of sin, of righteousness, and of judgment. A kingdom of righteousness has been set up in the world, and men are daily becoming more fully able to direct themselves by its laws. Those who reject Christianity may misrepresent the effects which the Christian religion has brought about. Mr. Greg may ask, as he has done lately in the pages of the *Contemporary*

* *Hist. of Christian Morals*, vol. ii. p. 156.

Review, whether “the kingdom of heaven which Jesus intended and foresaw” bears “even a recognizable resemblance to the proud, cruel, crushing, darkening, oppressive despotism which has for ages held sway in His name from the chambers of the Vatican? or even to the mitigated and modified travesties which reign, or have reigned, at Lambeth, Geneva, or Byzantium?”* But Mr. Greg has mistaken the scum on the surface for the stream—deep, rapid, and pure—which runs beneath. He has forgotten that the leaven works at first below, and that it invariably comes to the top last of all. And we may convict him out of his own mouth, if not of error, at least of partiality. He is obliged, to make good his charges against Christianity, to avail himself of the scandals of the past. To point a taunt at the Christian Church he has been obliged to refer to a condition of things which she has obviously outgrown. Jesus Christ not only “foresaw” that His Name would be used to support a state of things of which He disapproved, but what Mr. Greg would find it less easy to grant, He *foretold* it. He prophesied that many should arise in His Name, and say, “Lo! here is Christ; and, lo! there”; † but He warned His disciples not to believe them. He told them how Satan would robe himself as an angel of light, and would deceive, if it were possible, even the elect themselves. ‡ He knew that the powers of evil would do their utmost not only to oppose, but to misrepresent the gospel He had come to preach. But though “the kings of the earth” should “stand up, and the rulers take counsel together, against the Lord and His Anointed,” He knew that “He that dwelleth in the heavens” would “laugh them to scorn, the Lord” would “have them in derision.” § He knew that at His touch one moral disease after another would fly from among mankind; and that, the evil spirit once departed, they should sit at His feet clothed and in their right mind. He knew that when the earthquake of inward conflict shook the nations as His Church “filled up that which was behind of the afflictions of Christ,” || the candid and earnest seeker after truth would be constrained to cry with the centurion—“Truly this was the Son of God.” ¶ For He was in truth the Word of the Father; the only-begotten Son, whose function it was to make *Him* known to mankind, “Who dwelleth in the Light that no man can approach unto, Whom no man hath seen or can see, to Whom be honour and

* *Contemporary Review*, November, 1876.

† St. Matt. xxiv. 23.

‡ St. Matt. xxiv. 24.

§ Ps. ii.

|| Col. i. 24.

¶ St. Matt. xxvii. 54.

power everlasting.”* Well might He have worked a moral revolution of the most unheard-of kind in the condition of humanity. For there is but one explanation of the matter, and it is this:—“In the beginning was the Word, and the Word was with God, and the Word was God. And the Word was made Flesh and dwelt among us, and we beheld His glory, the glory of the only-begotten of the Father, full of grace and truth.”†

The CHAIRMAN (Rev. R. THORNTON, D.D., V.P.).—I am sure that I may tender your thanks to Professor Lias for his extremely interesting and well-written paper. After the reading of two communications the discussion will open.‡

The following letters were then read:—

Aberdeen, January, 1877.

The paper by the Rev. Professor Lias is very excellent. It deals in a thorough manner with the subject in hand, and contains such evidence in favour of the good effects of our common Christianity as cannot on any just ground be gainsaid. It is, indeed, an able defence of the faith. The Professor makes a good analysis of history, and selects many points which speak eloquently in favour of our Christian religion, and which, when combined, constitute a bulwark which can never be assailed with any real success. This is all the more creditable to the good sense and wise selection of the writer, because Christianity is not a system of mere externals, as other religious systems mainly are. Its noblest trophies and triumphs are in the heart, the region most hid from human eye, and where alone true moral reform obtains. Its noblest work, therefore, is not always patent to the view of him who would describe it. Professor Lias believes that those aspects of human life or forms of religion, through which Christianity was manifested in the past ages of our Christian era, did service in their day in helping on the cause of God. And in this, I presume, few enlightened Christian men will differ from him. But it must be ever kept in mind that these were no parts of Christianity proper, that they were in no way required by it, but only by the imperfections of the people in whose minds they had a place. It is of very great importance to state this clearly at the present day, because the moment we speak of those adventitious elements of religion which were associated with Christianity in past ages as if they were parts proper of that system, that moment we give the infidel the opportunity of seizing on the failings of inconsistent professors of Christianity, and of holding them up to contempt, saying, “This is your Christianity!” Is not this the great fallacy

* 1 Tim. vi. 16; St. John i. 18.

† St. John i. 14.

‡ As a reply to one communication containing an objection to the paper, Professor Lias remarks: “That Christianity is a revelation from God in a sense which cannot be predicated of other religions, and that it maintains its course in the world under a superintending Providence: these are propositions involved in the very idea of Christianity itself.”

that runs through a recent work by Dr. Draper? Professor Lias expresses very clearly the distinction I refer to in sec. 15 of his paper, when he says—"Mr. Greg has mistaken the scum on the surface for the stream—deep, rapid, and pure—which runs beneath." I very cordially endorse this paper in its main line of argument throughout.

A. STEWART.

January 15th, 1877.

As I start this afternoon for the North of England, and shall not return for two or three days, I take this means of expressing myself on Professor Lias's paper, which is to be read this evening at the Institute. The paper appears to me to occupy just that ground of general defence of our religion which is so suitable to the position of the "Victoria Institute." What I should have said, had I been able to be present, would have been rather in the way of supplement to the remarks of the learned and discriminating essayist. The estimate which he well makes of the moral power exerted, on the whole, by Christianity is not disputed by the generality of unbelievers in the present day. Even Mr. Lecky, in his *European Morals from Augustus to Charlemagne*, concedes as much as Professor Lias asks. In the notes to my own *Bampton Lectures*, referred to by the *Edinburgh Review* for the true description of the moral state of the empire as Christianity found it, I have given an extract from M. de Pressensé on the "first three ages" of Christianity, which also exhibits the same state of facts from the point of view of a French Protestant of some learning. But I would now observe that the controversy of the nineteenth century with our Religion is not so much against the moral power of its teaching as against the distinctive features of it as a *Revelation*. Even the *Revue des Deux Mondes*, criticising Strauss, defends for itself the title of "Christian," as indeed the right of all who are ready to admit that Jesus Christ is an illustrious "moral factor" who cannot be ignored in our modern estimate of civilization. The case is this: the Primitive Christianity, as represented in all the early writings, regards Jesus as Son of God, who took our nature, died as a man, and rose and ascended to heaven bodily after His resurrection; recognizes that He said, "I will build My Church"; that His followers set up a Society, and organized a social system, with rules and rulers of its own; shows that that organization prevailed in large parts of the Roman world as a separate organization, and then made terms with the imperial organization; and that since then, the joint organization has gone on as one. The nineteenth century is getting rid of the Christian part of the organization, and yet hopes to retain the leading moral improvements jointly effected in society. Christians feel that the original organization of a "church," a "new creation," cannot thus really be set aside without also disputing the original facts of the life of Emmanuel, "God with us." Thus it is Christianity as an organic whole, and not simply the moral influence of certain of its principles, that will have to be defended in the times before us.—Was our religion to be a "new creation," on the grounds taken by the Apostles and those who succeeded them?—or is it to terminate in a moral amendment of the "old creation"? and then, is the world to supersede the sacred organization and faith of the first ages of our Religion—and just to criticise its former literature, and subject its "evidences" to strict proof,—leaving individuals to accept it,—society as a whole doing without it?

WILLIAM J. IRONS.

Rev. J. KENNEDY, M.A., D.D.—Dr. Irons has said with great truth, that any criticisms made on this admirable paper must be rather in the way of supplement than in the way of correction or of opposition. It struck me, as I heard the paper read, that a great deal of it would be admitted by those who deny the supernatural origin and character of Christianity—those, in fact, who deny the very essence of our faith; but if they do make these admissions, we have a right to ask of them that they will explain the acknowledged superiority of Christianity. How comes it to pass that Christianity has wrought, and seems capable still of working moral changes in the world which no other system has worked, or seems capable of working? How comes it to pass that the character of our Lord has so transcended the character of all other professed reformers or teachers, as is admitted by the opponents of the Christian faith? I do not think they can give a sufficient answer to this question. In order to find an answer, we must ask wherein consists the moral power of Christianity? That it has a wonderful power, and that it has produced great changes and effects is indisputable; but wherein consists its moral power? Is it to be found simply in the beautiful moral character of its Founder, or in the beautiful moral precepts of its Founder? We are prepared to say that it is not in these; and here I think we should take our stand, and say—"It is not enough for you to admit that certain practical effects have been produced by Christianity; you must find the root and source of those practical effects." When we ask this question, we, as Christian teachers, are prepared to show, that from the very beginning Christianity was the supernatural thing, if I may use the expression, which it is to-day; and that that supernatural element was not something superinduced upon an earlier and simpler faith, but was the very essence of the earliest form of Christianity. Then we may proceed to show that it is in its wonderful Essence that its real moral power consists, and that no other sufficient and adequate explanation of that moral power can be found. When I speak of that wonderful Essence, I refer to the person of our Lord, as the Son of God, to His character as a Mediator and a Saviour in the work of redemption, and to the Holy Ghost, to which we as Christians ascribe the great influence which has been exerted in the world by the Christian faith. I know how imperfectly I state the matter, but I have at all events indicated where I think we ought to take our stand. Then I am not quite sure that the learned Professor sufficiently meets the objection raised by Mr. Greg. His answer is a figure, and figures in matters of logic are not good weapons: they are capable of different interpretations, and they convey different ideas to different persons. Professor Lias says—

"Mr. Greg has mistaken the scum on the surface for the stream—deep, rapid, and pure—which runs beneath. He has forgotten that the leaven at first works below, and that it invariably comes to the top last of all."

But I confess that I do not exactly know what the Professor means by that

statement. Mr. Greg appeals to the notorious fact, that for certain ages Christendom was scarcely better than old heathendom, and the Professor admits it. The question comes, How was it that Christendom, having that faith, which we say came into the world from God Himself for the world's redemption—how comes it to pass that that faith had become so inefficient that it had plainly lost its power, so that the very nations which possessed it were only on a moral level with nations that had not possessed it? I believe that there is a sufficient answer to this question, but I do not think that the learned Professor has brought it out. I think Mr. Greg does honour to Christ when he speaks of "the kingdom of heaven which Jesus intended and foresaw," as distinguished from "the proud, cruel, crushing, darkening, oppressive despotism of the Vatican, or the mitigated and modified travesties of Lambeth, Geneva, or Byzantium." There we meet Mr. Greg, and say "You admit that Jesus Christ did not intend such a state of things, that it is contrary to His idea, and mind, and will. It may be a mystery to us how it was that Christianity should have fallen—that is, the outward and visible forms of Christianity—into a condition so low as it did. We feel that that is a mystery, but we go back to the beginning, and we say, "Admit the mystery; make of it what you can; but there is the fact, that Christ not only intended a different state of things, but foretold that that loving purpose of His would be frustrated somehow or other in the world." This is a consideration which we cannot overlook. Then, while admitting the mystery, we can say that Christianity, when it was received by the world in its purity and integrity, did work those marvels which the Professor describes in this paper, and which cannot be denied by the most sceptical. And we can take this further ground, that Christianity is working marvellously in our own times in heathen countries, to which it is sent from this England of ours. In this way I only indicate—and I feel that I should apologize for doing it so imperfectly—the ground on which I think we may meet Mr. Greg. I would take my stand first of all on this: the moral power of Christianity is not to be found simply in the beauty of the character of Jesus Christ, wonderful as that is. We may say that we cannot account for that character on other principles; but it is not on that character alone, nor on the beautiful moral precepts of our Lord, that His moral power rests. His moral power is found in this—He is the revealer of God's love, whereby He seeks to restore us spiritually to Himself. The Christianity of the Bible, for which alone Christ and Christianity are responsible, works to-day the same moral marvels which it has worked before, and is as mighty now as it ever was. I hope the President will excuse me for making these remarks, which I should not have made but for the reticence of the meeting. (Cheers.)

Mr. L. T. DIBDIN.—I should like to make a few remarks, not by way of criticism, but by way of asking two or three questions. If our papers possess any defects, it is better to find them here in the armoury than to let

them be discovered when they have gone out into the world. In his second paragraph Professor Lias says :—

“Canon Kingsley has told us his belief, that the literature and philosophy of Greece were as much a part of God’s design for man’s elevation as the law of Moses, and I have no wish to contradict him.”

Now, in a sense, of course, this must be true. Granted that God has any great design in His government of this world, and of course everything that happens must conduce to that end more or less ; but, in the special sense in which I suppose this passage is written, I apprehend that the literature and philosophy of Greece had nothing to do with that design. Then, in the 3rd paragraph of the paper there is a syllogism which is a little inverted. The object of the paper, Professor Lias says, is—

“To show that Christianity has made good her pretensions ; that she has actually introduced into the world the most effective instrument for the moral and spiritual improvement of man which has ever been brought to bear upon him, and since that which elevates the individual cannot be without its effect upon the race, it will satisfy all the conditions of the inquiry if we show that Christianity has actually produced an extraordinary change in the condition of the world.”

Now, it does not follow that, even if Christianity has produced “an extraordinary change in the condition of the world,” it has produced a change in each individual. The proposition, that what influences an individual must influence the race, may be true, but it does not follow that what influences the race influences each individual. Of course if, as Professor Lias says in his 4th paragraph, “the most cursory glance at history” is sufficient to prove all that is stated in that paragraph, it would not have been necessary to write this paper. In his 6th paragraph, Professor Lias makes a point of the rapid promulgation of Christianity, as if that were peculiar to the Christian religion, but I may remind the members of the Institute that, in a paper, which was read before us some time ago by Bishop Claughton, on Buddhism, it was stated that Buddhism had spread as rapidly in Asia as Christianity. Then, in a note to the 7th paragraph, Professor Lias draws a distinction between the immorality of Messalina and the conduct of Theodora. They were neither of them very creditable specimens of womankind, I should think. But Professor Lias says :—

“Theodora is not accused, even by Procopius, of disgracing the Imperial throne with the vices of a Messalina, as described in revolting terms in the sixth Satire of Juvenal.”

But if the stories told of her can be believed, before she ascended that throne she at least equalled her predecessor in vice. Then, in the 9th paragraph of the paper I find a proposition of a startling character. Professor Lias says :—

“We find that here, as elsewhere, the rule holds good, that whatever is done for conscience’ sake, however ill-informed that conscience may be, will, in the end, be productive of good rather than evil.”

That struck me both as novel and startling; for we must all admit that almost all the persecution that ever happened in the world, has been done most strictly "for conscience' sake," and yet it would be difficult to find what good it has been productive of. With regard to the Crusades, it was new to me to learn that the spirit of chivalry which was, no doubt, developed in those Crusades, was in any way due to Christianity, because I have always understood that that spirit of chivalry was imbibed from the Moors and Saracens, with whom we then came in contact, and it was in the Crusades, and in consequence of that contact, that "the gentil knyght," so far as he had any existence at all, first came into existence. We know that civilization and the arts and sciences had left Christendom, and were only to be found among the Arabs, principally in Spain, and when the Spaniards began to get back their country from the Moors, they began to learn from them their knowledge, and to be imbued with their spirit, and, as I have always understood, what we call chivalry then came into existence in Europe. For instance, Saladin was a fine specimen of the perfect "gentil knyght," although he was a Moslem. Then, in the 11th paragraph of the paper, we have a very beautiful description of the state of the world as it is now, but it is one which, if we read some chapters of contemporary history, we should hardly recognize. For instance, we are told that "drunkenness is banished, at least from the upper and middle classes." However that may be, it certainly is not banished from those who are below them. Then Professor Lias says that war is very much mitigated in its horrors, and that it is never now produced "by the ambition of one king or the jealousy or irritability of another." But my mind goes back at once to the war of 1870, which I think it is right to say was caused by no conflict of principle, but simply by ambition. As to the improvement in our prisons and workhouses, no doubt that is very marked, but it is difficult to say that that is due to Christianity, because, as Professor Lias himself says, Christianity has been operating in the world for eighteen centuries, and it is only during the last fifty years that our prisons and workhouses have been in that improved condition. It may well be asked, "How is it that it is only so lately that Christianity has begun to tell upon these particular features of society?" Then, in his 13th paragraph, Professor Lias seems to draw a distinction between what Christianity has done, and what China, Japan, India, or Turkey would do. Well, look at the atrocities which have been perpetrated by us in India, and Russia in Turkey in the name of advancing Christianity. In the general scope of his paper, Professor Lias has shown very eloquently how some things have improved, and how gross immorality is much less than it was before Christianity was introduced, but there are developments of immorality which are peculiar to, or which are much aggravated in the days in which we live. There are forms of vice with which, particularly in the profession to which I belong, we are brought in daily contact, and it is impossible to deny that these forms of vice are lamentably on the increase. I allude especially to commercial fraud and bad faith. Then, in

the domain of general history, the dreadful outbreak of the French Revolution was as awful, in its way, as anything that ever occurred in the heathen ages. The good, then, which Christianity has, no doubt, brought about, is not altogether unmingled with evil, which, though not necessary to Christianity, has been developed along with it. (Cheers.)

Mr. LEACH, a visitor.—I should like to say a few words, as an advocate for the opponents of Christianity, and I will begin with a small criticism. Professor Lias says, in a note to his 7th paragraph :—

“Theodora is not accused, even by Procopius, of disgracing the imperial throne with the vices of a Messalina.”

But I believe that the Professor is rather sceptical as to the evidence of Procopius in the case of Theodora. Now it seems to me that the evidence of Tacitus in the case of Tiberius is even more open to doubt, for I think the latter was much libelled. Then Professor Lias says, in his 5th paragraph :—

“Tacitus, at a loss how to shame his countrymen into decency, holds up before them in his despair, the half-naked barbarians of Germany as a model of what Romans ought to be.”

Now it is a question whether the object of Tacitus in writing the *Germania* was to show up the Romans. It seems to me that if an author of the present day were to write a paper on a savage tribe, like the Patagonians, for instance, and were to point out how different the Patagonians were from ourselves, it would be rash to maintain that he therefore contended for their superiority over us. It is not true that Tacitus wrote of the Germans with that meaning ; at all events I cannot discover that meaning in his book. As to the distinction drawn between Theodora and Messalina, there was so little difference that it is a matter of very slight importance. As to the stories of Procopius, I never heard anything so bad said of any one. As to the defence that these things were not done in public, I can only say that they were of a more strictly public character than anything ever said or done in modern society. In the 10th paragraph of the paper, Professor Lias tells us :—

“While England was still divided into six or seven kingdoms we find the genius of Christianity, ever tending to unity, had already created a national Church under the great Archbishop Theodore, and had thus anticipated the time when the people of these islands should dwell peaceably together under one sceptre.”

I question whether the tendency to unity which is thus noted was one of which we have reason to be glad. It was simply a tendency to treason. The tendency of the Church to unity in those times meant allegiance to the Pope, and meant a foreign power set up in this kingdom against the home power, and I do not think we need praise that. Further on in the same paragraph we have a quotation from Professor Stubbs :—

“‘The clergy,’ says Professor Stubbs, ‘felt their vows and spiritual relations to be a much more real tie than mere nationality.’”

I hardly think that Professor Stubbs meant that as a matter to be proud of. Then, in the 13th paragraph of the paper, we are told :—

“Ancient philosophy found its highest realization in the doctrines of Plato, and they have been found incapable of regenerating the world.”

But I deny that position altogether. Plato was a dreamer, and at Alexandria the neo-Platonists were considerably tinged with Christianity. However much they diverged from Plato, they owed their spirit to him, and that spirit was based upon an ideal existing in the upper world of which all bodies in this world got some share. I should say that the highest realization of ancient philosophy would be found in Aristotle, who adopted the scientific method, in going by the processes of induction, instead of by those of deduction. He wanted to do as Bacon did—to make a great national history, and to lead us up from particulars to generals, instead of going by the other way, and that is the same spirit which now pervades modern science, with all the benefits which it has conferred upon us. I come now to the real difficulty of the paper, where I cannot feel that it has quite given us a solution. Professor Lias says, in his 13th paragraph :—

“Heathendom has, at best, produced but the stagnation of the whole and the wretchedness of the many ; at its worst it has produced vice in its most hideous aspects, and misery in its saddest and most degrading forms, whereas Christianity has never for a moment faltered in its onward advance, from the moment when it assumed the control of man's destinies to the present time—a period of eighteen centuries—it has never ceased to produce a steady progress in everything which tended to the true welfare of man.”

Now that is a strong statement. Christ came when the Roman Empire was on the wane and fast breaking up. So far from Christianity tending to stop its decay, it did nothing of the sort. I will not say that it tended to hasten it, though I have no doubt that it was one of the many elements which hastened the break-up of politics and of society, but I want to know why it did not cure it. The Romans were a people who had shown great nobility of character and great capacity for good, and many of them, who had adopted the Stoic doctrines, were people of whom Christianity might have been proud. I want to know why Christianity did not stop the state of corruption which was going on and put things right again.* One answer to that may be that Christianity, for some reason or other, adopted a spirit of enmity to all knowledge. We find bishops and fathers of the Church decrying knowledge as Pagan, and as leading to doubt and infidelity, and we find St. Augustine saying that it is an immoral thing to suppose that there could be any antipodes, because the people who lived there could not see Christ when He came down to the judgment, for the earth would be between Him

* It was not generally adopted ; and even where adopted, it was too often rather in the spirit of Paganism, instead of that of *true* Christianity.
—Ed.

and them. Knowledge must have been at a very bad pass indeed when that was said by a father of the Church. I want to know why Christianity, instead of encouraging science, always opposed it.* Then I raise this further question : Is this progress which we have undoubtedly made in morals as well as in other things due to Christianity or to civilization ? Civilization, of course, is a term which we should all find it rather difficult to define, and I will not attempt to define it, but it seems to me that it is a great question whether Christianity and progress are to be considered as cause and effect. If we want to prove scientifically that one thing is a cause and another the effect, we ask, "Do we find the two things together, and when one is absent is the other absent ?" Apply that test, and we find that though Christianity and civilization are together with us at the present time, there was a previous time when Christianity remained and civilization disappeared ; and for nine centuries out of the eighteen during which Christianity has existed, we find Christianity present and civilization absent ; therefore I do not think it can be taken as proved that progress in morals is caused by Christianity. Of course the real fact may be that Christianity may be a development of civilization, and not civilization a development of Christianity ; and certain it is, that with the progress of civilization there has also been a progress in Christianity, which is far purer now than it was in the days of Justinian or of Charlemagne.

The CHAIRMAN.—I am glad that the paper has been so narrowly criticised, but it strikes me that whilst Professor Lias's opponents were doing their worst, they were with him all along. While I leave the Professor to defend himself generally, I would suggest to Mr. Dibdin that he will find that the Arabs never invented anything. All their science and art was traditional. They worked at it very hard indeed, but most of it came from Greece, and a little from India, and though they elaborated it they had no creative intellect, no power of originating ; this is my impression on the subject of Arabian science and literature, and I believe Professor Lias will concur with me. With regard to the criticism upon Tiberius I certainly incline to what Mr. Leach said, for I have always thought that one of the most touching portions of Roman history was the account which Suetonius gives of the emotion of Tiberius when he was compelled to divorce the wife whom he had loved so much. He was badly treated, and no doubt, had he been allowed to live with her, he would have been a very much better man than he was. I quite agree that he must not be looked upon as a person originally brutal and sensual ; but when he returned to Capri, no doubt in consequence of ill-treatment, he was what Professor Lias calls him. I would make one suggestion of my own to supplement the paper, and that is, that

* And yet we find that the Church was often the only organization which maintained learning. The monastic libraries in every country have tended to do so. We owe much to the learning of the clergy in all ages.—Ed.

Christianity, in the main, is more, perhaps, of a preventive than of an active force. Again, one does not see all the effect of Christianity at first ; it is only when you come to look into it that you find its real character and the real nature of the work it has done. Christianity must be judged not only by what it has done, but by what it has prevented from being done ; if we look at what humanity without Christianity became, and then look at what humanity, with all its native evil, has really become under the influence of Christianity, then, by comparing the two, we find a vast difference. Humanity, both with and without the influence of Christianity, has arrived at unsatisfactory results, but in the one case it is horrible, and in the other it is simply blamable. We must regard Christianity as the power which prevents the great mass of humanity from becoming corrupt. Civilization, if we look at it in the widest acceptation of the word, may certainly exist, and does exist, without Christianity : it is the full recognition of a man's being not only an individual but also what Aristotle calls *πολιτης*, a member of the community. It is to his social rather than individual capacity that civilization belongs. Now, Christianity introduces a higher civilization than any other. We have had Roman civilization, Chinese civilization, Arabian civilization, and Mussulman civilization, and we find the social as well as the individual character of the man recognized in all these ; but Christ gives us a better and higher society, and therefore the grandest form of civilization which the world has yet seen. Thus, though deplorable effects have sometimes been produced by the innate evil of humanity, yet I conceive that on the whole Professor Lias is right in his conclusion that the result of Christianity and its effect upon human civilization, have been far higher and better than the effect of any other system which the world has yet known. (Cheers.)

Rev. J. W. BUCKLEY.—I must say that I totally differ from our Chairman in the observation that Christianity is merely a preventive system. It appears to me that it is exactly the contrary ; it seeks to bring the heart of man truly and entirely into subjection to the will of God and Jesus Christ. It is true that Christianity fails to some extent, because the excessive corruption of man constantly rebels against it, and because Christianity has not yet got to its maximum ; but you take a very erroneous view of Christianity if you say it is merely a preventive system. It is a system to crush man's sin, and bring man's will back into subjection to the will of God.*

Mr. BUCKLEY.—I agree with what has been said about its failure ; for while man is what he is that must be so. Christianity has only done part of its work, but the rest will come in time. I say that Christianity is meant to correct all the evil in the world, and it will do it. The object of Christianity is to bring man's heart back to God, from Whom at present it is separated.

The CHAIRMAN.—I think you have quite misunderstood me. I never was guilty of anything so preposterous as to suppose that Christianity

* What law of civilization can we break without breaking a precept of Christianity?—Ed.

was not an active force. I should think it most monstrous if I had said anything of the kind. What I intended to say was, that I would supplement the paper by suggesting that we do not look so much as we ought upon Christianity as a preventive force, and that this character of Christianity ought to be distinctly brought out. Professor LIAS speaks of Christianity rather as an active force : I ask this Institute to look upon it as a preventive force also ; for I think the salting power of Christianity to preserve from corruption is a very important part of its influence upon humanity. But as to saying that Christianity is not an active force, I never had any idea of such a thing. (Hear, hear.)

Mr. R. W. DIBDIN.—You meant, in fact, that it has a negative moral force as well as an active force ? [The CHAIRMAN.—Yes, precisely.] I think that some of the observations which have been made to-night seem rather to have disparaged the effects of Christianity, but, speaking for myself, and probably for some others who are present, I repudiate any such interpretation of my views. It is quite possible that some of those who adopt the views of the Professor, may look at the world as at present existing, from rather too favourable a point of view, and may shade down some of the worst instances of vice and heighten up some of the virtues, so as to make the result more startling. But we emphatically deny that Christianity has failed. (Cheers.) Christianity has influenced all mankind in a marvellous way. It has not yet leavened the whole lump, still its results are visible everywhere. It is very important to remember that the great object of Christianity is to deal with individuals rather than with large masses of men, and that in so far only as the individual is touched, will the large mass be materially influenced. We find in the teaching of Christ Himself, that He addressed it much to individuals ; and we find the Apostles constantly writing to men who professed Christianity not in a general and wide sense, but impressing upon them its *personal* importance. Take the case of a drunkard, who has been the terror of his neighbourhood and the curse of his family : in how many cases have such men been reclaimed by the influence of Christianity, and been led to be respectable and honourable members of society ! Christianity has done a great work here, which is not lessened because there are other drunkards unreclaimed. The case of nations where there are only a few really Christian people and the great majority are indifferent, or are absolute disbelievers in the doctrines of Christianity, simply shows that Christianity has not had its full power there, and its influence has not been thoroughly brought to bear upon the population. I believe that Christianity has not failed in what it has done, and that it will not finally fail in what it will do in the future, and I think that something was needed to be said in the course of this discussion, to show that we do not think there is any reproach attaching to Christianity because its indirect effects, though admittedly great, have not been greater. (Cheers.)

Professor LIAS.—I have to thank those who have been performing the

part of the opponents of Christianity ; for one of the great advantages of discussion here is, that we all wish, as Christian men and women, that nothing should go forth as our defence of Christianity which is not capable of bearing the test of criticism and of the severest examination. With regard to the remarks that have been made, I think it would be best for me to notice them *seriatim*.

Dr. Kennedy complains that he does not understand my metaphor in answer to Mr. Greg. Let me, therefore, explain that I referred to the fact, that Christianity has all along been slowly leavening the mass through the life of the individual ; that the result has been a gradual rise in the tone of Christian society ; that this rise, in accordance with the teaching of Christ, was due to the secret and hidden influence of the Spirit, who comes we know not whence, and goes we not whither, and is, therefore, not, as a rule, to be looked for in public, among those in high office, even in the Church, but rather among those who lived lives of retirement, until the often repeated influence of such lives has leavened society as a whole, and has been thus able to mould the characters of those who live in the world, and occupy its high places. I should not be disposed to admit that it was a "notorious fact, that, for certain ages, Christianity was scarcely better than old heathendom." I should be disposed to say, that at its very worst, as Mr. Lecky admits, it was infinitely superior to the heathen world at its very best.

Mr. L. T. Dibdin has raised some objection to the fact that I referred to the late Canon Kingsley as "an earnest and vigorous defender of our religion." I was not referring to *Yeast*, in which perhaps it may be said that he was, to a certain extent, an unbeliever ; but I do feel much indebted to him for my knowledge of Christianity, especially in what he wrote in *Hypatia*, where he shows that it was doing a great deal of good in the world. I ought not to omit a reference to his *Phaethon* and to his Sermons, with their vigorous, manly, Christian tone. As I read my paper this morning before coming down to the Institute, it struck me that that passage in the second paragraph which has been referred to, was capable of misconception, that it almost made it appear as if I thought that the philosophers and sages of Greece had done as much as Moses for the elevation of man. Now I did not mean it in that way. What I meant to say was, that it was as certainly a part of God's education of the world as any other part of His education of the world ; but of course I admit that the phrase "as much" is liable to misinterpretation. The same observation may apply to the passage taken exception to in the third paragraph of the paper. As to the question whether Tiberius was sensual or not, that does not affect the situation in any appreciable degree. Our chairman has anticipated my reply to a great extent, but I may add that two sides can be taken of every character. Some people think that Henry VIII. was a very good man, but that is not an opinion which is generally held by English society. No doubt there were features in the character of Tiberius, his emotional character and the elevated and

noble sentiments he expressed at times, which make it very easy for one to say that Tacitus was very hard upon him ; but the fact is, that that is a matter of pure detail. I can only say that I am very glad I did not live in the reign of the emperor Tiberius. With regard to Tacitus, I would simply remark that many thinkers of eminence have been of opinion that the *Germania* was written to shame Rome. That may not have been the case ; but either way, that, again, is a matter of pure detail. Then, with regard to the empress Theodora, we are threatened with a discussion, the reverse of edifying, as to whether she or Messalina was the worst ; but that is beside the point I wished to bring forward. My point was that Christian society would not allow a Theodora *on the throne*, to indulge in the vices which were not even rebuked in the case of Messalina, which shows that Christianity had become a very powerful moral force in the course of a few centuries, even in the depraved atmosphere of Byzantium. Then I have been accused of making a startling statement, when I said that " whatever was done for conscience' sake, however ill-informed that conscience may be, will, in the end, be productive of good rather than evil." I adhere to my statement. " The blood of martyrs " has ever been " the seed of the Church " ; and even religious persecution, if it has had no other good effect, has never failed—(1) To deepen and purify the faith of the persecuted ; and (2) to attract others to it. Even if the persecuted faith should be in some respects in error, yet it is the truth, and not the error mingled with it, that gives strength to stand the test ; it is the truth, and not the error, which attracts men to it. The next point I come to is, as to whether chivalry was due to the Moors. I am aware that many of the Moors were persons of polished manners and of a character superior even to many of the knights of the West who combated them ; but a careful examination of the history of chivalry and of its connection with the Crusades will, I think, justify my opinion, that the war undertaken under the Crusades, though under a mistaken view of what Christ's service demanded, had the effect of bringing Christianity to bear on the usages of war ; and no one can possibly deny, whatever individual instances of atrocity may be brought against it, that war, as carried on in the nineteenth century, and as carried on centuries ago, are two very different things ; and to what can that difference be attributed, if not to our religion ? Then again, with reference to the same speaker's remark, that chivalry was due to the Moors, I would reply that the institution of chivalry, as known in Christian Europe, was deeply tinged by Christianity ; and I would venture to maintain that Saladin, though courteous, cultivated, and honourable, fell very much below the ideal of manly virtue which the chivalry of Christian nations held up before its votaries. Then I was told that the Franco-German war was due solely to the jealousy and ambition of the sovereigns who engaged in it. Now I think that statement I may venture distinctly to controvert. It was not simply the ambition of a king, on one side or the other, but what I have called the clash of opposing principles, as held by large masses, which led

to that war. I do not believe the Franco-German war would ever have taken place, but for the concealed irritability of the two peoples who met in that deadly conflict. In the Middle Ages one man could throw Europe into a state of war, while now, it is only the antagonism, not of rulers but of peoples, that can bring it about. However this, after all, is a mere matter of opinion, and if anybody likes to strike that passage out of my paper, it leaves the position as it was before. As to the question of workhouses and prisons, there were many organizations for the relief of distress in our monasteries much more than fifty years ago. Then I come to the point about Russia and Turkey, and all I would say is, that while there are sure to be differences of opinion on the subject, I would rather live in Russia than in Turkey, and I would prefer to live in England, to being in either of those countries. There is this to be said for Russia, that with all her faults and all her absolutism, she has emancipated her slaves within our memory, and to what has that been owing except the influence of Christianity, which, even in Russia, is a great controlling power? (Cheers.) As to India, I would only refer to the efforts being made to put a stop to the famine, to show that the most beneficent, the wisest, and the best Government for India, has been that of its Christian rulers. As to the question whether, in commercial morals and good faith, we are worse now than we were before, I do not know that this is the case. We are all prone to exaggerate existing evils, and if you take the *Times* of fifty, sixty, or seventy years ago, you will find plenty of records of commercial dishonesty. I never said that Christianity had eradicated evil from the world, but I do point to the country in which we live, as showing us the best and most glorious development of Christian principles. We cannot help admiring, for instance, the conduct of our working men who are on strike now, when we compare it with what they would have done thirty-four years ago, for it shows what Christianity has done, to make its principles felt among those who a little time ago would have risen in violence and indignation, whenever arrangements were made of which they did not approve.

A visitor (Mr. Leach) states that poor Archbishop Theodore was, somehow or other, instrumental in bringing the Pope into England. He was sent here by the Pope, no doubt, but when here he did not choose to obey the Pope; he simply ignored his interference in the ecclesiastical affairs of this country, as much as the Archbishop of Canterbury would now. It was not until the Norman Conquest that the Papacy was really brought here; but Archbishop Theodore brought the various parts of the country into a kind of ecclesiastico-political union, and so paved the way for one ruler with one sceptre, and for putting an end to the war, strife, and murder to which we had been condemned since the invasion. Now, I come to that unfortunate 13th paragraph in my paper, where it seems I have committed the terrible blunder of using the name of Plato instead of the name of Aristotle! But any one who does not like my argument can substitute the one name for the other to suit himself. Then Mr. Leach asks why Christianity did not

stop the decay, and arrest the break-up of the Roman empire. To that it would be enough to remark, that God both could and did choose to bring about the regeneration of society by other means. But a fuller answer can be given. The Roman empire was doomed, like other empires, to decay, because, like them, *it was founded upon a falsehood*. Its principle was the deification of man as man, with all his imperfections on his head. We learn from the prophecy of Daniel that the "stone made without hands" had long been destined, in the providence of God, to destroy that evil, that idolatrous principle, and to substitute for it the deification of man by personal union with God. The dissolution of the Roman empire, with its *Divus Imperator*, its sacrifices to his *genius*, must first take place, before society, constructed upon its only true basis, could advance to her true perfection. Mr. Leach next inquires, why Christianity, in times past, instead of encouraging science, always opposed it. In the first place, his remark is true of physical science only; for, as was remarked (to me) in the course of the discussion, we owe all our other knowledge to the mediæval clergy, who cultivated it, as far as possible, in their monastic retreats, when the world outside was in too disturbed a condition to pursue it. In the next, we have to remember that one great truth of Christianity was this, "To the poor the Gospel is preached." The old philosophies exalted the intellect; they had no message for the poor and degraded; they had descended, in and after the Apostolic era, to mere displays of disputation and rhetoric. The Gospel came with an emphatic proclamation of the principle, "not with wisdom of words, lest the cross of Christ should be made of none effect." Whether the world has been, on the whole, a loser by the fact, that this foundation has been made secure, before men were permitted to build the temple of knowledge upon it, I will not argue. But I think that the gradual nature of God's dealings with man has been entirely lost sight of by the objectors to my line of argument. He who, so far as modern science would lead us to conclude, formed the visible universe by processes extending over periods of vast duration; who took ages upon ages to prepare this earth for habitation by man; who permitted mankind—assuming the truth of Christianity—to live for thousands of years without its light, can hardly be complained of, if He allowed some centuries to elapse before the influence of Christianity upon the world had reached even its present stage of development. Christianity has done wonders in the past; in the future it has, I believe, still greater triumphs in store. Mr. Leach asks whether our present progress is due to Christianity or civilization. In reply, I would simply point to the fact, that without Christianity, civilization, whether in Egypt, Assyria, Persia, Greece, Rome, Arabia, India, has been the parent of decay. It has secured permanence only when allied to Christianity. This fact decides the question, whether we owe to Christianity or to civilization the blessings we now enjoy.

With regard to the idea of Mr. R. W. Dibdin, that I was, to a certain extent, reflecting the whole influence of Christianity, and heightening the lights and darkening the shadows, I do not think my paper is justly chargeable

with that, because it has simply dealt with facts as they are. My argument was not that Christianity has succeeded in driving away all vice from the world, because I could not live a week or a day without finding something that would conflict with that view ; but what I say is, that vice existed before Christ came, and that Christianity has restrained it, and is restraining it to a great extent, and therefore it is so far clear that Christianity comes from God. Then I have been told that Christianity exercises an influence rather upon individuals than upon the world. If Mr. Dibdin will turn to the 14th and 15th paragraphs of my paper, he will see that I have made that observation myself, but I cannot of course carry it out at length in so short a paper. I must leave my audience to bear something in mind. I have taken it as my starting-point, that if Christianity has produced, as we know it has produced, a marvellous influence upon the lives of individuals, that influence will make itself felt throughout the world, that you or I, so far as we are influenced by the spirit of Christ, exercise a restraining influence upon all around us, and do our best to raise the moral tone of the whole of society. Then as to drunkenness, the same speaker seemed to say that it was not banished from the lower classes, and that is what I said myself ; but I say also, that it is my firm belief, that the efforts now being made by Sir Wilfrid Lawson and others will not be many years without bearing fruit, just as the agitation under the great Wilberforce for putting down slavery bore fruit. Some of us may not live to see it, but I believe that others now in this room will live to see drunkenness banished from all classes, simply and solely through the influence of the Christian religion.

Finally, I would like to make one remark about the letter of Dr. Irons. Dr. Irons seems to think that I have not given enough effect to the doctrines of Christianity as apart from its moral power. Perhaps I have not dealt with that point so clearly as I wished to do, but what I wished to bring forward was that the moral power of Christianity was inseparable from its doctrines. Christianity could have had no moral power whatever if our Lord had only preached the Sermon on the Mount, or only talked wisely and well, and done nothing more. But what I have said in the paper, though I confess that I have not laid sufficient stress upon it, is that Christ gave us the power to carry Christianity into effect : He not only gave us the purest and best morality that the world has ever seen, but the means of carrying it into our lives and our souls ; and that the spring of all virtue and all morality is Christ Himself. When we say that a moral power has been introduced into the world which will compare with any influence brought to bear on us before, we say in effect that we believe that in the beginning was the Word, and the Word was with God, and the Word was God. (Cheers.)

The Meeting was then adjourned.

* * *This discussion is given verbatim, as many popular objections are treated on therein.*

ORDINARY MEETING, FEBRUARY 5TH, 1877.

THE REV. G. CURREY, D.D., MASTER OF THE CHARTERHOUSE,
IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

ASSOCIATES :—Revs. A. Knox, B.A., Birkenhead ; A. Langston Oldham, M.A., Rugby ; Maitland Wood, Birkenhead.

Also the presentation of the following Works for the Library :—

- “ Proceedings of the Royal Society,” Part 176. *From the Society.*
 “ Proceedings of the Royal Geographical Society,” Part 1. *Ditto.*
 “ Proceedings of the Royal United Service Institution,” Part 88. *From the Institute.*
 “ Proceedings of the United States Geological and Geographical Survey.” *From the Survey.*
 “ Address at the Inauguration of Adelaide University.” By the Lord Bishop. *From the Author.*
 “ Essay on International Law.” Rev. J. P. Thompson, LL.D. *Ditto.*
 “ On Free Trade.” J. Wood, Esq. *Ditto.*
 “ On the Fourth Gospel.” Professor J. S. Porter, D.D. *Ditto.*
 “ On the Great Pyramid.” Rev. H. B. Wrey. *Copies from W. H. Ince, Esq., and N. Whitley, Esq.*

The following Paper was then read by the Author :—

ON THE STRUCTURE OF GEOLOGICAL FORMATIONS, AS EVIDENCE OF DESIGN. By DAVID HOWARD, Esq., F.C.S.

THE examination of the structure of geological formations has shown to a surprising extent the simplicity of the processes that have brought about the present condition of the earth's surface. We propose, therefore, briefly to examine how far this simplicity extends, and whether the evidence of a Creative Hand in nature is in any way diminished by these discoveries.

2. The idea of some, indeed, is, that, given a nebulous mass, the forces of nature of which we know are quite sufficient to explain the formation of the world. Now, even if this be true, such theories are not necessarily antagonistic to a true belief in a Creator? Whence came this self-evolving nebula? So marvellous a creation needs a Creator no less than the fully-evolved world around us. And what are the forces of nature of which we so glibly talk? It is well for us to consider how little we really know what they are, or whence they come, before we attribute to them that self-existence which belongs to the Divine Essence. It is undoubtedly the case, that the more we study the structure of the earth the clearer do we find the indications, in many of the strata at any rate, of the probable mode of formation from pre-existing rocks; but the more carefully we follow out the problem into detail, the more we shall be struck by the order and fitness which prevail everywhere in the result, and which show an overruling design so well marked, that it is absolutely inconceivable that it should be the result of chance. If we find that the "forces of nature" in their action through past ages, have been so tempered as to preserve that fitness for supporting life that we see in the world around us, and by marvellous compensation reproduce the very strata that they seemed to destroy; if, instead of bringing

about that dead level of uniformity which chance would produce, they still preserve what seems a superfluous richness of diversity in the result, the conclusion is surely forced upon us, that the whole has been the work of a guiding intelligence ; and this conception of creative might, followed by formative energy, ever moulding the universe with startling simplicity of means, yet with amazing diversity of result, is surely not less worthy than the cruder one, which would attribute to the Creator creative acts, yet refuse to trace the process of those acts.

3. The highest results of human invention or constructive skill are always marked by simplicity in method and diversity in result. If we trace, for instance, the history of the steam-engine, we find that progress has been always in the direction of simplicity ; the earlier engines are distinguished by complex arrangements, which in the later forms are replaced by others at once more simple and more effective. In the steam-valve, we begin by clumsy complexity, and end in a result so simple, that the wonder is that it was not the very first thing tried. If this be true of human work, need we fear to trace the same notes of perfect workmanship in nature ? It is specially from this point of view that the study of geology is interesting to a chemist. We see clear evidence in the past of the forces now at work around us, of the disintegration of older rocks by air and water, and the formation of others from the detritus. But the general tendency of these forces is the mixture of the elements upon which they work ; we see and understand how the varied rocks of a watershed are reduced to the state of formless mud that we find at the mouth of a river. But so far from river mud being the chief result of this formation, we find that the elementary bodies are distributed with the most perplexing inequality.

4. The chemist can, no doubt, in his laboratory effect with more or less success the separation and combination of the elements ; but the processes he uses are in most instances of a nature which it is absolutely impossible to conceive to have produced the natural minerals, and almost every specimen in a mineralogical collection suggests chemical problems of the most interesting nature. Here, then, we have just those marks of the highest workmanship of which I have spoken ; if we have learnt anything from geology at all, the forces that have been at work are startlingly simple, and yet the variety of the results is such that not only we cannot with all our complex apparatus and varied means reproduce more than a small fraction of

them, but we are utterly at a loss to understand how those forces can have produced all this variety. By all means let us study the formation of stratified beds of sandstone or clay, and fathom if we can the mysteries of the chalk and coal formations; but let us not lose sight also of all the other less conspicuous chemical problems that must be solved, before we can boast that we have grasped the whole mystery of the world around. The more we do this the more we shall be struck by the complexity of the problem, and the more we shall find to admire in the first cause of what we see.

5. There will, I fear, be some who, realizing the marvellous nature of the result, will rest content to see the first cause in the forces of nature; but if we in any measure fathom what is the result, we shall surely see that blind chance, or a fortuitous concourse of atoms, has not formed the world; and I would ask those who still rest content in accepting the forces of nature as the causeless causes of the world, if these forces are more comprehensible than a Creator, or if in denying the Creator they have diminished in the slightest degree the difficulty of the explanation of the creation.

6. Let us fully examine the globe, and the stages through which it has passed, and then see if a nebulous mass left to itself can be conceived as the origin of it all; and let us fully realize all that the laws of nature have wrought, all that zoology and chemistry can teach us of the marvels of their work, before we deny the conclusion, at once most natural and most true, that such a creation has had a Creator, and that such laws are but the expression of the working of Him "in Whom we live, and move, and have our being."

7. Among the most brilliant discoveries of modern science is the application of the spectroscope, not only to the analysis of the terrestrial bodies, but also to the analysis of the sun and stars themselves. The presence of a large majority of those elements most familiar to the chemist is clearly shown in the sun. The same analysis applied to the fixed stars, however, gives most unexpected results; the spectra they give make it plain that they are in a condition similar to the sun, but by no means identical in composition; the black lines, which are the indices of the presence of volatilized metals, in the solar atmosphere are there, but they are not identical with those given by the light of our sun. Some of the most familiar lines are present in the light of almost all of the stars that have been examined, those of hydrogen being present in forty-

eight out of fifty examined, those of sodium and iron in a considerable number, but others are absent. It is perhaps too soon to say that the elementary bodies of which these suns are composed are different from those we know; but, at any rate, we may be sure that the proportions must differ widely from those in our sun. The results of the examination of certain nebulæ are even more remarkable; they prove to consist of incandescent gases, not of a light-giving sphere, surrounded by vapour, as in the other cases. This has been assumed by some to prove that they are future worlds still in a nebulous condition; owing to the dimness of their light, it is impossible to speak with certainty of the absence of elements; but so far it is remarkable, that gaseous matter only has been shown to be present; and, as far as chemistry can show, no condensation could develop the solid substance of the world from these few elementary gases.

8. These differences of composition among the different systems of the heavens are most interesting, carrying us back for their origin to the very foundation of the worlds, to that first beginning of things when the vast systems round us took their form; and even then we see that no mere chance ruled, but that we must look for a cause sufficient to explain these diversities of composition. We may go a step further still, and ask, "What is the cause of those different forms of matter which we call elements?" It is well not to be too certain in scientific questions; some day we may fulfil the dreams of the alchemists, and transmute one element into another; but if that day does come, we shall have to relearn the first principles of chemistry, and perhaps most of our other sciences too; and till then we may assume that there are about sixty-four elementary bodies. We are so used to take this for granted, that we do not consider how totally unable we are to explain it. All our knowledge of the forces of nature is entirely at fault here; yet, till we can give an explanation of this first of our problems, we cannot boast of a complete knowledge of creation.

9. The recent investigations showing that motion, light, heat, electricity, magnetism, are mutually interchangeable, make this essential diversity of the matter on which they act still more remarkable; and it is contrary to all *à priori* conceptions that it should be so; we can much more easily conceive of matter as one, and the forces as many; than of matter as various, and the force as one. Even if it should be that all these elements are but forms of one matter, the extraordinary

persistence of the elementary forms is equally remarkable, resisting as it does all the forms of force that can be brought to bear upon it.

10. If we begin at the lowest rocks, we are at once met by one of those problems, the solution of which still remains a mystery,—I mean the formation of granite. Occurring as it does among the very earliest rocks, so many of which bear the most evident traces of fusion, it was for long taken for granted that this singular formation also was of the nature of a lava, and that it resulted from the cooling of a melted mass.

11. The separation and rearrangement of its constituents into the well-known definite crystals of felspar, mica, and quartz, that make up granite, by gradual cooling, is conceivable, though we are quite unable to repeat the process by again fusing and cooling the mass; but this hypothesis is shown to be untenable, by the curious fact that the crystals of felspar are found to be embedded in those of mica and quartz; felspar, however, is the most fusible of the three constituents; and therefore, if the crystallization was caused by the cooling of a fused mass, must have formed last, in which case the quartz and mica would have been embedded in felspar. Finally, we find veins of granite running through rocks which do not bear, as we should expect, signs of the tremendous heat to which they must have been exposed to allow the granite to remain fluid while penetrating into the vein, and this point should specially be noted, as the structure of granite could not possibly be produced except by slow cooling.

12. All these considerations lead us to the conclusion that we must look to some other cause for the origin of granite; and though we may vaguely guess that it may probably have been formed by the combined effects of heat and pressure in the presence of water, the guess is but a confession of our ignorance of the conditions of its formation, and still more of the causes that brought about those conditions.

13. We are thus, in the very first step of the inquiry, brought face to face with a problem well suited to impress us with the vastness of those forces, that, guided by some directing cause, have so wonderfully wrought upon the face of our earth.

14. There is somewhat less difficulty in understanding the formation of the other igneous rocks, though we cannot but be struck by the diversity of composition, which marks a selective power in nature, of which we can form but little idea. Here, too, in this simpler question we find curious difficulties; the

structure of porphyritic lava is altogether different from that of recent lava from active volcanoes, and tends to show that other forces than mere fusion and solidification have been at work. The origin of metamorphic rocks also remains still unexplained.

15. They present evident signs of stratification, as if deposited from water, and contain fossil remains, and yet possess a more or less crystalline structure, closely resembling that of the primary rock. Strange theories have been made to explain this double character, and fire and water, electricity and magnetism, have been called in to account for them, without an attempt being made to explain how they can have produced the result. A careful and patient study of these rocks may ultimately lead to an understanding of their true nature, but will also without doubt impress us with the variety of conditions that have been brought about in their formation. The pseudo-morphic minerals form in this respect a most interesting study. In them we have the form of one mineral, and the constitution of another; showing that since the first formation of the mineral, other agents have so altered it, that it is in fact a cast of the original crystal in new matter. Probably in all these cases, the element which has been substituted for another, has acted in solution upon the original crystal, the original constituent being carried off in solution, without alteration of the original form of the mass. But when we endeavour to trace the origin of these solutions which have acted thus locally, and as it were capriciously, we find it impossible to do so.

16. To a certain extent the formation of the stratified rocks is less difficult to understand. The disintegration of primary rocks, and the gradual elutriation of streams, give an easy explanation of the formation of the sand and clay, which form the basis of the non-calcareous rocks. An examination of the geology of Dartmoor or Cornwall will easily show us the decomposition of granite, and the separation of the detritus by elutriation into clay and sand, the alkali being carried off in solution, and we can almost watch the progress of the process.

17. If, however, we examine the beds deposited in the Moreton Hampstead Valley, we shall see that this has gone on with very different rapidity at different times. If it were continuous, the valleys should be filled by a continuous deposit, but we find alternations of clay and sand, and peat, evidently pointing to great changes of the condition of formation.

18. The consolidation of sands and clay into sandstone and

slates and shales we can in some measure trace, though even here there are links missing in our knowledge. We know but little, for example, of the origin of the amorphous silica, which cements the grains of sand together to form sandstone. I have never been able to find, however, even an attempt to trace quantitatively, the relations between the constituents of the primary rocks and those of the different rocks of each succeeding period, and till we have done this, we cannot claim to have certainly traced their origin. But besides the clays and sands of which we have spoken, there is a no less important class of rocks, the origin of which is a most difficult question. We can actually watch the formation of clay; but what about limestones? The analytical process which can extract a pure marble from a diluvial mass is certainly a most remarkable one. The chemist is here at fault. The methods he would use, however effectual in the laboratory, are certainly not those of nature, and we must look elsewhere for the explanation. There is one agent, no doubt, that we find in nature which can effect this separation, and as far as I know only one—that is, the life of the lower animals. By that mysterious power of which we know so little, that we call life, a zoophyte can extract the dissolved lime from water and give us a coral of pure carbonate of lime; and the combined labours of countless myriads of globigerinæ have sufficed to build up the chalk to its vast thickness. No branch of investigation has given more interesting results than those of the deep-sea soundings of the *Challenger*, showing, as they do, that the process of chalk-formation is now going on, in the same manner that had been determined from the examination of the chalk of past ages. It may be that chalk and coral are examples of the mode of formation, which alone in the past ages of the world has produced the limestone formations, and the crystalline form induced afterwards by subsequent changes; at any rate, we have no certain knowledge of any mode by which carbonate of lime is separated in a pure state in nature except by the operation of animal life.

19. In the chalk formation, as we all know, occur the flints, which again in later formations supply the material for gravel, when the chalk has been washed away; a process familiar enough to any one who has walked over the shingle at the foot of a chalk cliff. Much as we know about the formation of chalk, we have yet learnt very little of the origin of the companion flint. It has been attributed to marine infusoria and sponges, but this is, as yet, little more than a guess, as

we have no knowledge of such growth, capable of producing the solid masses that make up the vast beds in question.

20. There is another very well-known formation, which may also serve to remind us of the past influence of that mysterious power of life upon our globe. We acknowledge that coal is the result of vegetation, with but little realization of the stupendous luxuriance of growth that must have been required to produce the thick seams of coal that we have so extravagantly dealt with, yet before we think we have grasped the problem of the world, we should be prepared to show whence all that wealth of carbon was derived, whether it was all previously existent in the atmosphere as carbonic acid, and what must have been the effect of its withdrawal. I may here remark that all calculations made with a view of proving the length of time that has passed in the formation of the various strata, from the rate at which similar formations take place at the present moment, are vitiated by the impossibility of proving that the conditions were absolutely identical with those which we are observing. We know that a comparatively small difference in the depth of water is sufficient to put a stop to the growth of coral, and that the variations of temperature that the zoophyte can bear are very limited, but we do not yet know how rapidly it is possible for the coral formation to go on when all the conditions are favourable, and specially when the supply of the requisite carbonate of lime is abundant. The same remarks are true of the chalk formation: it may be that what we are now able to observe of ocean life is but a faint survival of the teeming vitality that has been supported in the sea in past ages, the records of which are written in the vast chalk-beds. The clay deposits of which we have spoken give us another example of this uncertainty.

21. It is very tempting to say an inch of deposit has been formed in a year, therefore if the deposit is 1,000 inches thick it is 1,000 years old; yet nothing can be more fallacious. We see the stream in summer running perfectly clear from the spring on the moor, bringing down no deposit at all, but, on the contrary, cutting its way through the mud previously brought down. A thunderstorm passes over the moor, and in a few hours it is pouring down a muddy stream, carrying more sand and clay in a minute than a century of its former current could have moved; and if it change thus from hour to hour, how can we form even a slight idea of what effect the tremendous changes of climate, of which we see traces, have had on the

time occupied by geological changes of which we see the result? A change of temperature, of moisture, of carbonic acid in the air, may not merely make our calculations somewhat inaccurate, but almost infinitely wrong.

22. We see, then, that the process of formation of the more familiar strata of the globe is in great measure comprehensible to us; though the more we examine the subject the more we shall be struck by the proportion and fitness that prevail everywhere, and which point most clearly to a guiding power, rather than to blind force.

23. There are other deposits, however, which we cannot, as yet, trace to their origin. Iron ore is found in beds, some of which are of almost pure oxide; the separation of it in this state is most difficult to account for. We do not know by what alchymy of nature the conditions required for such formation could have been brought about, or by what selective process the iron was thus collected together, instead of being, as we might have expected, distributed through the rocks. The same difficulty meets us in a still stronger degree, when we examine the deposits of other metals; by what power were they separated into the veins of the rocks where we now find them? and how comes it that in one vein we find copper ore, or, stranger still, metallic copper, in another lead ore, in another tin, in another silver?

24. We must be struck with the prodigal variety of nature, if we may use the word, which has enriched the earth with substances, the use of which in the economy of nature remains still a mystery to us; and the means by which they have been kept in a separate state is yet more perplexing to us.

25. Of the sixty-four elements, but a small portion make up the mass of the globe; the proportionate quantity of the rarer elements is almost infinitely small. By what power have they been preserved from total loss in the general mass, and why do we find them distributed in small deposits, with no assignable cause for their separate existence?

26. This is not only true of the rarer elements, but also of special conditions of the more familiar ones. In Asia Minor and elsewhere we find beds of carbonate of magnesia, of which some portions are chemically pure. The structure of the rock is very curious; it is not crystalline, but would seem to have been consolidated from a moist precipitate by great pressure.

27. Chemistry can produce a crystalline carbonate of magnesia from a solution in water and carbonic acid, but if we

attempt to produce an amorphous carbonate by precipitation, we lose a considerable portion of the carbonic acid, and obtain a mixture of hydrate and carbonate. Now, before we can explain the formation of this magnesite, we must show not only how the carbonate of magnesia was precipitated in an absolutely pure state, but how it was thrown down in a precipitate of this remarkable constitution. The natural compounds of boron, borax, boracic acid, and borate of lime, are another example of an element of comparatively rare occurrence, yet which is found in great quantities in particular places. In Tuscany, the steam from certain suffioni is impregnated with boracic acid, which collects in the water, through which the steam forces its way into the air; in South America, borate of lime is found in beds in rounded masses, which are dug up like potatoes. In some parts of California or Nevada, in addition to these deposits of borate of lime, there are also found lakes, the water of which is so strongly impregnated with borax that crystals of it are found in the mud at the bottom; and similar lakes in the North of India yield the tincal of commerce.

28. There has been much speculation as to the probable derivation of these various deposits from boracic acid from suffioni, but no one has hazarded an explanation why this element should be thus abundant in rare spots on the globe, and almost unknown elsewhere.

29. It would be easy to multiply instances of this unknown analytical power in nature, which has thus balanced the tendency which we see in the processes going on around us, to mix all things into one even mass; but enough has been brought forward to show that a balance of forces has existed and still exists, that it is incomparably easier to conceive as the result of design, than of blind chance. The study of geology, and the light it throws upon the formative processes that have been at work upon the earth, thus show us that the compensative power which causes the waste and destruction of the animal to be the life and growth of the vegetable, and the vegetable to be the sustainer of the animal, has been at work from the earliest ages, ever unravelling the seemingly tangled skein of counteracting forces, and ever reproducing from the waste and destruction of the earth's crust a fresh, yet ever-varied, repetition of forms of matter. We can, it is true, trace in some measure the action of these forces; but there are wide gaps in our knowledge even of the details of those processes the operation of which we know most of; and these processes of which we know anything

are but a small portion of those that must have contributed to produce the world we see. We are utterly unable to grasp the whole, or to feel that we have mastered not the details only, but the very plan itself of creation. We see, then, processes so simple that they perplex us by their very simplicity, giving results of infinite complexity, results which we can only avoid attributing to a Creative Intelligence by using language about the forces of nature, which, if words have any meaning, attribute deity to those forces.

30. The old argument from design is thus left strengthened, not weakened, by the progress of our knowledge, and still with those unexplained points which are the necessary evidence of its truth. We sometimes speak as if it were needful, in order to prove an intelligent author, that we should be able to explain the whole scheme on which He worked, instead of boldly claiming the difficulties of such a proof as its strongest evidence. If the design is fully within our grasp, there is clearly no proof so far that the designer is of higher intelligence than ourselves. We may pursue the study of geology with no fear of that result; we shall still find the clearest evidence of design, and of the design of an intelligence infinitely above ours, which we may reverently study, but can never fathom.

The other branch of geological study,—that of the successive forms of life upon the globe, is too wide a subject to enter upon now, yet I cannot avoid alluding to one point which is more directly allied to the questions we have been considering.

Great as have been the discoveries of modern chemistry, they have thrown but little light upon the mystery of life; the old distinction between organic and inorganic products has been found untenable, and it has been found possible to produce from bodies undoubtedly inorganic products that would certainly be classed as organic; yet the distinction between organized and unorganized bodies is brought out more strongly than ever by these very discoveries.

We can in a measure imitate the destructive processes of life, and form the compounds that are the result of secretion and decomposition; but the constructive powers of the living organism are as much beyond us as ever.

No light has been thrown upon the origin of life, and thus each fossil that we find, even of the simplest form, is a proof of the Divine power, which alone can bridge over the gulf that separates the living from the dead.

The researches of Pasteur and Tyndall masterpieces of

accurate scientific study, prove, as far as it is possible to prove anything in science, that all life, even of the most elementary forms, is derived from antecedent life.

If this is true now, we must suppose it true in the earliest geological periods, and are therefore left with no explanation of the great mystery of the presence of life upon the globe, but that, at once old and true,—the fiat of Omnipotence.

The CHAIRMAN (the Master of the Charterhouse).—I am sure I may convey the thanks of the meeting to Mr. Howard for his interesting paper.

REV. DR. FISHER.—(*A Pause.*)—Perhaps it is because the paper is so much beyond the reach of hostile criticism that no one rises to speak upon it. I have had much pleasure in reading it over at my leisure, and also in hearing it read; but perhaps a friendly critic may say that it is, if anything, rather modest in some of its statements. It might advance a little further than it has done in some things, and instead of speaking hesitatingly, it might assert, most strongly, the point at which it aims. In the 24th paragraph I find this passage:—

“We must be struck with the prodigal variety of nature, if we may use the word, which has enriched the earth with substances.”

Now, I think a good many of our difficulties, at present, arise from the want of good definitions, and adhering with precision to those definitions. There must arise here the question of what is meant by Nature. Do we mean by Nature the whole of existence, or do we mean the whole of created existence? Shall we say, as Chatham said in one of his speeches, “God and Nature,” or shall we say “Nature”? Almost all the sceptics admit something of creation; scarcely any of them will say there is no such thing, or they confound and contradict themselves. We first hold by Nature as the sum of created existence, and then stand up for God as the creator of all, and then we can understand the “prodigal variety”; but Nature of itself, we hold, is blind. Nature of itself can do nothing, except through processes which the God of nature produces. This is, in my opinion, an important point: we should have good definitions first, and precision of language in speaking afterwards.

REV. PREBENDARY ROW.—There are few things in the actual statements in the paper with which I should be disposed to find fault, but it appears to me that it fails to realize the point stated in the programme. The paper is entitled “On the Structure of Geological Formations as Evidence of Design,” but it seems to me that the evidence of design has been nowhere pointed out, except in one case, where we are told that the various stars are composed of different materials from the earth or the sun. No doubt if that is established as a fact, it will prove the presence of design, because

otherwise, we should expect to find that all the materials of the universe were alike, and therefore such a variation would, no doubt, prove the presence of some power which has prevented the whole from being fused in a common homogeneous mass. But I cannot find in the paper what are the distinct points of design which Mr. Howard supposes the paper to prove; there is a great deal of interesting matter in it, but I want to know what this has to do with proving the presence of design, or, as I should like to call it, adaptation, because the term "design" is, as it has been used, open to considerable objections, and it is better to get rid of those objections. But the real question at issue in these modern days, is not so much the fact of the presence of adaptation, for that I believe is conceded by all unbelievers, but the cause of it. It is whether adaptation proves the presence of Intelligence. This is the all-important point which we want particularly to turn attention to—for I apprehend that none of our physical philosophers deny the plain fact that there are certain things which prove adaptation—and it is not dealt with in this paper. I have no particular complaint to make with regard to the contents of the paper in relation to its facts, and I agree with Dr. Fisher that in the present day one of the most important wants in this controversy is a succession of clear definitions, or else we shall fall into an inconceivable mass of confusion. For example, Dr. Fisher selected that term "nature"; I forget how many senses it bears in natural science, according to the Duke of Argyll in *The Reign of Law*; but in Webster's Dictionary it has fourteen different senses, and "law" twenty-seven; and our whole argument depends on the sense in which we use these words. If I mean by "nature" the material universe, there is something intelligible in the use of the term, but if I include in it man and his volition, it becomes a wholly different idea. We should not allow confusion of that kind to exist. That confusion is very common, not only in scientific but in theological treatises on the subject of miracles. Then the phrase "forces of nature" is also very misleading. I am inclined to think that this has caused a great deal of the confusion into which we have at present fallen, for I cannot take up any book, theological or philosophical, without finding these terms used with an interchangeable meaning. There is one thing I consider of great importance, that it by no means follows, because we cannot find traces of adaptation in some cases, that that invalidates the proof in those cases where we do find it. It is often argued that there are certain things to which it is impossible to assign a use; but suppose that is so, does it by one single atom invalidate those cases where the adaptation and the use are as clear as the sun in the heavens? I apprehend not. (Cheers). We may not be able to understand the whole of a complicated piece of machinery, but that does not get rid of the fact that certain parts of the machine show adaptation which we can understand. Mr. Howard's paper professes to deal with that

portion of creation in which the smallest amount of adaptation is shown, and I think it rather unwise to put forth the weakest proofs of our argument. If we can prove adaptation, which we most certainly can, I hold it to be a great error to concede, as some theologians are prepared to concede, that we cannot prove the being of a God from the adaptation of the universe. The one great argument by which common sense will infer the existence of a Deity, is the adaptation of the universe. If this does not prove the existence of intelligence, other arguments will fail to persuade the great mass of mankind; and therefore I maintain that we are bound to show, and to establish distinctly, the fact that adaptation and order—the adaptations of the universe and the order of the universe—do unquestionably prove the presence of intelligence, and that the assertion of materialists, that this is nothing better than anthropomorphism, is beside the mark. The plain fact is, that no scientific man can express himself except in anthropomorphic terms; such are all the terms of language. To except, therefore, against the use of such terms, as is constantly done, is absurd. When I argue from the fact of adaptation to the presence of intelligence, I am told that that only proves the presence of human intelligence. I say it does not: it proves the presence of intelligence generally, and our minds are so constituted that I am sure we cannot believe otherwise. If we see an exceedingly complicated piece of mechanism of any kind—take the human body for instance—we cannot believe that it has resulted from the concurrence of a set of blind forces. Blind forces produce nothing but confusion. But as I have implied already, the real strength of the argument can only be found in the various structures which possess life. I allow that the construction of the heavens proves adaptation, but in a very inferior degree the geological formations. They are not powerful enough to do more than bring up the rear of the argument, and ought not to be placed in the forefront. It is very undesirable to place in the forefront the weakest points instead of the strongest: let us always put the strongest first. The thing we want, in these days, is to have the force of the adaptation argument thoroughly discussed and most clearly set forth. It does not do merely to quote instances of adaptation, which are in numbers numberless, but the point is, Does adaptation prove intelligence? Many philosophers say it does not; that it can result from other causes than intelligence; and the real question is, Are we right or they, when we see these adaptations and affirm that they prove the presence of a superintending and intelligent mind? (Cheers.)

Mr. W. MELMOTH WALTERS.—The object, I take it, of this paper, is rather to supplement the stronger argument of the evidence of adaptation *on the lines of Geology*. It is quite true that in that particular line we do not see what the design may be; but the argument, I take it, is, that the arrangement of minerals in particular directions where we should not expect to find

them, is an evidence of some design. Mr. Row thinks we should be sure what that design is before we adduce the fact as evidence of design at all ; but I do not agree with that view, for it may show that there is a design, although what that design is we are not in a position to say. The paper before us rather avoids the ordinarily-adopted ground of giving instances of *design* and *adaptation*, and simply shows us that where we find certain arrangements of geological strata, where we should not expect such formations, there must have been some directing mind to place them in those positions. Rather anticipating the objection raised by Mr. Row, Mr. Howard says in his 30th paragraph—

“If the design is fully within our grasp, there is clearly no proof so far that the designer is of higher intelligence than ourselves. We may pursue the study of geology with no fear of that result ; we shall still find the clearest evidence of design, and of the design of an intelligence infinitely above ours, which we may reverently study, but can never fathom.”

I think Mr. Row is wrong in saying that the paper contains no evidence of design. We find such evidence in the 2nd paragraph, where Mr. Howard says—

“If we find that the ‘forces of nature,’ in their action through past ages have been so tempered as to preserve that fitness for supporting life, that we see in the world around us, and by marvellous compensation reproduce the very strata that they seemed to destroy ; if, instead of bringing about that dead level of uniformity which chance would produce, they still preserve what seems a superfluous richness of diversity in the result, the conclusion is surely forced upon us, that the whole has been the work of a guiding intelligence.”

Then further on, in the 3rd paragraph, we find this :—

“But the general tendency of these forces is the mixture of the elements upon which they work ; we see and understand how the varied rocks of a watershed are reduced to the state of formless mud that we find at the mouth of a river. But so far from river mud being the chief result of this formation, we find that the elementary bodies are distributed with the most perplexing inequality.”

This is another instance of the proof of design. Then we go on further, and in the 23rd paragraph we find this passage :—

“We do not know by what alchymy of nature the conditions required for such formation could have been brought about, or by what selective process the iron was thus collected together, instead of being, as we might have expected, distributed through the rocks. The same difficulty meets us in a still stronger degree when we examine the deposits of other metals. By what power were they separated into the veins of the rocks where we now find them ? and how comes it that in one vein we find copper ore, or, stranger still, metallic copper, in another lead ore, in another tin, in another silver ?”

This, again, is evidence of design, but what the design may be, we cannot say. The design may be that these metals shall be brought within reach of the inhabitants of the earth, to be worked by them. Then Mr. Howard says in his 29th paragraph—

“ It would be easy to multiply instances of this unknown analytical power in nature, which has thus balanced the tendency which we see in the processes going on around us, to mix all things into one even mass.”

It seems to me that the point of the paper is to show that there is a design, although the writer of the paper does not point out, what is beyond his ken, what that particular design is. I should like to ask one question for the sake of information as to the nebulous bodies being known to consist of inflammable gases. Is there any reason why they should not be solid substances surrounded by incandescent gases? It does not follow that there does not lie behind that incandescent gas a solid body. (Cheers.)

Mr. J. E. HOWARD, F.R.S.—The only fault I should find with the paper is that it is perhaps too short. If the argument had been carried more deeply into the chemical part of the question it would have left nothing to be desired. At the same time I admit that this would involve treating questions incomprehensible to minds not trained in that particular line of research. It would be as difficult to lay before ordinary hearers the problems of chemistry, as to teach the children in our common schools the higher branches of mathematics. It seems to me that the constitution of matter, particularly in its chemical aspects, thoroughly indicates the working of an infinite mind and infinite wisdom. Nobody who studies the subject can possibly be drawn to any other conclusion. I will not take up the time of the meeting by illustrating this. But in proportion as we ascend in the scale of creation we certainly find greater difficulties in proving our point, because when we come to the vegetable and then to the animal world, although we find marvellous instances on every hand of adaptation *and* design, we are met by the evolutionists, who say that there are gradual changes taken advantage of by some obscure force of so-called natural selection, and wrought out without the help of any Deity or any mind at all, in some incomprehensible way, into something advantageous to each particular creature. Of course, this argument cannot be carried back into the antecedent portion of the subject—into the arrangement of atoms, and the atomic forces of matter. A Darwinian must be very much enamoured of his view indeed if he carries it back so far, and declares that atoms are the parents of each other! Although I have seen attempts to insinuate even this absurdity. In proportion as we ascend in the scale of creation we meet with greater difficulties, of which theology takes account, and of which the opponents of the doctrines of theology take advantage; but the greatest difficulty of all is man. The adaptation of man is to fill the highest place in creation, but he is marred in many respects by his fallen self-will. We find a great want of order in his actions; but there is no such want in the actions of the atoms and the molecules. They all act perfectly right, but man's acts are very often perfectly wrong. Taking the scriptural explanation, the argument holds good with regard to man just as it does with regard to everything else. But the point where we meet with the fewest

difficulties is the constitution of matter itself, though this is not easy to make properly intelligible to the whole world.

The CHAIRMAN.—Before Mr. Howard replies, I would just say a few words in reference to this subject, although I do not pretend to have that knowledge of it which would make me at all a competent critic. I listened to the paper with a great deal of interest, as I have also listened to the discussion. It has been said by Mr. Row that the point is not so much to prove adaptation, as to show that adaptation indicates an intelligent Being. I do not quite understand how that proposition is capable of proof. It seems to me to be a kind of inference that we naturally make in our own minds, when we begin to examine the instances of adaptation, and when those instances become numerous and diversified. The only mode, so far as I can see, by which we conclude that these are evidences of an intelligent superintending Being is, by the analogy which we observe with regard to human action and human works. All our arguments of this kind must depend upon the assumption of that analogy between the human mind and human actions, and the higher mind and higher actions. We see works which resemble the works of man in that respect, and we conclude, by way of analogy, that there must have been a similar operation on the part of a superintending Cause. I suppose that this is not exactly capable of proof, but is an inference. But that inference becomes stronger and stronger in proportion as the instances of adaptation are more numerous and diversified. It is precisely in this way that the value of the paper may be estimated. I do not agree with Mr. Row in wishing that the author had selected greater and more leading proofs of adaptation. The striking, clear, and patent instances have been constantly insisted upon. Mr. Howard seems to have purposely selected the less obvious instances of adaptation, and that selection seems to me to be a very valuable addition to this argument. We all know the great and leading instances of adaptation, or many of them, and as they are multiplied they become more forcible and remain in our minds, but when we find these less obvious instances also, they strike our minds with peculiar force. We look, for instance, at the atomic structure of the globe, if I may use the term, and at first sight it may not seem to indicate traces of particular adaptation, but when we look at it more closely, as the author of this paper has done, we see most singular instances of adaptation and order, although we cannot trace the reason for them. We see some interposition, which is evidently an adaptation to serve a particular purpose, and possibly to serve more purposes with which we are not acquainted. I suppose our ancestors, when they first observed coal or iron, knew very little indeed of the great purposes which these great beds of coal and reservoirs of iron were to serve with reference to the wants of the inhabitants of the globe. As time goes on those purposes become apparent, and are served; and as we find the different uses to which the different materials are put, we begin

to see more and more the adaptation of these structures to the uses of man, and possibly to other great purposes as well. In that way we may go very much further in our admission of adaptation than our knowledge of present adaptation would warrant, and therefore this paper seems to me to be very valuable, in extending and enabling us to examine more particularly these less obvious arrangements and adaptations. Mr. Howard has done good service in pointing out these things, and in showing us that here we have arrangements which in a less scientific age would have been regarded as serving no particular purpose, except to form the soil on which man trod, but which, the more we examine them, prove that they were intended to serve purposes, and are adapted to needs which become more clearly discoverable as time goes on. When we see the great extent and multiplicity of these arrangements and adaptations, the conviction is more clearly forced upon our minds, that there must have been some infinitely intelligent Being who has made all these things. It seems to me that the paper before us was precisely intended to seize the less obvious instances and from them to bring forward arguments which are not the less strong because they are not at first sight discoverable to the inquirer. (Cheers.)

Mr. DAVID HOWARD.—I must thank those who have taken part in this discussion for the kind way in which they have spoken of this paper. Of its shortcomings I am more conscious than any one else can be, for it is more difficult than would commonly be supposed, to bring before an audience, not previously trained to the work, the peculiar force of these chemical problems. I suppose that to any one who never tried to make a solid piece of magnesia, a piece of magnesite will ever be a perplexity. You cannot explain it fully to any one untrained. You can only explain "this is not the ordinary magnesia which is tolerably familiar to us all—or was when we were children." This is one example out of many. I was tempted to draw the paper out into detail, but I feared that I should fail to make the details either interesting or comprehensible. As to the use of the words "law" and "order," and so on, it is difficult to avoid the use of popular terms, inaccurate as they are. As Dr. Fisher has pointed out, the word "nature" is sometimes used to mean God, sometimes to mean *κόσμος*, sometimes one thing, and sometimes another: we can only use these inaccurate terms in the best way we can. The word "force" is an example. No doubt the more accurate word is "energy," but the use of the Greek word does not get us far out of the difficulty, for *ἐνέργεια* in Liddell and Scott is defined as "force." I sought to bring out that the same constructive power which made the stars of different compositions, has been acting throughout—that it has been no mere change, but a constructive agency in nature, which has produced what we see of adaptation to the use of man. I do not think the Christian can avoid taking this for granted as being the object of the adaptation and formation of the world. When we say that the world was created for the benefit of man, there is an evidence of that in

the crust of the globe ; and I have been endeavouring to avoid metaphysical or theological questions, and to treat the crust of the globe by itself. If in a foreign country we came upon a wall, we should regard that as evidence of man, and say "there has been a builder here," even though we might not have the remotest idea of what the wall was built for, and so when we see in the crust of the globe indications which show, not merely to the metaphysical mind, but to the commonest observer, signs of adaptation, we say "these are evidences of design." It is the instinct of one's nature to come to that conclusion. We cannot always show evidence of *adaptation*, but I do not think any observer can avoid being struck with the evidences of *design* in the sense of intelligent guidance of the laws of nature, and it is in that sense that I use the word design. That it is as good an argument as the more evident ones I do not venture to maintain ; but, on the other hand, it is often urged—not in fixed terms, for the attacks on Christianity or Theism are often not made in fixed terms, but by the general tendency of the language used—that geology is so simple that there is no need of any Creator there ; that the forces of nature will do all that is required ; that if you stir up a nebula and leave it to itself it will compose a world, because you can decompose granite, and produce Thames mud, and so on. (Laughter.) It was to that result that I wished to apply myself. With regard to the question asked me about the constitution of nebulae, I will try to explain, though it is difficult to do so in a few words. If you examine the sun with a spectroscope, you see *black* lines, which are identical with those produced by certain vaporous gases as *bright* lines. The common light of salt gives under the spectroscope two intense yellow lines, and if you throw a light through that you can get a complete spectrum, with two black lines. The rule, therefore, or the law is—that any light passing through a coloured light will show black lines, where the coloured light would show coloured lines, and applying this principle, it can be proved that the light of the sun passes through an incandescent atmosphere of intense heat sufficient to keep iron in a state of vapour. In nebulae you have the nitrogen line, and it is not conceivable that you can have a heat sufficient to make nitrogen luminous with a cold solid body behind, as it requires a much greater heat to make gas luminous than would be required to heat a solid globe to incandescence. Of course this is so far guess-work, as it is only the result of experiments in the laboratory ; but this is the argument on which it is inferred that nebulae are merely gaseous bodies. If they contained all the elements of a world, we should expect to find not merely the lines of gases, but the lines of the sun's spectrum. (Cheers.)

The Meeting was afterwards adjourned

ORDINARY MEETING, MARCH 5TH, 1877.

C. BROOKE, Esq., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBER :— C. Smith, Esq., F.G.S., Lancashire.

ASSOCIATES :—A. Steuart, Esq., B.A., Banff ; Rev. E. Sellar, Cape of Good Hope ; Rev. W. D. Jones, Cape of Good Hope.

Also the presentation of the following Works for the Library :—

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| “Proceedings of the Royal Society,” Part 177. | <i>From the Society.</i> |
| “Proceedings of the Royal Institution,” Parts 64–65. | <i>From the Institution.</i> |
| “Proceedings of the Geological Society,” Part 129. | <i>From the Society.</i> |
| “Points and Passages.” By R. Brown, Sen., Esq. | <i>From the Author.</i> |
| “The Hidden Mystery.” Ditto. | <i>Ditto.</i> |
| “The Great Dionysiak Myth.” By R. Brown, Jun., Esq. | <i>Ditto.</i> |
| “The Divine Order of the Universe.” Rev. A. Clissold. | <i>Ditto.</i> |

The following Paper was then read by the Author :—

THE BIBLE AND MODERN ASTRONOMY. By the
Rev. Canon BIRKS, M.A., Knightbridge Professor of Moral
Philosophy, Cambridge.

IN the fifth of the Seven Essays, which attracted so much notice seventeen years ago, a broad contrast is said to exist between the statements of the Bible and modern discoveries both in Astronomy and Geology. The whole account of creation in the book of Genesis is given, it is affirmed, from a different point of view from that which we now unavoidably take. The order of things, as we now know them to be, is to a great extent reversed, although here and there we may pick out some general analogies and points of resemblance. Mr. Goodwin thus resumes the subject at the close of his remarks :—

“The treatment to which the Mosaic narrative is subjected by the theological geologists is anything but respectful. The writers of this school agree in representing it as a series of elaborate equivocations, a story which palters with us in a double sense. But if we regard it as the speculation of some Hebrew Descartes or Newton, promulgated in all good faith as the best and most probable account that could be given of God’s universe, it resumes the dignity and value of which the writers in question have done their best to deprive it. It has been sometimes felt as a difficulty in taking this view of the case, that the writer asserts so solemnly that for which he must have known he had no authority. But this arises only from our modern habits of thought, and from the modesty of assertion which the spirit of true science has taught us. The early speculator was harassed by no such scruple, and asserts, as fact, what he knew only as probabilities. But we are not on that account to doubt his perfect good faith.”

2. The sacred writers, then, according to the Essayist, were as inferior to modern men of science in modesty and veracity as in scientific attainments. And the remedy he propounds for the blindness of theologians, who cannot receive this low estimate of God’s chosen messengers, is to accept frankly the principle that those things, for the discovery of which man has faculties specially provided, are not the fit objects of Divine revelation !

In chapter xv. of *The Bible and Modern Thought*, I have examined this principle, and shown it to be fatally opposed to the very existence of such a revelation. It would confine it to those

subjects only which we have no faculty to understand. It is thus, really, a simple and effectual expedient for getting rid of all revelation, by leaving it nothing within the range of the human faculties which it is permitted to reveal. The Divine Record of creation, I have said, to which the Son of God appealed with such holy reverence, is to resume the dignity and value which it had lost, while esteemed to be the word of God, by ranking as the speculation of some Hebrew sciolist, who had never learned the modesty of modern science, and made a bold but mistaken guess at the origin of the world. Men have regarded it, for ages, as the inspired word of God. It is cheering to be assured that their respect for it need not be in the least diminished, when they come to regard it as the blind conjecture of some unknown pretender to Divine communications.

3. The view of the relation between Scripture and modern science, strongly maintained by my friend Canon Titcomb in his paper read to this Institute three years ago, seems to me to differ only by a slight shade from that advanced in Mr. Goodwin's essay. As I think his premises mainly erroneous, and the conclusions drawn from them adverse and not helpful to the cause of Christian truth, it is needful briefly to examine his statements. This will clear the way for a further expansion of my views, indicated in pp. 309-315 of *The Bible and Modern Thought*, which have since ripened further in my own mind, and seem to me a topic deserving the careful attention and thought of Christian men.

4. The doctrine to be examined is briefly this. Scripture is indifferent to the duty of expressing itself with exactness on scientific questions. This is proved, it is thought, by contrasting the statements in Genesis i. with the teaching of modern geology and astronomy as to the distances of the stars and the age of the world. Still, some statements of Scripture are so exactly scientific as to be perfectly consistent with the latest modern discoveries. This is instanced in three things: the place of man as coming last in the order of creation; the physiological affinity of birds and fishes, as shown by the blood-globules; and the mention of the sweet influences of the Pleiades, which are explained by Mädler's hypothesis, that Alcyone is the centre of the whole stellar universe. The inference is drawn, that "the inspiration of the Bible in questions involving science was subordinated to the single purpose of making moral and religious truth intelligible"; that "the writing of Moses is justly to be regarded as inspired, though the form into which his language was thrown is now found to be at variance with scientific accuracy." In fine, that "Science and Revelation occupy two distinct and separate spheres, and any attempt to make one interfere with the other will only bring them into open and ruinous conflict." The purposes of God in Revelation are moral

and spiritual, not scientific, and they are to be read in that light. This is the true harmony, it is urged, between Science and Scripture, and the only view which will stand the scrutiny of severe investigation.

5. Thus the threatened conflict between Science and Revealed Religion is averted, both by the Essayist, Mr. Herbert Spencer, and Canon Titcomb, by a treaty of partition. But the line of demarcation has a very important difference. With the Essayist, all belongs to Science, which men have faculties given them to investigate and understand. If there are any subjects beyond the range of our faculties, on which they can teach us nothing, these are resigned to Supernatural Revelation. All the Intelligible belongs to Science. The portion left for a Divine message to occupy is the Unintelligible alone. In Mr. Spencer's *First Principles* the division is nearly the same. The whole range of the Knowable belongs to Science, and Religion consists only in blind emotions, of which the object is the Unknowable. Christian faith is a portionless orphan, turned adrift in the wide and pathless waste of the Unknowable, without a single footbreadth of certainty and truth which it can call its own.

The partition in Canon Titcomb's paper is different. All moral and spiritual truth is placed on one side of the line which parts the infallible from the fallible and imperfect; all outward facts, and physical, zoological, and human changes on the other.

6. But such a partition is really impossible. I do not see how my remarks on this point, in the *The Bible and Modern Thought*, are to be refuted or set aside. I have written as follows:—

“The Bible is not a message to disembodied spirits. It is addressed to man in his actual character, as a being composed of body and soul, born in the weakness of infancy, placed in the midst of this lower creation, and trained through his senses to the knowledge of himself, of nature, and of God. A revelation for such a being must include many facts, that belong to almost every field of scientific inquiry. Facts which belong to geography, chronology, botany, zoology, astronomy, and legislative and political history, meet us in almost every page of the sacred narrative. The attempt must be vain to maintain a doctrinal authority in Scripture, and still to impute to it a merely human character, wherever it touches on questions of natural science. For the two elements are blended not less intimately than body and soul are united in man himself.

7. “Let us take the leading truth of Christianity, the resurrection of our Lord. None can be more central to the revelation, or more intensely spiritual. Yet it contains points of intimate connection with a dozen different sciences. It is a geographical truth; for He rose from the tomb at Calvary, and ascended from Olivet. It is a

truth of chronology ; for He rose the third day, in the procuratorship of Pilate, and on the first of the long unbroken series of Christian sabbaths. It is a physiological truth ; for the body laid in the grave was raised on the third day, before it had seen corruption. It is connected with a truth of botany ; for that sacred body had been embalmed with myrrh and aloes. It is a truth of political history ; for crucifixion was a Roman, not a Jewish punishment, and a Jewish watch, by permission of a Roman governor, had been set over the tomb. . . . It is connected with jurisprudence and the laws of evidence ; for He ‘appeared to witnesses chosen before of God, who did eat and drink with Him after He rose from the dead.’ And hence the idea of retaining the authority of the Bible as in any sense Divine, and making an exception for the parts into which there enters some scientific element, is utterly impracticable. The doctrines and the facts, the precepts and the histories, are joined inseparably by the Spirit of God himself. Deny the authority of the facts, and you destroy the whole revelation.”

8. The doctrine of the Fifth Essay is plain. The Bible is simply the work of several Jewish writers, who had neither the knowledge, nor the modesty, nor the strict regard to truth, of modern men of science. They were harassed by no scruples, while boldly offering their own crude guesses as if they were certain facts, and messages clothed with Divine authority. But the other view is much harder to understand. The Bible is personified, and said to be indifferent to the duty of expressing itself with scientific accuracy and truth. Speaking generally, its language on these subjects is inaccurate and untrue. Still there are cases, here and there, of such consistency with the latest discoveries of science, as to indicate some higher than mere human authorship. On this ground we are to believe that the Spirit of God is their true author. But we are to concede that the Divine Spirit is usually indifferent to the duty of giving accurate statements on all questions in which natural science is involved ; and that He prefers, for some reason or other, to mix moral and spiritual messages of supreme importance to mankind with a series of statements at variance with the whole course of modern discovery, erroneous and untrue.

9. I am surprised that any thoughtful mind can find rest or satisfaction in such a theory.

The doctrine that He who inspired the Bible, while all future discoveries lay open to His prescient wisdom, forbore to reveal them supernaturally, because they lay outside the proper object of His message, is clear and simple. So is the further doctrine that whatever He has made known consists of facts and not fictions, is true and not false. But it is neither clear nor

simple, nor at all credible, that there is a duty of speaking with scientific accuracy, which has been wholly neglected and transgressed, in most cases, by the Spirit of Truth and Holiness himself; and that our faith in His Divine authorship can rest on our detecting a few marvellously correct scientific anticipations, here and there, like islets, in a wide sea of erroneous statements, visionary fictions and contradictions of the well-attested results of scientific research.

10. Three cases alone are specified. The first is that man comes last in the Bible record of creation, and also in the series of modern geology. But however weighty the fact, what can it prove, when nearly all the rest of the Mosaic narrative is affirmed to misrepresent or contradict the proved facts of geological science? Are we to argue that the book of Genesis must have a Divine inspiration, because, in its record of creation, one part in fifty turns out to be scientifically true, while all the rest is erroneous? Infidels will laugh in our face, if we venture to argue in such a way.

11. Next, the fishes and birds are said to be created on the fifth, but the beasts of the earth on the sixth day. This is compared with an alleged recent discovery, that the blood-globules in birds and fishes are alike, and differ from those of land animals. So also birds and fishes are oviparous, and beasts viviparous. But on the other hand whales are viviparous, and the creation of great whales is assigned to the fifth day. The creeping things of the earth are not viviparous, and have a nearer scientific affinity to the birds or fishes than to the beasts, and still they are included in the work of the sixth day. The contrast in Genesis does not seem to refer at all to the skeleton, or to the mode of birth, still less to the size of the blood-globules. It plainly relates to the *habitat* of these three classes alone. No details of physiology on other matters, however interesting in their own place, can thus do anything either to confute or confirm the Divine authority of the statement in the sacred text.

12. The third piece of alleged evidence is still more baseless. The words in Job, "Canst thou bind the sweet influences of the Pleiades?" are held to be an anticipation of Mädler's recent guess, that Alcyone, one of the seven, is the centre of revolution to the whole stellar universe. But there is no proof whatever that this guess is true; and if it were true, there are plain reasons why it could not possibly be what is meant by the words addressed to the patriarch.

13. First, all that Science has proved—and even that proof is not free from some doubts—is that the sun and planets are moving towards a point in or near the constellation Hercules. But there is no proof that the motion has changed its direction since first

detected, or that it is in a plane great circle, or that there is any deflection on the side towards Alcyone; least of all that it is round a fixed centre, and that centre Alcyone. But there is negative evidence the other way. If Alcyone were the physical centre, its mass and inherent splendour should be immensely great, as compared with other stars, and of this there is no sign. The natural result would be a concentric glomeration of stars, growing denser on all sides around it; and of this also there is no sign. But if it were held merely that the resulting centre of gravity of all the stars seen by our telescopes lay near Alcyone, of which there is no proof whatever, the words of the text could bear no such meaning. The influence of attraction would not then belong specially to that star, or to the other Pleiades, but must plainly be shared alike by every star in the whole firmament.

14. But in the text two questions are proposed. "Canst thou bind the sweet influences of the Pleiades, or loose the bonds of Orion?" If central attraction is meant in one case, central repulsion, its opposite, must naturally be signified in the other. But this is clearly impossible. The application of the double inquiry to the opening of all nature in the early spring, and its binding with the frosts of winter, is natural and impressive, and agrees with the whole context. It forms a simple and sublime appeal to the plain tokens of Divine power and wisdom in the yearly changes of the seasons. Any application of the words to the physical and mechanical relations of the whole stellar universe is quite foreign from the manifest design of the whole passage. The alleged agreement is that of a very improbable guess in science with a perfectly untenable interpretation of a Scriptural text.

15. These two fictitious defences once set aside, the concession itself remains to be examined. Is the Bible utterly indifferent to the duty of expressing itself with scientific accuracy and truth? The assertion, even if it were true in substance, is plainly inexact in phrase. What is really meant is neither that the human writers neglected a rule wholly beyond their unaided powers to fulfil, nor that the Spirit of God has been negligent of a duty He might have fulfilled. It is that no such duty exists. What is really affirmed is that it is lawful, wise, and expedient that God's own messages of moral and spiritual truth should be given to mankind in a vehicle of human narratives, deeply tinged with errors and misstatements, and contradictions of genuine science. The Holy Spirit is held to have kept the writers from going wrong on all moral questions, but not from any amount of mistaken assertion as to physical changes, and the facts of human history. This notion is specially applied to the record of creation in Genesis, and to all the allusions of the Bible to the physical structure of the universe.

16. My own conviction is just the reverse. The Bible is "the true sayings of God." The Scripture "cannot be broken." "It is easier for heaven and earth to pass, than for one tittle of the law to fail." It is "the Lord God of the holy prophet," by whom these messages are given to mankind. The whole, therefore, comes to us stamped with His Divine authority. And this must include all its contents, till some adequate evidence can be adduced to exempt any portion from the claim which belongs to the rest, and thus prove it to be some flaw, contracted in the transmission of God's own perfect message. It is an error to suppose that the Bible was given to supersede the patient inductions of natural philosophy, and to supply, ready-made, a complete physical theory of the universe. It is an equal error to deny that it announces, with Divine authority, many great facts, which are rightfully included among the proper materials of all true and genuine science.

17. The charges of scientific falsehood, brought against the Scriptures, have doubtless been owing, in part, to the carelessness and rashness of well-meaning but incompetent advocates of the Christian faith. Hasty impressions of what the Bible says have thus been confounded with its real statements. But they are no less due to that looseness of thought, which sets down every unproved hypothesis, started by physical philosophers, as a firm and established fact of science. The easy credulity with which some Christian men are ready to take up the newest scientific guesses, and not only sacrifice to them a considerable part of their own faith in the Bible, but exhort others to do the same, as a triumph of Christian candour over the blindness of prejudice, is a most painful and dangerous symptom of the times in which we live. It is due to the cause of genuine science itself, no less than of Christian faith, and the reverence due to the Word of God, to revise, one by one, these rapid conclusions, and sift anew the strength and solidity of some of the main assertions, on which there has been raised a vast superstructure of contempt for the authority of Scripture, and practical unbelief.

18. I propose, then, in the rest of this paper, to answer this first question—Are the statements of Scripture, when compared with the teaching of modern astronomy, guilty of habitual inaccuracy, or, in simpler words, erroneous and untrue? Or is the fact just the reverse, that while modern researches have thrown some fuller light than before on the physical relations of the universe, the statements of the Bible are physically not less true than those of modern astronomy, while they go deeper and rise higher, and throw light on the true proportions and moral purpose of the physical relations themselves?

19. The charge to be examined meets us at the opening of the fifth essay on the Mosaic Cosmogony, in these words:—

“The Ptolemaic system contemplated the whole visible universe, from the earth, as the immovable centre of things. Copernicus changed the point of view, and, placing the observer in the sun, reduced the earth to an inconspicuous globule, a merely subordinate member of a family of planets. . . . The Hebrew records, the basis of religious faith, manifestly countenanced the opinion of the earth's immobility, and other views of the universe, very incompatible with those propounded by Copernicus. It can scarcely be said that the first chapter of Genesis is not intended in part to convey some physical truth; and, taking its words in their plain sense, it manifestly gives a view of the universe adverse to that of modern science. It represents the sky as a watery vault, in which the sun, moon, and stars are set. But the discordance of this description with facts does not appear to have been so palpable to the minds of the seventeenth century. The brilliant progress of astronomical science subdued the minds of men. The doctrine of the earth's mobility found its way into children's catechisms, and the limited views of the nature of the universe in the Old Testament ceased to be felt as religious difficulties.”

Such is the first main charge of scientific error brought against the Bible. Some say that our proper course, as honest Christians, is frankly to concede its truth. The Bible espouses the Ptolemaic doctrine of the earth's immobility. But the Copernican doctrine, which makes the sun, and not the earth, the immovable centre of our system, is alone true. So the Bible has adopted and endorsed popular errors, instead of scientific truth.

20. Now, first of all, the competing varieties of conception are four at least, and not two only; and may be named after Ptolemy, Copernicus, Newton, and Herschel. In the first the earth is taken as a fixed centre; in the second the sun; in the third the centre of gravity of the solar system; in the fourth, resulting from Herschel's discovery of the solar motion, no fixed point is clearly defined, but one is assumed to lie in some distant part of infinite space. On this Mädler has grafted his conjecture, that it may perhaps be Alcyone, one of the Pleiades. The only fact, however, even probably ascertained, is a motion of our whole system, at the rate of about 150 millions of miles yearly, or five miles a second, towards a point not far from the bright star of Lyra. But whether there be any fixed centre of this wider stellar system, and if there be, in what direction it lies, and at what distance, remains, in the Herschellian theory, wholly vague and uncertain. Astronomy, as a science of observation and exact inference, can at present give these questions no answer whatever.

21. Let us, then, condemn the Bible as erroneous, and revolutionize all customary speech, to satisfy the alleged claims of scientific accuracy and truth, and what result will follow? We shall have ceased to be intelligible to the common people, and nearly all

mankind. But we shall be left just as unscientific as before. In our search for something real and absolute, we are to abandon all terms which express only relative motion. But the rainbow recedes before us. The sun rises and sets no longer, and the earth revolves on its own axis, and in its orbit round the sun as a fixed centre. But of this fixed centre it has to be said in its turn, "And yet it moves." Neither the earth is now to revolve round the sun, nor the sun round the earth, but both alike around a fixed invisible point between them. Here again we find no rest. Herschel's discovery alters and disturbs our last conclusion. The earth and planets no longer move in ellipses around a common invisible centre, but travel in complicated corkscrews, or spirals, through empty space. And we have no assurance that this stage is final, and that all the stars, from which the sun's motion has been inferred, may not be travelling together towards some more distant point or centre in the depths of infinite vacuity.

22. These changes all assume that there is some absolute motion, which alone is scientifically true. But is this certain? May we not be sacrificing what is certain and real to a mere shadow, instead of exchanging a series of fictions for reality? Is there, after all, such a thing as absolute motion? The common impressions are given by Newton in his scholium in these words:—

"Absolute space in its own nature, without regard to anything external, remains always similar and immovable. Relative space is some movable dimension or measure of the absolute space, which our senses determine by its positions to bodies, and which is vulgarly taken for immovable space. Absolute and relative space are the same in figure and magnitude, but they do not remain always immovably the same. For if the earth, for instance, moves, a space of our air which, relatively in respect of the earth remains always the same, will at one time be one part of absolute space, at another time it will be another part. . . Absolute motion is the translation of a body from one absolute place into another, and relative motion from one relative place into another. Thus, in a ship under sail, the relative place is that part of the ship which the body possesses. Relative rest is the continuance in the same part of the ship, or its cavity. But real, absolute rest, is the continuance of the body in the same part of the immovable space, in which the ship and all that it contains is moved."

23. Newton then proceeds to put the case of a sailor, walking on a ship's deck from west to east, while the ship sails ten times as fast westward, and the earth 10,000 times as fast from west to east. In Mr. Spencer's *First Principles* an exactly similar case is proposed, to prove that absolute space and motion are inconceivable. The conclusion drawn is in these words:—

“That which seems moving proves to be stationary, that which seems stationary proves to be moving ; while that which we conclude to be going rapidly in one direction turns out to be going much more rapidly in the opposite way. What we are conscious of is not the real motion of any object, but merely its motion as measured from some assigned position. We take for granted that there are fixed points in space, with respect to which all motions are absolute, and we find it impossible to rid ourselves of the idea. Nevertheless, absolute motion cannot even be imagined, much less known. All we can assert is that space is a relative reality, that our consciousness of this unchanging relative reality implies an absolute reality, equally unchanging, as far as we are concerned, and the relative reality may be unhesitatingly accepted in thought as a valid basis of our reasonings.”

24. The doctrine of Newton is plain and simple, that there is an absolute space and motion, though we have never seen or known one, or witnessed the other. Mr. Spencer's is ambiguous. Space and motion, he says, are relative realities, and absolute space and motion cannot even be imagined, and still we cannot help believing in their reality. They are forms of the Unknowable. Yet we may know, without any doubt, that they are truly represented by relative space and motion. These, however, are all that experience presents to us, or our imagination can conceive.

25. The Bible statements and popular language are thus to be condemned as unscientific and erroneous on this ground. We must take for granted an idea, of which, Mr. Spencer says, we cannot rid ourselves, but which, he further says, cannot be imagined, much less known. This seems a very precarious basis for an indictment of systematic error against the Word of God, and the customary speech of all mankind. Is it not worth while to look at the matter more closely, and see whether, after all, the mistake and illusion may not be on the other side ?

26. The idea of relative place and motion is simple and easy. Let us conceive a thousand material objects, each having a distinct place. There will then be nearly half a million distances and directions. If one of these bodies be moved, its distance from all the rest and their distances from it will be changed, but all the other distances will be unchanged. The relative changes are plainly mutual. If A recede from the rest, they must at the same time recede from it also. If four hundred keep their place relative of each other, and recede from the other six hundred, the idea is almost forced upon us that both sets are in motion, receding from the centre of gravity of the entire group of a thousand bodies.

27. How, then, are we to define absolute motion ? It must be change of place with regard to no one real object, nor any number

of real objects, but with reference to empty space alone. But is this possible? If a body were quite alone in the universe, could it move? Move it in thought as you please, will it not be just the same as before, alone with an infinite void on all sides? In this vast solitude there are no landmarks, nothing to which motion could be referred. But a motion which changes nothing, and alters no relation of distance, must be the same with absolute rest. I cannot conceive a motion when there is nothing to approach to, or from which to move further away. Newton writes on this subject as follows :—

28. "All things are placed in space as to order of situation. It is from their essence or nature that they are placed, and that the primary places of things should be movable is absurd. These then are the absolute places, and translations out of these are the absolute motions. But because the parts of space cannot be seen or distinguished by our senses, in their stead we use sensible measures of them. From the positions and distances of things from some body, considered as immovable, we define all places, and with respect to such places we estimate all motions. So, instead of absolute places and motions we use relative ones, and that without inconvenience in common affairs. But in philosophical disquisitions we ought to abstract from our senses, and consider things in themselves. For it may be that there is no body really at rest, to which the places and motions of others may be referred. It is possible that in the remote regions of the fixed stars, or perhaps far beyond them, there may be some body absolutely at rest; but it is impossible to know, from the position of bodies one to another in our regions, whether any of these do keep their positions to that remote body. Thus absolute rest cannot be determined from the positions of bodies in our regions. . . . All motions from places in motion are no other than parts of the entire and absolute motions. Entire and absolute motions are not otherwise to be determined than by immovable places. Now no other places are immovable but those that from infinity to infinity do always retain the same given positions one to another, and on this account must remain unmoved, and thereby constitute what I call immovable space."

29. Thus, Newton holds it doubtful whether any body be really at rest, though he thinks such a body may, perhaps, exist in some remote part of the universe. If it exist, absolute motions will be those relative to this unknown body. In other words, they are relative still, but the relation is to a hypothetical body, of which we cannot know where it is to be found, or whether it really exists.

We must revert, then, to another conception. Absolute motions are those which are referred to no real body at all, but to the points, assumed to be immovable, of empty space. Is this a true and valid conception! Do we not really, in our thoughts,

when we speak of these fixed points of empty space, introduce an immense number of hypothetical or imaginary atoms, not perceived by the senses, to fill up the intervals between the bodies we can see, or occupy the spaces beyond them? Thus, if the solar system is moving in a known direction, we may conceive the whole of the ether within the orbit of Neptune either to move or not to move along with it. In the latter case the visible parts of our system are moving with reference to the invisible, and as the bulk of these last is immensely superior, they become the natural standard of reference. But if all be conceived to move together, our notions of immovable space will be drawn from these interstices, now supposed to be ever changing, of our own system. And if our whole system, visible and invisible, including all from which our notions of space are borrowed, is to be reckoned in motion, it must be in relation to some equal or larger visible and invisible system, far away. And this is plainly a new relation, or set of almost infinite relations.

30. Absolute Space and Motion is thus a rainbow, receding ever before us. The moment we strive to grasp it, it eludes us and disappears. If some one body somewhere were absolutely at rest, we could never be sure of the fact, or learn where it could be found.

31. Newton remarks further :

“There is only one real circular motion of any one revolving body, corresponding to one power of endeavouring to recede from the axe of motion, as its proper and adequate effect. But relative motions in one and the same body are innumerable, according to the various relations it bears to external bodies. Relative quantities are not the quantities themselves, whose names they bear, but sensible measures of them, which are commonly used instead of the measured quantities themselves. And if the meaning of words is to be determined by their use, then, by the names space, place and motion, their measures are properly to be understood, and the expressions will be unusual and purely mathematical, if the measured quantities themselves are meant; upon which account they strain the sacred writings, who there interpret the words for the measured quantities. Nor do these less defile the purity of philosophical truths, who confound the real quantities themselves with their relations and vulgar measures. It is, indeed a matter of great difficulty to discover and distinguish the true motions of particular bodies from the apparent, because the parts of that immovable space in which the motions are performed, do by no means come under our senses. Yet it is not altogether desperate. For we have some arguments to guide us, partly from the apparent motions, which are the differences of the true, and partly from the forces which are the causes and effects of the true motions.”

32. Here Newton repels and refutes that charge of scientific
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inaccuracy and falsehood, which has often been brought against the sacred writings, because they do not speak of absolute, but of relative motions only. The meaning of words, he says, "is determined by their use," and Scripture employs them in their usual meaning. But I doubt whether the rest of his remarks are equally well-founded and just. Let us examine them a little further.

33. And first, relative motions can with no propriety be called measures of the absolute motions. Let us suppose a number of bodies from A to Z, all moving with different velocities, and in different directions. Taking A for a standard, as if it were fixed, there will be twenty-five relative motions of the other bodies from B to Z. The motion of C relative to B, or N relative to M, will be the difference of the second and first, of the thirteenth and twelfth, of these twenty-five motions. There will be three hundred such relative motions, depending on the first twenty-five, and their differences. What, now, is the relation of all these to the absolute motions? These will be nothing else than the first twenty-five motions, increased by the absolute motion of A with reference to empty space, supposed immovable. This one quantity remains unknown. Hence the relative motions cannot measure the absolute, nor the absolute the relative. For the relatives, plus x , an unknown and unknowable quantity, are themselves the absolute motions, and measures of the one must be measures of the other also.

34. Again, the two helps suggested for learning the true from the apparent motions, cannot really avail us. The first is that the apparent motions are the differences of the true, and thus may help to determine them. But what is wanted is this very difference, the unknown x , which must be added to all the relative motions, to make them absolute. Let this be given for one body, and it will be given for all. But the differences plainly supply no help whatever for its discovery.

35. The other help is sought in "the forces, which are causes and effects of the true motions," as thus explained. "If two globes kept at a given distance one from another by means of a cord were revolved around their common centre of gravity, we might, from the tension of the cord, discover the endeavour of the globes to recede from each other, and the axis of their motion, and thence compute the quantity of their circular motions."

Here, however, all that would be proved is a relation between a tangential velocity at right angles to the joining line, and a centripetal force, acting in the direction of that line. Both of these are definite relations between the two globes, and not of either globe to points fixed absolutely in empty space. Circular motion implies two bodies at least, an actual distance between them, and a line of junction. If we conceive a relative movement of each, at right angles to that joining line, and in opposite direc-

tions, the result, if there be no deflecting force, must be a growing divergence, and a motion becoming more and more obtuse to the new line of junction. A force tending towards the other body will be required, to hinder this divergence, and transform the momentary lateral into a permanently circular or elliptical motion. But all this is clearly relative. It involves the relation of one body to the other, and of both to their centre of gravity. Any number of bodies in one plane, at the corners of a regular polygon, might thus revolve in their own plane with a circular motion. There would need only a definite relation between the angular velocity and the central force, or deflecting power. But if all moved also in parallel directions towards some distant body with a common velocity, the first relative motions would be unaffected, and the circularity retained. Thus any additional absolute motion, common to all the bodies, could not affect their relative motions, or the amount of force needed to counteract a tangential divergence. The second method, then, must fail, no less than the first, to bridge over the impassable gulf between relative and so-called absolute motions.

36. The result of these reasonings may be summed up, I conceive, in the following axioms:—

1. All the motions, of which we have or can have any experience, are relative motions only.

2. Relative motions might be turned into absolute, if the absolute motion of any one body with reference to mere empty space, could be ascertained. But this discovery is impossible.

3. Absolute motions are thus a mental illusion, and nothing more. We first invent or mentally conceive an immense number of points, having fixed place-relations to each other, and then, still conceiving these as without motion, think of known visible bodies as moving with reference to them.

4. Real motion is a change of place with reference to really existing bodies.

5. Imaginary motion is a change of place with reference to points or bodies only *conceived* to exist.

6. The language of relative motion is equally true, and scientifically faultless, whatever plane of vision or point of sight we assume, to which the changes are referred.

37. These axioms, if true, will help to clear away a mist which has rested on this whole subject from the time of Copernicus down to the present day. The remarks in the Fifth Essay are one signal example of an error and misconception, which has very widely prevailed. Professing to be wiser than common speech and the language of the Bible, Modern Science has overleapt the bounds of truth, and become guilty of unscientific error. This same error, which imputes inaccuracy and falsehood, not only to the language of Scripture, but to the daily speech of all mankind, has

beguiled men of science into vain pursuit of a phantom which can never be found. Relative motions have been set aside as unscientific, and replaced by others, called absolute. But these in turn, when examined, have proved to be only relative. The chase after the absolute has then been resumed in a second stage. Five of such changes may be noted. The basis or fixed standard has been taken, successively, at the earth's surface, the earth's centre, the sun's centre, the centre of the solar system, and some point far away in the depths of the starry universe. Out of these successive points of sight, the Ptolemaic, Tyconic, Copernican, Newtonian, and Herschellian systems have arisen. The last of these, with Mädler's unproved and most improbable conjecture, offers Alcyone as the unmoved centre for all the twelve hundred stars, on which the calculations of the solar motion depend. But in this fifth stage we are just as far from having attained absolute motions as when our journey began. Utter emptiness and nothingness is a wholly unsafe anchorage, either in the neighbourhood of the Pleiades, or of our own system, and no grappling-irons can possibly be found.

38. On the other hand, when we frankly accept the truth, that the only motions we can know, measure, or experience, are relative, that is, of one or more real bodies with reference to other bodies equally real, our perplexity will disappear. It is true that the earth turns on its axis daily with respect to the heavenly bodies. It is no less true that all the heavenly bodies revolve daily with reference to each of the many surface-planes of the earth. It is true that the earth, every year, revolves in the ecliptic plane around the sun. It is no less true that, with reference to the earth's centre and in that same ecliptic plane, the sun circles once in the year around the earth. With reference to the sun's centre, all the planets move approximately in ellipses, with the sun's centre in the near focus. But with reference to the earth's centre, it is true that all the planets, though not the sun or the moon, move in cycloids of a very complex form. Each of these sets of relations is equally relative, equally scientific, and equally true. No absolutely fixed point has been, or can ever be found, so as to set aside one or all of these relative motions, and convict the language which embodies them of scientific falsehood.

39. The rising, culmination, and setting of the sun, moon, and stars, the transit of Venus across the sun's disc, the travelling of the moon over the sun in an eclipse, the occultation of stars, the entrance of stars into the field of a telescope, the preceding and following parts of the heavens, the immersion and emersion of Jupiter's satellites, are all phrases scientifically true. They are not mistakes or falsehoods, but facts of relative motion, strictly and rightly expressed. Other statements, which give the motions

in each case from other points of sight, may be equally true, and also needful for some purposes of science. But it is sciolism, and not science, which offers us the motions relative to some distant, inaccessible point of sight as the absolute motions, and denounces all the rest as unscientific and untrue.

40. All known and experienced motions are relative. Absolute motions, even if they did exist, could never be discovered or known. The question that remains is the comparative use and importance of the different sets of relations. Something or other must be assumed to be at rest, and we may adopt either a mechanical, sensible, or moral standard of the relative value.

If we take a mechanical standard, we must deal with the material atoms alone. Here equal force or mass is the one test of value. The whole earth thus exceeds immensely the mass of any mountain or plain on its own surface. The mass of the sun is far greater than that of the earth, and the sum total of all the stars in the firmament is some thousand times, possibly some millions of times, greater still. There will thus be a clear gradation in the importance of the relative motions, tried by a mechanical standard, from those which have reference to some one locality of the earth's surface, to those which relate to an unknown dynamical centre of the whole stellar universe.

41. When we consider motion with reference to the senses and faculties of living creatures, a wholly different order of importance is revealed. Our earth, on its surface, is peopled with countless forms of life. These are wholly absent from the void places of the system, and all but the surfaces of the other planets; and of their presence even there we have no assurance. And thus the relative motions, as viewed from all places on the earth's surface, have an importance shared by few, and possibly by none, of the countless varieties of sets of such motions, as viewed from other points of sight, in their bearing on the sensations and activities of the whole world of animated existence.

42. Again, the mechanical or solid proportion of things, and the visual, are not the same. The universe is twofold, as present to the eyes of every known living creature. One half belongs to the skies above, the other to the earth below. The celestial hemisphere presents only a few objects, dispersed over its blue vault, and these are accessible by one sense alone. But the terrestrial half, the earth's surface, is filled in every part with objects that come within the range of all the senses, and affect most intimately, in various ways, the safety and welfare of every living creature. Thus the relative importance of the two visual hemispheres reverses that of their absolute dimension or size; and the ratio of masses and momenta, for all the uses of life, has to be displaced and superseded by another of a wholly different, and almost opposite

kind. The earth's surface supplies, every moment, myriads on myriads of points of sight, and determinants of visual place and motion, for immense multitudes of creatures, while we have no certain assurance that such points of sight exist elsewhere in any part of the solar system or stellar universe.

43. Our earth, however, is not simply the home of animal life, but of reasonable and moral agents. It is "given to the sons of men." Animal life is higher and nobler than lifeless matter. But reason is far higher and nobler than animal sensation and life alone. Yet man is so wonderfully formed of body and soul, that for these creatures endued with reason, as well as for irrational animals, the only real points of sight and centres of experience and observation are on the surface of the earth. The importance of the relative motions, estimated from all the planes of the earth's surface, is thus still further intensified and increased. Men can indeed project themselves in thought beyond their actual place on the earth's surface, and contemplate the universe from ideal positions, never really attained. But these mental excursions belong to a small number only, and even in their case must be rare, compared with the hourly experiences of human life. For millions on millions of mankind, the constant point of sight, by which all motions are estimated, and to which they are referred, is some part of the surface of the earth. To each and all of them the earth is seen to be at rest, all its visible parts keeping a fixed and settled relation to each other, and the lights of heaven are seen to travel in daily circuit around it. Thus the relative rest of all the different parts of the earth's surface, and the daily revolution of the heavens, are the two main facts of constant experience, which need to be embodied in the language, and minister to the wants and uses, of daily life. The same language, thus used instinctively by every nation under heaven, is alone suitable and appropriate to be used in every Divine message; which, through facts of earlier or later history, addressed to the senses of men, would appeal to their conscience and reason, and reveal to them great moral and spiritual truths. If the Most High God speaks to men upon earth, He must speak to them as being what they are, and where they are. The point of sight, from which motions, changes, and facts of history are set before them, must be real, not fantastic, ideal, and remote. It is through their senses and daily experience, and not in spite of them, that the All-wise God must appeal to the heart and conscience of all mankind.

44. The charge, then, in the Fifth Essay, that to understand and interpret the Bible optically, or with reference to motions and changes, as seen from the earth's surface, is to make it equivocate and "palter with us in a double sense," is preposterous and absurd. It is the only course, which is consistent alike with plain common

sense, and the gravity and simplicity of a Divine message. Sunrise and sunset, and the daily circuit of the stars through the sky, are not blunders and falsehoods, to be excused in the common people on the ground of their ignorance of science, and fatal to the inspiration and authority of writings that claim to be the words of the living God. It is the accusers who are unscientific, and not the popular speech which they censure, or the Bible which they would deprive, on such grounds, of its claim to be "the true sayings of God." The first main count in the indictment, which would degrade the Word of God to a merely human level, because it is said to espouse the Ptolemaic, and not the Copernican theory, is frivolous and vexatious. Newton rejects and disclaims it, and the ground of that rejection is clear and simple. If the meaning of words is fixed by usage, the Bible in this case merely conforms to the usage of all mankind. But I believe that he is quite mistaken when he adds the remark that they "no less defile the purity of philosophical truths, who confound real quantities, that is absolute motions, with their vulgar measures, that is, the relative motions." For absolute motions are not measured at all by the relative, but are the very same, increased or lessened by some unknown difference. All the relative places and motions of the parts or atoms of a real universe, however vast, may be known and compared at least in thought. But who can fix and anchor that universe in mere empty space, or bind and fasten the whole to infinite nothingness and negation of all being? Relative places and motions may be, and have been, measured, and one actual distance of two bodies may serve as a measure and standard to all the rest. But the so-called absolute places and absolute motions have no possible point of departure from which the measurement can begin. They are merely an unknown, unmeasurable pathway from nothing to real being, and from real being to nothing.

45. These remarks, if true, will clear away a mist of deep prejudice which has gathered in these days around the statements of the Bible, and tends to obscure and impair, even among sincere Christians, the full sense of their Divine authority. They will serve to prepare the way for a further discussion of the errors, in detail, which have been laid to its charge, and especially in the Mosaic record of creation. Those who believe that Jesus is the Christ, the Son of God, the Word by whom all things were made, and in whom lie hid all the treasures of wisdom and knowledge, will find it impossible to believe further that the words He quoted with such deep reverence, and to which he referred the Pharisees in order to decide a moral question of high importance, are, after all, full of scientific errors, and contain simply the guesses of some unripe Hebrew speculator, who had not learned the modesty of modern science, and had no scruple in offering his own fancies as

the words of God. But they will find it not much easier to believe that either the Bible or its Divine Author is indifferent to the duty of scientific accuracy, and has offered to mankind the most precious and weighty spiritual truths in a setting very mainly composed of physical errors and falsehoods.

46. Man is composed of body and soul. God's messages to man are also twofold, containing facts that appeal to the bodily senses of mankind, and truths that speak more directly to their heart and conscience. And these two elements are as closely conjoined in the message, as soul and body in the person to whom the messages are given. It is a strange and groundless fancy, that we can reject the facts of the Bible, and stab to the heart its historical veracity, and still retain the authority of its truths unimpaired. The words of St. John apply here by a very close analogy. "He who loveth not his brother whom he hath seen, how can he love God whom he hath not seen?" He who believes that the Bible is mistaken in all its notions of the physical universe,—that in Astronomy it follows vulgar errors, in its Cosmogony contradicts the clear teachings of science, and in its history of man's origin is wrong both in time and place, and in almost every other particular,—how can he possibly believe that it is an inspired message from Heaven, on which we may rest our souls for time and for eternity?

I believe all such concessions to be as baseless in point of science as they are mischievous and delusive in their moral aspect. Whether they are held by sincere Christians or open unbelievers, I think they ought to be resisted and opposed with all that depth of conviction which springs from a firm reliance on the teaching of our Lord and Master, the incarnate Son of the Most High. Science, and especially Geology, is now passing through an imperfect and transitional stage. The time will come when all recent discoveries, freed from spurious additions, which have no ground but the rashness of premature guess-work, will be lit up with clear sunlight, and open out a wider and better defined landscape; and, while we gaze upon it, the truth, wisdom, and harmony of the Divine message will stand revealed to us with a completeness and grandeur never known before.

The CHAIRMAN.—It is now my pleasurable duty to convey our thanks to the Rev. Canon Birks for his admirable paper.

The HON. SECRETARY.—Professor Birks has asked me to lay before you the following letter, which he has received from Professor J. Clerk-Maxwell, F.R.S., Professor of Experimental Physics in the University of Cambridge.

11, *Scroope Terrace*, 21st March, 1877.

DEAR PROFESSOR BIRKS,—I have read your lecture again, but am unable to say more than to thank you for the clear way in which you have set forth the proper use of language with respect to motion. Whenever we begin to subject the primitive phraseology about natural events to scientific analysis, our language becomes stiff, and cramped, and unpoetical, because it is built upon a framework of new and rough scientific hypotheses which have not yet been settled into their proper places even by experts, and which to the mass of mankind are nothing but jargon. In this state of things, poetry and science are supposed to be in opposition to each other; and if science is admitted deficient in grace, poetry is suspected to be indifferent to truth.

But as soon as the scientific analysis has been made in a satisfactory manner in any particular subject, it becomes evident that the primitive phraseology which stood the test of experience for so many thousand years is really the most scientific as well as the most elegant, and that it does not convey any false impressions to those who have studied the matter, any more than to those who have not.

Thus, our phraseology about the thermal phenomena was put into confusion last century by those who said there was no heat in the fire, nor anywhere else, except in our minds.

We now agree in language better with our remoter ancestors when we measure the quantity of heat given out by a pound of coal, and we never think of confounding what we are measuring with a sensation.

Yours, very truly,

J. CLERK-MAXWELL.

I have also received the following letter from the Plumian Professor Astronomy at Cambridge :—

March 31, 1877.

I THANK you for sending me a copy of Professor Birks's paper "On the Bible and Modern Astronomy." I have read it through, and can say of it generally that I consider it to be an able contribution towards settling the question of the mutual relation between the revelations of Scripture and the discoveries of modern physical science. The only particular remark it occurs to me to make is, that I cordially agree with what Professor Birks has said in art. 17 of the essay, where he speaks of "the looseness of thought which sets down every unproved hypothesis started by physical philosophers as a firm and established fact of science," and condemns "the easy credulity with which some Christian men are ready to take up the newest scientific guesses, and not only sacrifice to them a considerable part of their own faith in the Bible, but exhort others to do the same, as a triumph of Christian candour over the blindness of prejudice." I think, too, that Professor Birks has well exposed the inappropriateness of the view taken by Canon Titcomb (in art. 24 of his paper "On Certain Magnitudes in Nature") as to the bearing of Mädler's unproved conclusion, that the star Alcyone of the Pleiades is at the centre of gravity of the stellar system, upon the interpretation of Job xxxviii. 31.

J. CHALLIS.

The Rev. Prebendary IRONS writes :—

I am sorry Professor Birks directed his arguments against one of the "Essays and Reviews" of the last generation of thinkers, as they may be called. What would have met the object of Prof. Birks's paper would have been a brief statement, which he is so competent to make, of, first, certain outlines of the modern astronomy; next, the indications in the Old Testament of the truth of those outlines, together with the admission of the popular language of some passages, not more inconsistent with the latent truths in other places, that is, our own popular language, *e.g.* as to the sun's "rising and setting," with the scientific acknowledgment of the "Copernican system," as it is termed. The language is sometimes popular, sometimes poetical, sometimes scientifically true. "The sun goeth forth" to the uttermost parts of the heavens is popular; God "calleth the stars by name" is poetry; "He hangeth the round earth upon nothing" is science.

I would point out that almost all the graver questions (and they are but few) raised on this subject are, and will long continue to be, questions of exegesis, and not capable of being judged by ordinary Bible readers, who must be content to use their Old Testament for spiritual edification, and satisfy themselves with the assurance that neither men of science who can read Hebrew, nor Hebrew scholars who read science, have yet found any instance in the Sacred Scripture of a statement opposed clearly to known facts of science. But I would go further, and add that, were it otherwise for the present, yet ordinary Christians, and the Bible too, can afford to wait till men of science make themselves a little more clear and a little more certain.

Meanwhile our scientific doubters or critics seem to be bound to be more explicit. They should place side by side, in columns if they will, the facts of astronomy, or any other certain science, and the texts which deny them. There has been a great deal of loose talk on this subject, and not a little desire to look candid and knowing and liberal on the one side, and look devout and orthodox on the other.

Rev. Canon TRICOMB.—I am sincerely thankful to Canon Birks for having again brought forward this subject, because, however greatly our views may differ, I am satisfied that good only can result from its free and full discussion. Yet with regard to the paper which has just been read, I cannot but complain of its injustice; for there seems to me to be a spirit in it which seats itself in a chair of dogmatic and infallible authority, and demands that all dissent from its utterances should be relegated to the empire of religious unbelief. Now, sir, I lay no stress upon the fact that this is rather hard upon a man who has all his life long been preaching and speaking and writing in defence of God's Holy Word, and who has taken an active and public part in endeavouring to stem the progress of infidelity. I say I lay no stress upon that fact. But I *do* lay great stress upon the next fact which I mark in connection with this paper, *viz.*, its mischievous confusion of thought, in bracketing the opinions of Mr. Herbert Spencer, who denies revelation altogether, and of Mr. Goodwin, "the fifth Essayist," who acknowledges it only in part, with any one like myself, who believes in Divine Revelation as tenaciously as Canon Birks. I venture to submit, sir, that this sort of criticism radically fails to distinguish between things "which differ," and that while it may serve the purposes of controversy it

can never serve the interests of truth. In any such hasty generalization as this you may be sure there lies some mistaken judgment, some sort of hidden misrepresentation. It is so here. Of course I do not for a moment accuse my brother of intentionally misrepresenting me, yet he certainly has done so. Hurried along by that rapidity of thought which so often belongs to acute but impulsive minds, he has come to the conclusion that because I am contending for theology and philosophy as occupying two distinct spheres of thought, and as having two separate missions in the world, I therefore exclude from Divine teaching all facts in Scripture which bear upon the natural sciences. If you look to the conclusion of his 5th paragraph, you will see the following words:—"The partition in Canon Titcomb's paper is different. All moral and spiritual truth is placed on one side; all outward facts, and physical, zoological, and human changes on the other." Now, sir, I protest, in the first place, against this artificial summary of my views, because the words are not my own. I never once used the terms, "outward facts," "physical, zoological, and human changes"; nor, indeed, anything like them. In appropriating them, therefore, to myself and saying that I have separated them from the teaching of Divine Truth, my friend has simply set up a hobgoblin and hunted it down for his own intellectual gratification. I no less object, however, to the ambiguity of this language. "*All moral and spiritual truth is placed on one side.*" "On one side"—of what? Again, "*all outward facts, &c., on the other side.*" On the other side—of what? The whole statement is loose and undefined. It is true that the sentence begins with an acknowledgment of my views being different from those of the two other writers before named; nevertheless, the difference is expressed so vaguely that no one can tell what it means. The plain sense of the words, when taken in connection with the general scope of the paragraph, undoubtedly implies that I place "moral and spiritual truth" within the scope of Divine Revelation; but "all outward facts and physical changes" on the outside of it. I cannot but believe that I am right in this assertion; for the paper just read states that my attempt is to maintain the doctrinal authority of Scripture, and yet to impute to it a merely human authority (§ 6). Now, sir, if that be the intended sense of the passage, I not only repudiate it as false; but I defy any careful reader of my paper to find in it one single word for its justification. Take, for example, the interpretation which I gave of the first chapter of Genesis. Is not that chapter full of "outward facts and physical changes"? Yet, the very basis of the whole reasoning upon it was, that Moses received it from God under the form of a Divine vision. Canon Birks may object very fairly to my belief in this series of facts and changes as having been communicated to Moses under a vision. That I allow. Although why he should object, I know not; seeing that Balaam's and Micaiah's revelations were given by vision, and that when Isaiah described the mountain of the Lord's House, established in the tops of the mountains, and all nations flowing into it," he distinctly declared it to

have been the word which he saw. And how could he have seen it except by vision? Still, I say, my friend Canon Birks may very fairly differ from me in that line of thought. But it is impossible for him to say that I have separated the facts and changes recorded in the first chapter of Genesis from the limits of Divine Revelation, when I have expressly declared them to have been supernaturally communicated. It may be, however, that my friend will fall back upon another meaning to his words. He may contend that while I place the whole of this chapter within the compass of a Divine Revelation, I nevertheless separate its "outward facts and physical changes" from "all moral and spiritual truth." But, even were this his meaning, I no less repudiate the charge as unfounded. For those who take the trouble to read paragraph 27 of my paper, will distinctly see that I treat the very *facts* communicated to Moses as the basis of moral and spiritual teaching. For example, I describe the six epochal alternations of evening and morning in Genesis i., with all their successive changes, as having been revealed by God under the form of natural days, for the express purpose of introducing to man the institution of the Sabbath. How, then, can it be affirmed that I separate those "outward facts" from the teaching of moral truth? On the contrary, I deal with them as having been an ordained vehicle for the communication of that truth. Thus, the charge of Canon Birks, in its second form, no less than in its first, bursts, under this analysis, like an empty bubble. Nor is there anything else in my paper which justifies the charge. There cannot be found a line in it which separates the teaching of spiritual truth from the record of physical facts. How could such an opinion be held, or such a statement be made by any sincere believer, when facts of that nature are inextricably inseparable from parts of Scripture, like the "History of the Deluge," "The Birth and Resurrection of our Lord," and, indeed, the whole series of "Miracles," from one end of the Bible to the other? The truth is, that this partition between the "outward facts and changes" related in Scripture, and its "moral and spiritual teaching" is a wholly gratuitous assumption of Canon Birks, and one which I repel as demonstrably and utterly false. What I did say in my paper was (and here I nail my colours to the mast, and intend to hold them against all comers), that it formed no part of the purposes, either of inspiration or of Revelation, to express facts bearing upon questions of science with scientific accuracy; the sacred writers being left to clothe them in the popular phraseology of the times in which they lived, on the ground that they were not intended to teach science, but solely to convey moral and spiritual instruction. The question, therefore, between myself and Canon Birks, is not one which affects the truth of any facts or physical changes recorded in Scripture; nor is it one which affects those facts as having been made use of for the conveyance of moral and spiritual teaching. On those points, as I have now clearly shown him, we are agreed; notwithstanding that by too superficial a study of my paper, Canon Birks has been pleased to think otherwise. The real point of difference between us, is whether it be possible

for the Scripture record of outward facts and physical changes in nature to contain any infallible communication of moral and religious truth, when from a scientific point of view the language employed in such records may not always be infallibly exact. Canon Birks thinks that if *any* portion of Divine Revelation be scientifically correct, all is of necessity bound to be so. But is not this an unwarranted assumption? For *how* can any man tell, that, in matters upon which it was no part of Revelation to instruct us scientifically, God should not have been pleased to be more exact in one part of His Word than in another? How can Canon Birks, or I, or any one else transfer our ideas to the mind of the Infinite, and say what God ought to have done, or ought not to have done? The question is what He has done? But, then, it is said that an admission of the least inaccuracy of expression, even as to a scientific fact, must necessarily deteriorate the moral and spiritual teaching of the Bible. But why? For if it formed no part of the Divine purpose to teach science in Scripture, then the scientific accuracy of its language may well have been subordinated to its real purpose, viz., its moral and spiritual teaching. Why should this view weaken the authority of inspiration? Is the authority of inspiration weakened because Old Testament Scripture represents God under the form of a Being who has human parts and passions when we know that He has not? And when this is done, moreover, not only in poetic books, but even in the historical? Is it not evident that God was pleased in the early education of His Church to deal with it as a teacher does with children, stating facts somewhat immaturely for the purpose of suiting its imperfect powers of comprehension? If God did this, in a manner which cannot be gainsaid, with reference to His Person, why should it be thought incredible for Him to have done the same in relation to His Creative works? How can this latter view weaken the authority of inspiration? It may do so among those who have been nursed in the belief that any other view of inspiration is wrong. But among men of science who are drifting into a sea of doubt and uncertainty, and who are disposed to reject the Bible because they have been told that its inspiration must necessarily involve as much infallibility in scientific matters as in things relating to everlasting life—among such persons this view of the question is most helpful and reassuring; and so far from weakening the authority of God's Holy Word, strengthens it. I am aware that such an appeal to consequences is no test of truth, neither do I use it as such. I only mean that it is as much to be considered on my side as on the side of my opponent; and that if he is right in appealing to his views on the ground of their being necessary to sustain the faith of those who believe, as I think, too much, I am no less justified in appealing to my views on the ground of their being necessary to help forward the faith of those who believe too little. In reality, however, the investigations of truth ought to be quite independent of any consideration of results; for whatever consequences may flow from its discovery, truth will always take care of itself: it can never perish. In the course of

this search after truth, however, I must beg to remark, as I did in my paper, that we ought never to attempt to force the doctrine of Bible inspiration "along preconceived and self-determined lines of our own making"; but to take it "just as it stands, interpreting it according to those necessary laws of sequence which accompany the discovery of actual facts." If we go beyond that I am convinced we shall "weaken the evidences of Divine Revelation instead of strengthening them; and in our vain attempt to uphold the Word of God by insecure props we shall bring it down with a crash." Feeling this most conscientiously, I will only end my reply by observing of Canon Birks's paper, as he has done of mine, that I consider it to be "adverse and not helpful to the cause of Christian truth."

Rev. A. I. MACCAUL (Lecturer in Hebrew at King's College).—I have listened with great regret to what has fallen from Canon Titcomb. My belief in regard to this matter is, that in the first chapter of Genesis we have neither visions nor pictures; but a narrative of the same kind as we have in any other portion of the Scripture. Where there are visions in other portions of Scripture we are always told that they are visions.* Nor is there any trace of a poetical origin, although some urge that the description may be regarded as poetical. It contains no evidence of the rhythmical arrangement that is found in poetry; but is all prose—straightforward, natural prose, and before I give it up I shall require that some mistake or error is not only alleged, but proved against it. Many objections have been brought against the Scripture; but let them be brought in detail, and we will consider them in detail. (Hear, hear.) We are told by some that those portions of the Scripture which are in apparent opposition to facts have been falsely translated; but let those who make this assertion bring forward the instances, and we will consider them. I am not aware of such cases, and think that the paper read by Canon Birks is a gratifying and satisfactory one. (Hear, hear.) It is a gratifying explanation and justification of the language of Scripture. Why, we have at the present moment even scientific men talking of the sun rising and setting, and crossing the line. Indeed, scientific men are in the habit of applying popular forms of speech and phraseology to scientific facts that can scarcely be realized, except by scientific men who have very closely studied the subjects to which this language is applied. It is, therefore, no argument at all against the credibility of the Scripture, that popular language is used upon scientific subjects.

The Rev. Canon TITCOMB.—No one has said anything against the credibility of Scripture.

Mr. MACCAUL.—I think it a sad thing to allege that there are inaccuracies in Scripture in a broad way; indeed, I regard it as a very grave and serious offence. I do not hesitate to use the word "offence" (hear, hear), and I repeat that if there are any of these inaccuracies, let them be brought forward

* If a vision is something presented to the sight, physical or mental, the account of Michaiah does not conflict with this statement.—[A. I. MACC.]

in detail, and we will consider them. I cannot at this moment go back to the paper read by Canon Titcomb some years ago, but I gave my attention to it at the time, and what struck me particularly was that there were one or two reasonings in the paper based on erroneous translations of the first chapter of Genesis. First, with reference to the two ways in which the 20th verse is translated—a matter to which Canon Birks has referred in his paper—the translations as to the birds and the water. The passage as it is given in the Bible, is,—“And God said, Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the earth in the open firmament of heaven.” In the original Hebrew version there are two co-ordinate clauses : the Versions mostly have the verse as it is in the English version ; but in the Syriac and the Samaritan it is the same as in the Hebrew ; and Dachselt, in his *Biblia Hebr. Accent.*, gives his attention to this verse as well as to many other passages in the Old Testament, and shows that it is not correct to translate the verse as it is given in the English version. The Hebrew verse is divided into two portions—not necessarily of equal length—and in this verse the primary division comes after the word which corresponds to the English “that hath life.” The primary division is, “And God said, Let the waters bring forth abundantly the moving creature that hath life,” and it is urged, and I have no doubt correctly, that the second clause of the verse should be not subordinate to the first, but co-ordinate with it. There are two co-ordinate clauses standing side by side, and not necessarily having any connection with each other. There is one other point on which I desire to say a word, and that is as to the statement sometimes made that Biblical students are indebted to the students of science for the notions now generally held with respect to the antiquity of the earth. I think I am right in supposing that the opinions now held with reference to the antiquity of the earth are of comparatively recent date ; whereas Dathe, who was appointed Professor of Oriental Languages at Leipsic in the year 1762, says : “Jam pergit (v. 2) de terrâ, eam, *incertum quo tempore*, insignem subiisse mutationem.” And Schultz, in his *Scholia in Vetus Testamentum* (Norimbergæ, 1783, page 9) says : “Probabilior fit eorum interpretatio, qui Mosen h. l. de telluris nostræ ante *innumera sæcula create*, insecutâ post varias revolutiones vastatione sive destructione loqui putant.” I pointed out in a paper that I once read here, that we are limited in our interpretations and explanations by the original ; and if it cannot be proved that the original language contains what is contrary to modern science, we are in a position to grapple with the matter ; but until that is done we have no reason to be afraid. I beg to express my thanks to Canon Birks for his exceedingly instructive statement.

Rev. G. CURREY, D.D.—There have been many statements made with very great force by speakers on both sides, and I shall not attempt to enter fully into all the points that have been touched upon, some of them at considerable length. I will only say, with regard to Canon Titcomb, that I cannot but sympathize with him in a great degree, because, in the paper he

has read, Professor Birks, although probably he did not see the full force of some of the expressions he has used, seems to have somewhat severely attacked Canon Titcomb, whose statements have certainly been misinterpreted. (Hear, hear.) And I must be allowed to say, without any wish to use the language of indiscriminate censure, that Professor Birks has, in my opinion, laid himself open to the charge of representing the statements of his opponents not as they themselves mean them to be understood, unintentionally, of course. I formed this opinion in reading the paper calmly at home, before hearing the rather warm discussion of this evening; and I must plainly express my opinion that this fault runs throughout the paper, in which Professor Birks attacks opinions which are inferences from, not statements in, the books which he takes in hand. There is an instance of this in his treatment of the Fifth Essayist. The Essayist says (*Essays and Reviews*, p. 209), "It would have been well if theologians had made up their minds to accept frankly the principle that those things for the discovery of which man has faculties specially provided, are not fit objects of Divine Revelation." This is all he says. Now, I will ask you to look at the mode in which Professor Birks, in sec. 5 of his paper, represents or paraphrases this expression of the Essayist before he proceeds to refute it. Professor Birks says:—

"Thus the threatened conflict between Science and Revealed Religion is averted, both by the Essayist, Mr. Herbert Spencer, and Canon Titcomb, by a treaty of partition. But the line of demarcation has a very important difference. With the Essayist, all belongs to Science, which men have faculties given them to investigate and understand. If there are any subjects beyond the range of our faculties, on which they can teach us nothing, these are resigned to Supernatural Revelation."

Now, I ask Professor Birks to consider whether this is a fair paraphrase of the statement of the Essayist? (Hear.) The Essayist merely says that he can receive frankly the principle that those subjects for which man has faculties specially provided, are not fit objects of Divine Revelation; and then, when this has to be refuted, it is represented that the Essayist says, that all subjects of knowledge for the consideration of which man has faculties provided, are to be excluded from the domain of supernatural revelation. Is that the same thing as the statement of the Essayist? Professor Birks has also made large use of the *argumentum ad invidiam*. Is it possible, he asks, to believe that the all-wise God should make His revelation in language which is unscientific, erroneous, and untrue? Now the word "unscientific" is ambiguous. It may mean that the scientific element is absent, or that the language is contradictory to Science. These two meanings differ from each other. The opponent uses it in one sense, and Professor Birks argues as if it had been used in the other. It may be allowed that some who have propounded novel theories have made use of startling expressions; but if any Christian apologist ever applied the epithets "erroneous and untrue" to any words of Scripture, the exact words of the author should be quoted, and the exact sense in which they are used should be clearly shown,

before the opponent proceeds to refute them. But one would fancy, from Professor Birks's paper, that this proposition was actually maintained without qualification. The answer to this fancied assertion is contained in a very elaborate, and I will also say a very interesting, discussion with regard to the nature of absolute and relative motion.—A member has termed it a hard metaphysical discussion. Now, I do not regard it as metaphysical, for I think it a little physical. (Laughter.)—It is, indeed, interesting to have Newton's opinions quoted, and although it requires a good deal of study to make it all out, if you do succeed, you have arrived at something worth considering. But, after all, what does it come to? It comes simply to this, that when we speak of the sun going round the earth, this may be, in connection with the idea of relative motion, as scientifically true as if we spoke of the earth going round the sun. But this does not bear on the question of the accuracy of the statements contained in the Scriptures. I do not know that the Scripture ever said anything about the sun going round the earth; certainly not in the sense in which we use the phrase Scripture. It never recognizes any antipodes, and therefore the motion that takes place, whether of the earth round the sun, or *vice versa*, was utterly unknown to the writer of Holy Scripture. And here I would say that we must not separate Scripture from the writers of Scripture. It is stated in the paper we have heard read, that "Scripture says this," and "Scripture says that," that "Scripture uses such and such language." No; Scripture does not use language; but men who were guided by the Spirit of God use the language found in Scripture. In thus employing men to write the Scriptures, God did not guide them as to the language they used with reference to matters connected with science in any other sense than what was in accordance with the popular theories of the day. I have little doubt that those Hebrew writers, when speaking about the earth and the sun or any physical subject, had much the same notion of the nature of their motions as the rest of their countrymen; nor can I conceive that revelation was conveyed to man in such a way that the reader would gather one meaning while the language he read meant another. If the words of Holy Scripture were written by different men, according to the conceptions God had granted them, and in the popular language of the day in which they usually expressed the same conceptions, we may fairly suppose, without derogation to divine revelation, that God, when He reveals moral and spiritual truths to man, has made use of intelligent men as the instruments of His revelation, and that they have understood these things in the way in which they have represented them. Of course, this does not affect the question with regard to prophetic utterances; but we are not discussing prophetic utterances, we are discussing the meaning of the ordinary language of Scripture, and that I think is plainly the popular language applied to the theories of the day in which the writers of that language lived. So far from this being a derogation from the divine authority of Scripture, it is to me the most fitting way in which I

can conceive divine revelation should be made. The discussion entered upon in this paper as to relative motion might seem to show that inasmuch as when we speak of the sun rising we are speaking only in a popular and not in an accurate way, so, upon close investigation, it may be said that it is not accurate to speak of the sun as being stationary. But this merely amounts to saying that, so long as knowledge is imperfect, all language on such subjects is, in a certain sense, "unscientific," and that therefore it is not really derogatory to Holy Scripture to call its language "unscientific." In the main part of his paper, Professor Birks departs from the proposition with which he started, namely, the revelation of the Mosaic cosmogony made in the first chapter of Genesis. Upon this question the Professor leaves us where we were. He assumes that there must be a cosmogony in that chapter, but throws little light upon its nature. It is easy to say, generally, "It must be true, because God has spoken it." Of course, it must; but in what sense is it true? If you say it must be true in its natural sense and in the sense in which I understand it, that settles the question. But we do not know the way in which it is true. And if we strive to discover it, we must advance our theories with modesty, and accept those of others with toleration, even if they should maintain, as some have maintained, that the chapter in question does not contain any system of cosmogony at all. We owe our thanks to Professor Birks for the great pains he has taken in composing this paper. A great part of it is to me very interesting, especially that portion which refers to the Pleiades, and the fishes and the birds, for it confirms the view in which I ventured to differ from Canon Titcomb when his paper was read; namely, that we should not attach much importance to the alleged discovery of recondite truths by accidental and casual remarks that are made in the Scriptures. (Hear, hear.) It impresses upon us the importance of remembering that the endeavours which are sometimes made to fix the discovery of some recondite truth by reference to some merely casual remark in the Scriptures are very dangerous. (Hear, hear.) I have frequently heard it said that a remarkable proof of a recondite truth is to be found in some such casual remark; but when we come to examine the so-called recondite truth, we find that it is no truth at all. In that case those who have made a weapon of this discovery have it turned against themselves. After all I believe that Professor Birks and myself are not so much at issue, for in one part of his paper he speaks a good deal about the manner in which revelation is understood by man. You must speak of a thing as you see it. Although you may speak of absolute motion, you can only observe relative motion. That is all I contend. I say that the language of Scripture is according to the observation of those who wrote it; and in saying this I in no way detract from the Scripture. Professor Birks has, perhaps in the warmth of controversy, expressed himself rather hastily, and he has attributed to his adversaries statements which I am sure he would not have imputed to them on further consideration: in fact, begging of the question. Professor Birks has shown that observations and

descriptions must be made of phenomena according to the way in which they appear to the observers ; and if an infidel objects to the Scripture as erroneous and untrue because the scientific descriptions are according to the phenomena as popularly understood, I should reply by saying, not that the language used is the word of God, and must be true, but that the statements are made in the natural and the only way in which such revelations could be made. (Hear.) The statements of Scripture may not be in accordance with the definitions of abstract science, but may be simply agreeable to the appearance of things around us ; but this would not make them "erroneous" or "untrue." If any one calls them so, he uses improper and irreverent language, and renders himself justly liable to censure for such an improper way of speaking. But we must not imagine that we have disproved the theory, because we suppose that it involves the supposition that the statements of Scripture are "erroneous or untrue." This is, in fact, to beg the question. It is enough to answer that the epithets are improperly applied, whether by those who maintain, or by those who deny the theory ; and if, by improper use of terms, the maintainers damage their cause, the opponents do not establish theirs by *assuming* that such terms are properly applied. I am sure Professor Birks will agree with me in saying that he does not wish to attribute to Canon Titcomb anything like disbelief in the authority of Holy Scripture ; and I may add that perhaps Canon Titcomb was a little warm in replying to the paper, and imagined a more serious kind of attack than that which was really made upon him. I think that this discussion has been a very interesting one, although at the same time it has evolved a little more of the antagonistic element than we generally experience.

Captain F. PETRIE.—It has been stated by a leading member of one of our universities, who saw the proof of the paper just read, that *the astronomy and geology of the Bible are not considered by some men of science to be those of fact*. Now, although such an expression is variously understood, yet, accepting it in what I know to be its popularly received sense, I venture to make the following remarks. Some years ago, when the *Essays and Reviews* were published, a number of our most learned men were selected to give "replies." Amongst those selected to write were the *Radcliffe Observer*, and the late Mr. Phillips, Professor of Geology at Oxford. The former, in his reply, alluding to the Creation as given in Gen. i. 2, 3, said,

"Nothing can exceed in truth and grandeur these words of the inspired historian. Like the bold touches of a great artist, they create a picture which no after-addition or refinement can improve. The only passage besides these which concerns me as an astronomer, is that which describes with equal majesty the works of the Creator beyond the earth" (Gen. i. 14—18). "The most keen-eyed hypercriticism should see nothing to object to, as unworthy of an inspired pen, in this grand assertion of God's creation of the sun, and moon, and stars, and of the provision which He made by them for the necessities of His creatures."

Professor Phillips in his statement, speaking of his work as a geologist, says—

“There has never been produced in my own mind . . . the slightest impression that we” (he, and those who studied under him) “were considering facts and laws in any way opposed to Christian Faith, to the inferences from Natural Theology, or the deductions from Scripture.”

I now turn to a paper by Professor Challis, F.R.S., Plumian Professor of Astronomy at Cambridge (*Transactions*, vol. ix. p. 140). He says,

“The language of Scripture neither is nor can be unscientific, that is, it cannot be *contradictory* to the language of Science.”

I again turn to a paper by Professor Dawson, F.R.S., one of our geological authorities (*Transactions*, vol. ix. p. 173) :—

“The Bible abounds in illustrative references to natural objects and phenomena ; I think it is the conclusion of all competent naturalists who have carefully studied these, that they are remarkable for their precise truth to Nature and for the absence of all theoretical or hypothetical views.”

These opinions, recently given, and coming, some from laymen, others from clergymen, are of some weight, and I may add that the roll of those who discover no contradictions between Science and Revelation contains many a great name in the scientific world ; amongst these we find one who is called “the father of the physical science school of our day,”—Professor Stokes (see prefaces, vols. v. and x.) ; two more have been specially prominent of late ; need I say I allude to Professors Balfour Stewart and P. G. Tait ?

The CHAIRMAN.—I will not detain you two minutes by the remarks I think it desirable to make. I merely wish to say that I think Professor Birks’s paper throws a little unnecessary fog over the relations of absolute and relative motion. In sec. 23 he thus quotes from Spencer :—“Nevertheless, absolute motion cannot even be imagined, much less known.” I perfectly agree with him that absolute motion cannot be known, but I do not agree with his statement that it cannot even be imagined. (Hear, hear.) It is quite as easy to imagine a point in infinite space to be at rest, as it is to suppose this table to be absolutely at rest upon the floor of this room ; that is, relatively to the floor of this room it is at rest. It appears to me quite as easy to imagine that a point in space may be absolutely at rest, and that the absolute motion of any other point or body in space would be its change of position with regard to the point which is at rest. It is perfectly true that we never can know anything of absolute motion or rest, because we never have the means of knowing what point in space is absolutely at rest. All that we know about motion is by measuring change of distance or of place by the relative distances of one point or object from another ; but it appears to me that it is perfectly easy to conceive, although you cannot measure, relative motion. The author of the paper says—

“Newton holds it doubtful whether any body is really at rest, though he thinks such a body may perhaps exist in some remote part of the universe.”

Whether any body in the universe is absolutely at rest or not, appears to me to be foreign to the question of conception. The writer goes on to say—

“We must revert, then, to another conception. Absolute motions are those which are referred to no real body at all, but to the point assumed to be immovable, of empty space.—Is this a true and valid conception? Do we really, in our thoughts, when we speak of these fixed points of empty space, introduce an immense number of hypothetical or imaginary atoms?”

Not at all. All we have to do with is a point presumed to be absolutely at rest, and the absolute motion of any body would be referred to that. There are several other passages in which there seems to be a confusion between absolute and relative motion, which appears to me to be unnecessary. (Hear, hear.)

PROFESSOR BIRKS'S REPLY.

As three speakers have made serious objections to my paper, and only a few minutes were left at the time for explanation or answer, perhaps I may reasonably claim, in the printed report, some space for a rather fuller reply.

And, first, I regret deeply that Canon Titcomb should have charged me with a misreport of his opinions, and almost with having classed him among adversaries of the Bible, when he has written and laboured in its defence for so many years. I have known and esteemed him for twenty years. He has been by my choice and his kind consent a mission preacher in my parish. I have called him in my paper, and thought of him as a friend. This would have been quite impossible, had I meant to imply the charge he supposes me to have made. I said that the essayist, Mr. Spencer, and himself, agreed in one point, that Science and Religion could be reconciled by a treaty of partition. But I added at once that the partition was quite different, and that while theirs really left no room or place for Supernatural Revelation, he reserved to it the whole range of moral and spiritual truth. My true meaning, I think, is quite plain. Had I dreamed he could so have mistaken it, I would have striven to make it plainer still; and in stating the partial agreement and difference, would have avoided putting the three names, even for a moment, in apposition; though it was only to show, within a dozen lines, the great difference between them.

The real divergence between us may be explained most clearly, from my

point of view, by a brief historical parable. Two officers, let us suppose, before Waterloo, are consulted by the Duke, on the line of defence to be occupied next day by the British army. The first says, "Beware, my Lord, that you do not occupy Hougoumont; it lies much too forward, out of your true line of defence. It will be the first point attacked, and cannot be held. The troops placed in it will be slaughtered, the rest will be demoralized, and the battle will be lost." The second says, "Be sure, my Lord, that you *do* occupy Hougoumont. Man it with some of your best troops, and hold it firmly. It lies forward, it is true, but it is an essential part of the position. If you give it up to the enemy, and only place your troops on the ridge behind, their first step will be to seize it. They will have a secure fortress, from which their artillery will enfilade the whole position. Whole regiments will be swept away by the raking fire, and the battle will be lost almost as soon as it is begun. But it has a strong wall that can never be forced. The strife will be hot and fierce. The enemy will swarm round it, and may occupy the orchard for a moment, but they can never make good their entrance within the building itself. We *can* hold it, we ought to hold it, we must hold it to the last, and the battle will be won." Both officers might be equally sincere in their advice, and fight with equal bravery in the field. And still, if the Duke had listened to the first, the result would have been just as disastrous as if the advice had been given by a secret enemy.

In these opening pages of my paper I am not really the assailant, as Canon Titcomb seems to think, but the defendant, and one who has been first assailed. In *The Bible and Modern Thought*, perhaps the most widely circulated of my works, I have given a hundred pages to this very subject. My friend, in his paper, lays down the law that his line of defence of Scripture is the only one tenable, and that mine is mischievous and unsound. He condemns it in the strongest terms. Now my present object was to carry one part of my previous argument a step further than I had done before, as to the harmony between the words of the Bible and the facts of modern astronomy. How could I do this, with his paper full in my face in the recent Transactions of the Institute, unless I first showed briefly some reasons for my entire dissent from the law he sought to impose on every future champion of the Bible and Divine Revelation? I had every reason for wishing to avoid the necessity. He is a friend whom I have known for twenty years, a member of the Council, and I am only an associate, and he has written papers before, which I think valuable, and helpful to the cause of Bible truth. Public disagreement, in defenders of that cause, is always a stumbling-block to the weak, and involves a loss of moral power. To answer the paper fully would have needed a second, at least as long, and even a very brief reply robbed me of one-third of the space I needed for my own main subject. But there was no help for it. Till my main principle had been vindicated from the vehement onset he had made on it, I could not, honestly or logically, take a step further

in its application. And yet I believe, in the present stage of the great conflict with scientific unbelief, that the step I have desired to take is one really of high importance.

My friend has linked me with his argument in two opposite ways ; and these illustrate, I think, what an unsafe quicksand has been mistaken for a solid foundation. First, he quotes me by name as his authority for a so-called scientific fact, that many of the nebulae are distant from us not less than sixty trillions of miles, or ten millions of the years of light. This is one main premise, from which he infers that the Bible pays no respect to scientific exactness, and is utterly indifferent to the duty of expressing itself with exactness on scientific themes. Now the quotation is from a sixpenny work written more than thirty years ago. The statement was taken on trust from others, and was then a current and usual opinion. Soon after I was led to examine it closely, in connection with an essay of Struve, and became convinced of the entire fallacy of the ground on which it was conceived to rest. I had abandoned the view for thirty years, as one of the many mistaken guesses of science, and recent spectroscopic researches all tend to confirm the truth of my later view.

Much later I published a work of five hundred pages, in which I gave my most careful and mature convictions on the true nature of the relations between the Bible and Modern Science. After quoting me as adequate authority for the truth of a scientific guess I had long ceased to believe, how does my friend's paper describe my ripest conclusions and teaching in this later work ? In these words, that it is "a latent source of mischief, and spreads the very evil we deplore." The danger of it is immense, and the mischief is already working widely. A view the reverse of mine is "the only view by which we can be loyal to our Bible, and loyal to Science also." It is "impossible to doubt," what I have laboured at some length to disprove, and do more than doubt, and utterly disbelieve. We are bound, in all honesty, to admit, as the meaning of the Hebrew text, what Mr. MacCaul says Hebrew grammar disproves, and Dr. MacCaul, a first-rate Hebraist, employed three pages in refuting at length, namely, that all Genesis i., including the first and second verses, is included by the writer within the limit of the six days. My friend's inference is, that the language of Scripture "makes no pretensions to scientific accuracy"—a very strange euphemism for a narrative which shuts up within six natural days a series of changes which really occupied far more than ten million years.* Again, we are bound, as honest inquirers, to concede the utter contrast between the only natural sense of the Mosaic record and the certain discoveries of modern science. To deny this as I have done, and still do with all my heart, is to have the mind occupied with self-willed preconceptions. Its source is a self-assumed authority, which

* See preface, vol. x.

proudly prejudices the case. If we hold that account, with Dr. MacCaul, to be a real history, and not a series of unreal visions, wholly unlike what actually occurred, we make a vain attempt to uphold Revelation by insecure proofs, and shall bring it down with a crash. This Institute, if it defends the Bible on the footing on which I have defended it, in common with nearly all divines of past ages, that it is true in its statements of facts, as well as its moral precepts, "instead of being a foster-mother of religion, will become unconsciously one of its worst and deadliest foes."

After these strong censures and dogmatic statements of my friend, the words of Horace, "*Quis tulerit Gracchos,*" apply fully to his warm complaints against me for censoriousness and dogmatism in the four or five pages of defensive reply. I am conscious that I forbore to say much that I was tempted to say, simply because the Canon had long been an acquaintance and personal friend. But truth is no respecter of persons. The paper professed to lay down a code or rule directly for the guidance of all future champions of the faith. Indirectly it was a strong condemnation of my own previous works. I was bound either to abandon the task of writing my paper or to offer some reasons why I believe the proposed law to be wholly untrue, and its adoption fatal to the object it is meant to secure, and that the paper answers to its own description of the Bible, and is "utterly indifferent to the duty of expressing itself with exactness on scientific theories."

I cannot, of course, reply in detail to all the objections to my paper from different sources—Dr. Currey, Canon Titcomb, and the Chairman. The last of these offered the only remark "on the main thesis, which formed two-thirds of the whole, and I think I can easily show that the stricture was groundless. He said that it was perfectly easy to conceive the motion or rest of a mathematical point of empty space. But this is a mental illusion. What can be conceived as moving is an unextended monad, and not a mere point of empty space. So Newton has remarked, "that the primary places of things should be movable is absurd." Whatever is moved, by the very conception ceases to be a mere position, and has acquired some degree or measure of real, actual being.

To the other objections, all on the first pages, which clear the way to my main object, I must content myself with a very few words of reply. I respect my opponents, but cannot honestly accept the truth of any one stricture they have made. I cannot admit to Dr. Currey that I have hastily misrepresented the maxim of the Fifth Essay. I have given it the only meaning it can bear, unless we make it refer to faculties which do not exist, and thus turn it into mere nonsense, and reduce it to ashes. The remarks are not hasty, for they merely condense ten pages on this same topic in *The Bible and Modern Thought*, written sixteen years ago. Dr. Currey has a perfect right to refute them, if he is able, but not to charge me with having written in thoughtless haste. I cannot admit to my friend that I have misstated his opinions. On the contrary, I have taken pains to extract his true

meaning from a very careless phrase, which, taken strictly, would bring the charge of neglect of duty against the Holy Spirit of God. Confirmatory of the remarks of one speaker, what higher testimony can there be to the dignity, truth, and authority of all the Old Testament Scriptures, the Law and the Prophets, than that the Son of God appeals to them as the great defining landmarks in the history of mankind?

Modern science is a growing, thriving infant. But it is merely an infant still. The knowledge of the works of nature, in the wisest of its students, is but as a drop to the ocean, compared with His knowledge who is the Word and Wisdom of God, Who weighs the mountains in scales and the hills in a balance. It is He who appeals to the words of Gen. ii. 24 as a voice and message of His Heavenly Father, wherein is contained a law and message of Divine authority for every later generation of mankind. Let us not add to His words by rash and hasty misinterpretation, lest He reprove us, and we be found liars. But neither let us take away from them, by weak and hasty concessions to the premature guesses of those who mistake inch-deep knowledge of the mysteries of nature, for full and perfect insight, or we may at last fall under His sentence of **grave rebuke**, and be called "least in the kingdom of heaven."

INTERMEDIATE MEETING, MARCH 19TH, 1877.

REV. R. THORNTON, D.D., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

MEMBER :—D. Davis Josephs, Esq., Pontypridd.

LIFE ASSOCIATE :—Rev. C. Harcourt Vernon, S.C.L., Retford.

ASSOCIATES :—Captain G. Hewson, Alresford ; F. G. Jewell, Esq., Southsea ;
E. W. Roberts, Esq., London ; Rev. L. O. Lewis, Lancashire.

Also the presentation of the following Works for the Library :—

“Proceedings of the Royal Geographical Society,” Part 2. *From the Society.*

“Proceedings of the Warwickshire Naturalists’ Field Club,” 1876. *Ditto.*

“Hard Questions.” Canon Walsham How. *From the Author*

“Charing Cross Magazine.” *From T. W. Greenwell, Esq.*

A Lecture, entitled “An Analysis and Scientific Solution of the Problem of Language,” was then delivered by the Rev. A. Castle-Cleary, M.A. ; a discussion ensued, in which Mr. A. V. Newton, Rev. J. Fisher, D.D., Mr. A. Crickmay, Rev. J. Coxhead, Admiral E. G. Fishbourne, Mr. L. Dibdin, Mr. H. Seeley, and the Chairman took part. The Lecturer having replied, The Meeting was then adjourned.

ORDINARY MEETING, FEBRUARY 19TH, 1877.

THE REV. R. THORNTON, D.D., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following elections were announced :—

ASSOCIATES :—Rev. E. Male, M.A., Oxford ; G. P. Yeats, Esq., Malvern.

Also the presentation of the following Works for the Library :—

“The Boyle Lectures.” By Professor H. Wace, M.A. *From the Author.*

“Science the Handmaid of Religion.” By Rev. J. Coxhead, M.A. *Ditto.*

The following Paper was then read by Mr. HATHAWAY, the Author being unavoidably absent :—

ON COMPARATIVE PSYCHOLOGY. BY E. J. MORSHEAD, Esq.

THE objections to the theory of a distinction in kind between the human psychology and that of the lower animals may be divided into two classes ; firstly, those which are founded on the observation in the actions of the brute of apparent indications of intellectual processes ; and secondly, those resulting inferentially from the fatalistic view which invests even the most rational actions of man with the automatic * characteristics of instinct. The first class of objections allows a certain amount of reason to the brute, while the second class allows man himself nothing more than instinct, that is, instinct according to the broader definition laid down in a former paper on this subject.† Before considering the second class of objections, or rather the principles on which these

* A difficulty having been raised on a former occasion as to the meaning of the term “automatic,” I give a definition of Dr. Carpenter’s, which expresses the meaning in which I have employed it. He defines an automaton as “a machine which has within itself the power of motion, under conditions fixed *for* it, but not *by* it.”

I have used the word “desire” in a broader sense than is strictly admissible, as including fear, &c., it being necessary to employ one term to express all the emotions which tend to produce action.

The word “image” has been frequently used instead of “idea,” as the latter term conveys to many minds a notion of complexity.

† 2nd May, 1870.

objections rest, I will briefly summarize my former conclusions as to the nature of instinct; which principle I held to be the sole source of the actions of the brute, and the partial source of the actions of man. It will be necessary to revert to three points on which I insisted with regard to instinct.

2. The first point respected the definition. The commonly accepted definition of instinct is, that it is a power which produces actions "prior to experience";* and this definition would be unexceptionable, were it not that it tends to beget the idea that all actions which are performed *subsequently* to experience are not instinctive actions, an idea which radically vitiates our conception of the true nature of instinct. However various may be the manifestations of instinct, they nevertheless possess certain common characteristics, which furnish a sufficient basis of generalization. The general characteristic of instinct is a *desire* resulting in, or tending to result in, an action; the general characteristic of such actions is that they are beneficial to the agent; while the general characteristic of the desire is that it is excited to an action independently of any knowledge on the part of the agent as to whether the action is likely to be beneficial to him or not. The psychological process which produces the action is therefore clearly automatic; for, as the desire does not result from the knowledge of the agent, we can only explain it on the assumption that the agent is a machine possessing an inherent liability to be moved to action by the presentation to his consciousness of particular phenomena; and we can only explain the action on the assumption that it is the natural outcome of the desire. The existence, and to a great extent the nature, of the automatic process which intervenes between the sensual impression of the exciting cause and the action which results therefrom may be readily ascertained by an examination of our own mental states when we are under the influence of any of the more clearly-marked forms of the instinct, such as rage, fear, &c.: † and we can transfer the result of this self-examination by an almost certain analogy to the instincts of brutes, so far as regards those instincts which the brute possesses in common with ourselves. And although we lose the benefit of this analogy in regard to the instincts which are peculiar to the brute, yet we perceive in these latter instincts such a strong resemblance in the mode of their manifestation to those instincts which are common to man, and the nature of which we can ascertain by self-examination,

* Paley.

† It is unimportant whether we consider the instinct as exhibiting itself in different forms, or whether we speak of separate instincts.

that we are compelled to include them in the same category, and to invest them with whatever attributes we may have deduced from an examination of the general principle in our own natures. If, for example, I wish to ascertain how far the action of a dog who flies at my throat under the influence of anger is automatic, I may, by examining the corresponding passion in my own nature, plainly discern a feeling which tends to produce an action immediately beneficial to myself, in that it conduces to the injury and consequent incapacitating of the individual from whom I have received, or from whom I anticipate the reception of, an injury; and I perceive further that the passion is excited and leads to the action independently of the reason; for my reason, founded on my own knowledge, may approve or disapprove of the action according to circumstances; and, generally speaking, we may conclude from the phenomena of its external manifestation that the passion of anger in the dog is as automatic as the same passion in ourselves, and that it is excited irrespectively of any conviction in the mind of the animal of the benefit accruing from the action which it produces. The same analogy may be applied to the other passions and appetites which the animal possesses in common with man.

3. And although we cannot employ this analogy, at least so fully, in determining the nature of those instincts which are peculiar to different species of animal, and which are apparently wanting in the human psychology, yet we may detect, even in these instincts, certain features which we have ascertained by observation to be generally characteristic of instinct, *i.e.* by observing the phenomena of that principle in ourselves. Thus, the nest-building instinct of birds has no parallel in the human psychology; but we may safely assume that the bird *does* build its nest in obedience to an internal impulse; because we see that it will build the nest even when it cannot know by experience, or from information imparted to it by other birds, the object for which the nest is intended. And, besides the fact of this action being prior to experience, it presents another characteristic of instinct, *viz.*, *uniformity*. A man, who is not impelled to build his house by an innate desire, will employ his intellect in considering what sort of house is suitable to his wants; and the style of his house will be further determined by the means at his disposal,* or his desire to imitate others,

* The brute is sometimes compelled by circumstances to depart from his usual line of conduct. The beaver, who has been known to construct a dam out of the furniture of a drawing-room, modifies his actions somewhat in consequence of the absence of trees and water. But this does not prove his intelligence.

or his individual taste, or by fifty other influences the operation of which argues freedom in the agent to the extent that it shows him to be unimpelled by an innate desire; for an innate desire works uniformly; and produces uniform results. Hence, although we have no internal evidence of the nature of the nest-building instinct, yet we perceive that in its external phenomena it presents two features which we know to be characteristic of our own instincts, that is, the production of actions prior to experience, and uniformity of operation.

4. These illustrations will serve to exemplify the method which we may adopt in examining the nature of instinct in the lower animals, and by which we are enabled to discover in the brute the existence of an automatic principle sufficient to produce those actions which are necessary to the preservation of his existence. It is to this automatic principle that I apply the term "instinct"; and I include under this term not only the desire which impels the bird to the building of his nest, or the bee to the construction of his cell, but all the passions, feelings, desires, or whatever else we may choose to call them,—whether they are excited by particular circumstances, or whether they originate in a peculiar bodily condition, whether they are permanent or recur periodically; and the common elements on which this generalization rests, are the automatic characteristics specified above, and more particularly the tendency to produce actions in cases where the benefit and manifest object of such actions is beyond the cognizance of the agent.

5. The second point which I insisted upon was the automatic character of memory. Few persons will question this fact; as it must be apparent to everyone who has reflected on the matter, that he cannot recollect or forget things by the mere fiat of the rational will, but that facts and persons are recalled by an involuntary operation of the memory, and that the images of these facts or persons are accompanied on their reproduction by associated ideas and impressions, which again produce the feelings of attraction or repulsion which they excited when they were originally presented to his consciousness. I dwell on the phenomenon because it is important to my argument as accounting automatically for those cases in which the lower animals act from experience. The duckling which runs to the water almost immediately after it has emerged from the egg acts, as every one will admit, under the influence of what we call *blind* instinct; that is to say, it acts from an innate impulse, and not because it has learned, either from experience or from *à priori* reasoning on the subject, that the water is its natural element. But the case of the rook which is alarmed by the sight

of a gun is somewhat different. The fear of guns is not innate in the rook, and it does not fly from the gun until it has learned the dangerous properties of that weapon by experience; and on a superficial view the action might seem to be a rational one. Arguing, however, from the automatic nature of the human memory, we can explain the action of the rook without assuming the intervention of a rational process. A friend of mine once informed me that in middle life he settled in the same city with his former schoolmaster, and that he never met the old gentleman, who was then in an advanced stage of decrepitude, without experiencing an unconquerable sensation of terror: instances of this kind are of such common occurrence that one will be quite sufficient for the purpose of illustration. The terror was produced by a process precisely analogous to that which awakens the instinct of fear in the rook. There was no innate fear in my friend's mind of a person presenting the particular aspect of his schoolmaster; but the appearance of the schoolmaster having been once associated with the idea of danger, a sensation of fear was ever afterwards excited by his presence; although the slightest exercise of the reason was sufficient to show that the fear was absurd. No one will dispute the fact that my friend's feeling was instinctive, and that it was checked by the reason before it passed into action. But we must consider the action of the rook to be instinctive also. The automatic association of impressions in the memory, which we learn from our own consciousness, sufficiently explains such instances and enables us to establish the principle, that the causes which awaken the desires are capable of extension without the operation of a rational process.

6. The third point is more open to objection; and yet it is indispensable to a true apprehension of the distinction between man and brute. It is, that what are called *intellectual* processes are in themselves automatic, just as memory is automatic. I mean that generalization and abstraction, for instance, are, in their simpler forms, merely a part of the psychological mechanism of the animal, by means of which the impressions received by the senses are duly modified before they act upon the desires, and by which the motive power of the desires is directed into its proper channels. To requote an instance adduced in a former paper on this subject, the bull who is irritated by a red colour really *abstracts* the colour from the object of which it is an attribute. The dog who singles out his master from a crowd of indifferent persons *abstracts* likewise; but the process is mechanical, and is another way of expressing the fact that the

sight of his master attracts his attention to the exclusion of the other persons composing the crowd, and who are equally perceptible to his senses; and the same is true of generalization. The animal, having learned by experience that a certain object is prejudicial to it, will *generalize* from that object, and avoid for the future all objects which present the same appearance; if, for example, a dog has been injured by a bull, it will afterwards avoid not only the bull which has injured it, but *all* bulls; and thus it plainly both remembers and generalizes. I am not, of course, speaking here of these intellectual processes in their higher forms, nor do I mean to say that the animal has any rational control over them; in fact, it is not, perhaps, so correct to say that the animal generalizes and abstracts as it is to say that the objects which he encounters, or rather their appearances, abstract and generalize themselves in his brain. There are, as it is needless for me to state, generalizations and abstractions of which only the highest minds are capable; but these processes do not differ except in degree from the analogous processes which we observe in the psychology of the brute. Hence Locke's ground of distinction between men and brutes—that the latter do not possess general ideas or the power of abstraction—is insufficient; for the brute generalizes whatever impressions may be capable of awakening his desires, whether we choose to term those impressions *ideas* or not.

“This I think I may be positive in, that the power of abstracting is not at all in them, and that the having of general ideas is that which puts a perfect distinction betwixt man and brutes, and is an excellency which the faculties of brutes do by no means attain to, for it is evident we observe no footsteps in them of making use of general signs for universal ideas, from which we have reason to imagine that they have not the faculty of abstracting or making general ideas, since they have no use of words or any other general signs.”*

The fact that the brute does not possess the degree of generalization required by Locke's illustration does not, however, prove that the process is never found in brutes. The real distinction between men and brutes in this respect is, apart from the question of degree, that generalization and abstraction are, if I may be allowed the term, *mechanical* in the brute, whereas in man the same processes, although essentially auto-

* Locke, *Essay concerning Human Understanding*. Locke's estimate of abstraction and generalization is evidently formed on his conception of these processes as he perceived them in his own mind.

matic, *may* be utilized by the rational will. It is not necessary to suppose that these intellectual processes exist in the brute to any great extent; and it is sufficient if we allow that he possesses intellectual faculties, or the analogues of intellectual faculties, which serve the purpose of his preservation.

7. The first point was the enlargement of the usual definition of instinct; and, if we allow the second and third points, that is, the automatic character of memory and the intellectual processes,* we are able to explain those actions the benefit of which has been learned by experience; and we thus arrive at the existence of an automatic principle, which is sufficient for the purpose of preserving animal life. The automatic nature of instinct is, of course, most clearly evidenced in the operations of *blind* instinct, which we can only explain by saying that the animal has an innate liability to be excited to action by particular causes, *i.e.* by certain objects, or the qualities of objects, &c., and that these causes produce actions prior to experience by means of the desires which they awaken. Coming next to the extension of these causes by the operation of memory, we see that the desire must have been aroused by a process analogous to a reasoning process, but which such instances as that of my friend and his schoolmaster enable us to explain without the hypothesis of a rational principle.

8. It is obvious, then, that this automatic reason, as we find it in the brute, is a regulative machinery which lies outside the desires, and by which the impressions derived from the external world are modified in his brain before the desires are awakened; and although I have endeavoured to avoid anything like teleological argument, yet I am constrained to point out the manifest utility of this machinery; as were it absent the area of the animal's experience would be incapable of extension; and he would be only moved by those objects or appearances towards which his inclination or aversion is innate. This regulative machinery works as automatically as the desires; it consists of the principal intellectual processes—abstraction and generalization,†—and of memory. It is, as I consider, sufficient, in conjunction with the desires, to explain all the actions of the brute without our investing him with rational knowledge or a rational will, of which he shows no trace. As a question of terminology, it is immaterial whether we separate the desires from the machinery which arranges and modifies the impres-

* I use the term "process" to avoid applying the word "faculty."

† I have purposely omitted comparison, as it is more essentially a rational process.

sions produced on the senses, or whether we apply the term *instinct* to the whole of the complex mechanism by which the animal is guided to the performance of such actions as conduce to his preservation, or whether, on the other hand, we limit the term to the desires alone. As a matter of convenience, I will employ the term "natural sagacity" in reference to this modifying machinery, whenever it may be necessary to consider it apart from the desires.

9. But when we have admitted the existence of this automatic principle, and allowed its adequacy to produce all the actions of the brute, we are met by a still more serious difficulty. For the existence of this principle is held, virtually at least, by many thinkers who extend it to all the actions of man—who consider that the brute is governed automatically by the conditions which surround him, but who consider at the same time that man himself is impelled and controlled only by instincts, and that although his instincts may be occasionally of a higher and more complex nature, yet that he is really as much of an automaton as the brute; the only difference between man and brute being just the kind of difference which exists between two barrel-organs, one of which plays twice as many tunes as the other. As an illustration of this view I will quote the words of a well-known fatalist of the last century—the Baron d’Holbach :

“The will, as we have elsewhere said, is a modification of the brain, by which it is disposed to action or prepared to give play to the organs. The will is necessarily determined by the qualities, good or bad, agreeable or painful, of the object or the motive that acts upon his senses, or of which the idea remains with him, and is resuscitated by his memory. In consequence he acts necessarily; his action is the result of the impulse he receives either from the motive, from the object, or from the idea which has modified his brain or disposed his will. When he does not act according to this impulse, it is because there comes some new cause, some new motive, some new idea, which modifies his brain in a different manner, gives him a new impulse, determines his will in another way, by which the action of the former impulse is suspended; thus, the sight of an agreeable object, or its idea, determines his will to set him in action to procure it; but if a new object or a new idea more powerfully attracts him, it gives a new direction to his will, annihilates the effect of the former, and prevents the action by which it was to be procured. This is the mode in which reflection, experience, reason, necessarily arrests or suspends the action of man’s will; without this he would of necessity have followed the anterior impulse which carried him towards a then desirable object. In all this he always acts

according to necessary laws, from which he has no means of emancipating himself." *

Again—and in the following quotation I will draw attention to his recognition of the automatic principle of the intellect which I have previously indicated :

“ But he is not master of recalling to himself his ideas at pleasure ; their association is independent of him ; they are arranged in his brain in despite of him, without his own knowledge, where they have made an impression more or less profound ; his memory itself depends upon his organization,” &c.

10. The foregoing passages describe, almost exactly, the psychological machinery which, under the name of instinct, I have considered as supplying the motive power which produces all the actions of the lower animals ; and the description is also undoubtedly correct so far as it applies only to the animal nature of man. And unless we can show the existence in the human psychology of a principle differing in kind from the instinctive principle delineated in the above quotations, the psychological difference between man and brute will remain a difference only of degree, and will consist in this, that the desires of man are liable to be awakened by a greater variety of causes, and that the intellectual power which enables him to apprehend these causes is nothing more or less than an extension of the regulative machinery to which I have appropriated the term “ natural sagacity.” Man would still be an automaton ; his intellectual vision might be keener, his memory more capacious and more retentive, but he would still be acted upon necessarily by those causes to the influence of which he is naturally susceptible ; his religion or his moral code would be motive powers only in so far as they resulted from a more far-sighted consideration for his own happiness ; and the conflict between reason and passion would degenerate into a conflict between two different inclinations. I do not notice the obvious objection to this familiar theory—that it cuts at the root of moral responsibility. This is of course a weighty objection to its practical adoption, and is a reason why we should examine it far more carefully than is possible within the limits of this paper. The *consensus gentium* is in favour of a fundamental distinction between desire and the rational will ; and on this question the *consensus gentium* is of peculiar and especial value ; for it is founded on the self-knowledge of each individual.

* *System of Nature.*

11. The objection raised by the Fatalist to the existence of a rational will as a distinct principle of action—that is to say, distinct from desire—is not easily disposed of, however firmly we may be convinced of its fallacy; for however free * the will may be, it is impossible to conceive it, except as determined by some motive or other. And, if we allow this, how are we to distinguish it in kind from the desire which induces the duckling to seek the water, or the rook to avoid the gun? If we answer that man is acted upon by motives which are beyond the comprehension of the brute, and which consequently do not set his psychological machinery in motion, the Fatalist will point out that a difference also exists between the instincts of two given species of animal—that one animal is excited to action by objects or qualities of objects, which make no impression upon another; that the flower, or rather the sweetness contained in the flower, possesses an attraction for the bee, which it does not possess for the spider; and that, similarly, man is an animal endowed with social and moral instincts which influences him as automatically as the flower or the fly influence the spider or the bee, and that he is only a machine of more complex structure, and susceptible to motives which do not affect the brute. D'Holbach says:

“When Mutius Scaevola held his hand in the fire, he was as much acting under the influence of necessity, caused by interior motives that urged him to this strange action, as if his arm had been held by strong men; Pride, despair, the desire of braving his enemy, a wish to astonish him, an anxiety to intimidate him, &c., were the invisible chains that held his hand bound to the fire. The love of glory, enthusiasm for their country, in like manner caused Codrus and Decius to devote themselves for their fellow-citizens. The Indian Calanus and the philosopher Peregrinus were equally obliged to burn themselves by the desire of exciting the astonishment of the Grecian assembly.”†

On the same principle I have been compelled to lay this paper before the Institute, and at its close some learned member will be compelled to propose a vote of thanks to me for doing what I have really been unable to help.

12. Whenever we attempt to escape from this net of sophistry, we encounter a Fatalist with a drawn sword. If we point to

* Locke very justly remarks that the freedom is in the agent, and not in the will, and that therefore the common expression, “freedom of the will,” is erroneous. I use the expression, however, relatively to the desires.

† *System of Nature.*

the conflict which continually arises between the desires and the rational will, we are told that this is merely a conflict between two different desires, and is of the same nature as, for example, the conflict between rage and fear in the brute. If we assert that man frequently acts from moral principles, we are told that he is impelled either by a separate moral instinct, or by a desire of approbation, whether from the world at large, or a supposed impartial spectator; or that his action proceeds from a desire engendered by the perception that the sacrifice of a present inclination will be attended by greater ulterior benefit to himself. If he acts from religious motives, we are told that he is automatically influenced by the association in his mind of particular actions with his belief in future rewards and punishments. Finally, if he raises his hand, or lets it fall in order to show the freedom of his will by an arbitrary action, we are informed that the very desire to demonstrate the freedom of his will is the automatic cause of the action. It will be seen from this that the Fatalist regards a human agent as acting from necessity whenever he acts from a motive; and as every sane man acts from some motive or other, the corollary of this view is, that there is no mental condition intermediate between that of an automaton and that of a lunatic.

13. Again, if we accept this fatalistic view, it is evident that we are not only precluded from considering *man* as a free agent, but that we are also unable to conceive the existence of any free agent whatever; for whenever we shall attempt to picture to ourselves an abstract being endowed with infinite wisdom and power, we must, nevertheless, regard his actions as determined and limited by motives: and thus the view that action from motives is the same thing as *necessary* action conducts us into a manifest dilemma. It is quite reasonable to consider that whenever the rational will either does not exist, or does not operate, the agent acts from necessity. "Wherever thought is wholly wanting, or the power to act or forbear according to the direction of thought, there necessity takes place. This in an agent capable of volition, when the beginning or continuation of any action is contrary to that preference of his mind is called compulsion; when the hindering or stopping any action is contrary to his volition, it is called restraint. Agents that have no thought, no volition at all, are in everything necessary agents."* But the Fatalist has not known where to stop. Perceiving the existence of an automatic principle in man, he

* Locke, *Essay concerning Human Understanding*.

has applied it to *all* human thoughts and actions, under the influence, as I am inclined to think, of an idea which has given birth to many fallacies; viz., that having established the existence of a principle, it argues a truly philosophic mind to make it as universal as possible.

14. The issue, then, with the Fatalist may be reduced to the following terms:—"You consider," we may say to him, "all human actions to be necessary actions because they proceed from motives. But this position requires the assumption of the principle that all actions which proceed from motives are necessary actions, a principle which entails the consequence that every rational agent acts from necessity, and therefore that there is no such thing as a free agent. The limits which are placed on human freedom in regard to action do not touch the question at all; for the point under discussion is, primarily, the freedom of thought, and not the freedom of action. Unless, therefore, you are prepared to allow the inevitable consequence of your principle, you must renounce the principle itself, and admit that action from motives is not always necessary action. And, as you admit, on the other hand, the principle of automatism, it is clear that there must be a point where automatism ceases, and free agency begins."

15. This limit is to be found in our own natures, where we discover the two principles of automatism and free agency existing side by side. The difficulty of practically disentangling the automatic from the rational principle in any given action does not obviate the fact of their being two essentially distinct conceptions. The nature of the automatic principle is unmistakably shown in those actions the objects of which are unknown to the agent, when the action, though beneficial to him, is immediately produced by *desire*, but where the desire cannot have been awakened by a knowledge of the benefit resulting from its indulgence, inasmuch as this knowledge does not exist—at least in the mind of the agent. There are also actions which are produced by *knowledge* on the part of the agent; and these are what we usually term rational actions. That desire is sometimes concerned in the production of rational actions—that is, actions which result from the knowledge and reflection of the agent—is quite true. Our observation of blind instinct teaches us that the perception of certain qualities of an object, or a particular condition of body, excites a desire, and produces an action; and if, in the course of our reasoning on any subject, the images of such objects present themselves, it is natural that they should awaken the desire and influence our actions, or even our reasoning, automatically. But desire itself

is antagonistic to reasoning; for whenever we seriously set to work to form an impartial judgment on any matter, we carefully exclude from our minds such images as are likely to influence our desires and consequently to impair the correctness of our judgment; in other words, we shut out the automatic principle in order that the rational principle may work freely. And I think it might be shown that whenever desire helps to impel a man towards an action, the benefit of which he has demonstrated to himself by reflection, it is because an image has presented itself which would have excited a desire towards that action even if there had been no reflection at all. Yet, that a man may act from rational motives and without desire having any part in the production of the action, is a fact of which every one's self-consciousness will supply him with ample proof; for, if we examine ourselves when under the influence of an inclination produced by a rational conviction of the utility, &c., of any given action, we shall perceive that in many cases the inclination does not at all partake of the nature of a desire, and that whenever it does, the reason is, as I have just said, that a certain image has been evoked which would have excited the desire independently of the rational conviction.

16. But the Fatalist will maintain that there is a common element running through all human actions, to wit, that they all conduce to the benefit—I use this term in its widest sense—of the agent, whether he (the agent) is rationally aware of the benefit or not; and he will explain even benevolent actions on his theory of the gratification of a benevolent instinct. I may concede this point for the sake of avoiding irrelevant argument, and content myself with pointing out that there is a vital distinction between the principle which produces actions prior to experience, and the principle which produces actions in consequence of the knowledge possessed by the agent. The different senses in which the term “knowledge” is frequently employed in no way obliterate this distinction. In common discourse we hear the word applied to instinct in such expressions as “the horse knows what is good for it”—speaking of its food; but the horse cannot be said to know what is good for it in the same sense that the physiologist does. Its knowledge, even when it is experimental, consists in nothing more than a liability to be attracted or repelled by food which has on some former occasion proved agreeable or disagreeable to its palate. Its instinct guides it in the selection of the food which is best adapted for its sustenance, a fact of which the horse itself is profoundly ignorant. The lion feeds on the deer in obedience to an instinctive inclination to kill animals and eat

them, and the deer feeds on the herbage, likewise in obedience to its instinct; and no one supposes that the lion or the deer acts in such cases from a conviction that food is necessary to their existence, or that herbivorous or carnivorous diet, as the case may be, is suitable for them. Nor can we suppose that they are aware of the more remote objects which they are fulfilling in the economy of Nature—that the lion is keeping down the excess of herbivorous animals, and that the deer is keeping down the excess of vegetation. Each animal acts according to the instinct implanted in him; and although his actions are beneficial to himself, yet the knowledge that they are beneficial is plainly not his own knowledge. We cannot *prove*, indeed, that the lion does not perceive all the direct and indirect objects which he is fulfilling when he kills and eats the deer, any more than we can prove that he has not discovered a method of squaring the circle; but, in the absence of any evidence to the contrary, we are tolerably safe in assuming that he is actuated by an instinctive desire, and that a knowledge of the benefit resulting from the action has no share in its production.

17. Granting, therefore, that all voluntary actions—I mean here all actions which are not performed under compulsion—are beneficial to the agent, we must nevertheless divide actions, according to the method of their production, into two classes,—those in which the agent is aware of the benefit resulting from the action, and those in which he is not. In the latter case the action is, and can be, only produced by desire; in the former case, where the action proceeds from the knowledge possessed by the agent, it is questionable whether the term “desire” is properly applicable to the inclination which draws him to the performance of the action. I of course except those cases where the desire is excited by the introduction of an image capable of awakening it. At all events actions are frequently produced by strong rational motives without any indication of desire. Let us suppose one man to murder another in a sudden access of passion, and that, beyond the gratification of the momentary impulse, the action is in no way beneficial to him. Here the murderer acts in obedience to an instinct which was originally implanted in him for the purpose of his self-preservation, and the indulgence of which, if he were nothing more than an animal, might be, as a general rule, beneficial to him. But in the present instance his action is not caused by a perception of any benefit resulting from it, seeing that his greater benefit lies in the opposite direction. And when he comes to be hanged by process of law there is the strongest possible motive for his punishment, yet it cannot

be said that desire had anything to do either with the making or the execution of the law under which he suffers; for, although laws are made for the benefit of the community, and therefore come under the category which we are considering (of beneficial actions), yet legislators are not usually supposed to make them out of fright, which is an instinct, but out of a rational consideration for the public welfare. Now if we are to place all human actions in the same automatic or necessary category on the ground of their common tendency to the advantage of the agent, we must expect the perception of his greatest advantage to awaken the strongest desire. But we really find, on the contrary, that the strongest desires are generally those which are awakened without any knowledge in the agent of the benefit accruing from their fulfilment; whereas a clear perception of his own advantage produces in the agent a weaker inclination, and frequently no *desire* at all; in fact it often happens that a man will voluntarily call in the assistance of an animal desire to enable him to effect a purpose which his reason has shown to be beneficial.

18. From these considerations it is apparent that even if we allow a common (selfish) tendency in all the actions of man and brute, yet that actions are produced by two essentially different principles, which stand out in clear contrast with each other—the automatic principle operating independently of knowledge (in the agent), and the rational principle, producing actions from the knowledge of the agent by means of the rational will.

19. The rational principle is commonly considered to be a distinctive feature of the human psychology; and the variety of opinion which exists on this subject seems to have resulted from the selection of a particular phase as typical of the general principle. One writer considers the distinction to consist in a rational will, another in the intellectual faculties, another in the moral sense, another in self-consciousness, &c. &c. This variety of opinion amongst those who nevertheless maintain in common the distinctive existence of a rational principle, does not prove in any way the weakness of their general view, but rather that the attention of each writer has been too much taken up by a particular mode. If we place the distinction in the will alone, we do not escape the sophistry of the Fatalist; for he will argue, as we have just seen, that the will is always determined by motives, and that all motives are motives of self-interest or self-gratification. The moral sense he will regard as an instinct, peculiar possibly to man, and varying considerably in different individuals and races, but still an instinct,

combining with, or opposing itself to, other instincts; and he will consider all actions proceeding from the moral sense as being equally necessary with the actions produced by the desires of the animal. In short, nearly all the phases of the rational faculty which are ordinarily held to be distinctive characteristics will be explained by the Fatalist on automatic principles. I am not dealing here, it must be remembered, with sound argument, but with pure sophistry. Psychology is a strictly inductive science, and the difference between desire and the rational will is far more clearly proved to us by an examination of our own nature than by any amount of demonstration. And in indicating a phase of the rational principle which cannot be accounted for on the automatic theory of the Fatalist, I do not mean it to be inferred that this phase furnishes the only point of difference between the rational and automatic principles, but I am simply laying my finger on a point which the fatalistic theory leaves uncovered.

20. Whenever, on the automatic principle, the agent refrains, under the influence of a stronger motive, from an action towards which he is impelled by desire, the Fatalist argues that the stronger motive gives a necessary character to the action: and, so far as the actions of the lower animals are concerned, he is undoubtedly right; *e.g.*, a dog who is only restrained from flying at my throat by the sight of a cudgel which I hold in my hand, certainly acts from necessity, and is quite at the mercy of the predominant feeling. But when the Fatalist, extending this principle into all human actions, claims for them an automatic character, and resolves the process of reflection into a balance of desires, it is evident that his theory fails to explain one of the most common operations of the rational principle, namely, the restraining of an inclination, not by another and a stronger inclination, as is always the case in the conflict of instinctive desires, but by an arbitrary act of the will *before* any antagonistic consideration has presented itself,—an act by which the will checks the inclination, not under the influence of another motive, but in order to direct the intellect, so to speak, in quest of other motives; and no one who has impartially considered this phenomenon in his own mind will deny that there is in such cases a conscious and voluntary suspension of the action towards which he is impelled by desire.

21. Let us take the case of a schoolboy who has made himself drunk, and has been seriously unwell in consequence; the probable result is that he feels for some time to come a strong aversion either to alcoholic drinks generally or to the particular drink which has caused the disagreeable sensation. His aversion

is, of course, instinctive; and the abstention which it produces is automatic. Further on in life, let us imagine him to restrain an inclination for stimulants in consequence of his having acquired a sensitiveness to the opinion of society, and of his having become aware that society disapproves of drunkenness; in this case also we will concede that he is more or less automatically influenced by a social instinct. But let us suppose, thirdly, that, having arrived at maturity, he reflects on the nature of drunkenness and the numerous evils resulting from it, and that he abstains from intoxicating drinks in consequence of his reflection. The Fatalist will urge that the abstention is the necessary result of one or all of the considerations presented to him by his reflection, which overpower his inclination for the stimulant in the same way as the fear of the cudgel overpowers the anger of the dog.

22. But even if we admit that the abstention is automatically produced by any of the considerations suggested by reflection, there still remains a fundamental difference between the psychological process which results in the abstention of the man from stimulants and the process which precedes the final action of the dog. The dog flies at my throat or not according as rage or fear may preponderate; but the man suspends the performance of the action to which he is inclined *in order that* he may reflect; and the motives which ultimately determine his conduct are generated by, and therefore *follow* the reflection; and these motives, however automatically they may finally influence him, were not the primary cause of his abstention, for they did not at the time exist in his mind at all.

23. The importance of this suspensive power of the rational principle is recognized by Locke; and I think he might with more reason have made it the ground of distinction between man and brute.

“I desire it may be well considered whether the great inlet and exercise of all the liberty men have, are capable of, or can be useful to them, and that whereon depends the turn of their actions does not lie in this, that they can suspend their desires and stop them from determining their wills to any action till they have duly and fairly examined the good and evil of it, so far forth as the weight of the thing requires.”*

24. Recurring now to what has been laid down in the commencement of this paper relative to the automatic nature of the intellectual processes, it is easy to perceive why *intellect*, as

* *Essay concerning the Human Understanding.*

the term is commonly understood, is not in itself a satisfactory basis of distinction between man and brute. Understanding intellect as the sum of the intellectual faculties, the ordinary inquirer is perplexed by the discovery of the fact that brutes do unquestionably both abstract and generalize. But what are the real facts of the case? When a particular object is presented to my consciousness, I find, as a matter of experience, that one or more attributes of that object will often awaken an emotion or a desire which, if unrestrained, will pass into action, while the remaining attributes of the same object are comparatively or entirely disregarded. Unconsciously, and quite independently of my rational will, a separative or analytical process has been performed, and I find that I have *abstracted*. Further, the contemplation of this particular attribute has called up in my mind the images of other objects possessing the same attribute, and thus the process of *generalization* has been accomplished. And these processes deal not only with ideas or thoughts, but with whatever objects come within the range of my consciousness—with all the perceptible attributes of matter, with form, or colour, or extension, as well as with emotions or sensations; all of which are sorted, separated, or associated irrespectively of my rational will. Let me suppose, for example, that I want to examine the truth of the proposition that all red-headed men have freckled complexions—it is not of consequence whether the proposition is absurd or not. Unless my mind is sufficiently abstract to be capable of considering the quality of red-headedness apart from any individual of whom it may be a characteristic, I first of all fix my attention on a particular red-headed man; and in a short time I find that the images of different red-headed persons whom I have met in the course of my experience pass before my mind like Banquo and the eight kings. Each of these images I can arrest in its passage, and again examine until my memory produces the fact of the person whom it represents being freckled or otherwise. But I cannot at once summon up all the images of red-headed people that are stored away in the recesses of my memory; some of them may drop in now and then for the next month, especially if my mind is much exercised on the subject. And I cannot in every case where the image is recalled recollect whether the person was actually freckled or not. It is quite clear, therefore, that the process which evolves the images is not directly under the control of the rational will, but that it is self-working or automatic. The investigation by which I proposed to verify the generalization was indeed *initiated* by the rational will, and the rational will intervened at different stages. But, in such instances, it merely *utilizes* the mental processes which

could have gone on without its intervention ; it does not create the power which evolves or associates the images in my mind, any more than it creates the power of vision in my eye when, as a rational act, I turn it upon some object in the external world. In dealing with abstract thoughts or ideas, the mental processes under consideration are essentially the same in the mode of their operation. In metaphysical thought, for instance, the ideas are difficult of comprehension and the rational principle plays a more important part in their production, because a stronger effort of the will is necessary in order to enable the mind to realize them at all ; but when once they are realized, and the mind has become familiarized with them, they are sorted and arranged as automatically as the most superficial ideas or the simplest impressions of sense. These leading intellectual faculties are thus simply natural processes of the mind, which, although working automatically, are made use of by the rational principle.

25. Of this rational principle as manifested in the suspensive and directive phase above specified, there is in the psychology of the lower animals no indication whatever. All the instances—at least all I have ever heard of—in which the brute is said to have exhibited symptoms of intelligence, may be explained with very little trouble on the automatic principles so plainly discernible in our own natures. Of course, the phase which I have adduced does not embrace all the manifestations of the rational principle ; but it is the one which distinguishes most clearly the psychological nature of man from that of the brute. Nothing in the inorganic world is so inexplicable or incomprehensible to my mind as the simple action of a dog who attacks me under the provocation of a threatening gesture or look ; for there is an obvious reason for the action, and yet the dog does not act from that reason. But this rational principle, undefinable in itself, by whatever term we designate it,—whether reason, power, freedom, or self-consciousness,—this principle which reigns supreme over the other faculties of our nature, directing, controlling, and acting through them, not as an absolute but as a constitutional sovereign, is certainly the most incomprehensible of all.

The CHAIRMAN (Rev. R. Thornton, D.D., V.P.).—I am sure—or perhaps I should use the necessitarian language and say, “I am irresistibly compelled to take it for granted, that you are irresistibly compelled to thank the author for the essay, which he has been unable to avoid writing.” I shall now be glad to hear any remarks which any gentleman may feel himself compelled to make.

Rev. Prebendary Row.—As I take it, the general principle of Mr. Morshead

is, that the action of animals is altogether automatic, but I cannot agree with this. From my own observations it seems to me that those actions are something more than automatic. Of course our great difficulty in discussing this question arises from our inability to look into the minds of animals. But as we cannot do this, we are in the dark, and can only judge from analogy. Now, many years ago, my brother and my brother-in-law went out to bathe; neither of them could swim well, but they got out of their depth, and the dog of the latter, being on shore and seeing his master's danger, plunged in, and seizing him by the neck, rescued him. I do not think this can be regarded as an automatic action or as simply the result of pure instinct.* So far as my own experience goes, the difficulty of supposing that the acts of animals are purely instinctive, arises from the fact that they are capable of varying their operations in conformity with circumstances. Take for instance the bee. You may say that in building its comb its act is purely instinctive, and I will not dispute it; but what do you mean by instinct? Mr. Morshead uses the phrase "natural sagacity," which is very inconvenient, and which covers a great deal more ground than instinct. Suppose in a hive a piece of the comb falls down by some accident—in such a case the bees modify the architecture of the comb to meet that circumstance. Now if you admit, as I am not indisposed to do, that the action of the bee is purely instinctive, still when you find that the bee accommodates its architecture to the altered condition of circumstances, there is, I think, something more than mere instinct involved in the matter. Again, take the case of birds' nests. I know the general character of their nests, and I also know that they accommodate their architecture to circumstances. I cannot understand how it is possible to pronounce such acts purely instinctive or automatic. I do not think everything can be referred to pure instinct; for instance, a setter that I once had was a most notorious poacher, and the way he carried on his operations was this:—In the neighbourhood there was a sheep-dog with a cross of the greyhound; hence he was a rapid runner. The two animals used to go out poaching together. The sheep-dog would not go out by himself, but was induced to do so by the setter. When the setter got his dinner, he used to fetch the sheep-dog, and after dividing his dinner with him, the two went out hunting together. I cannot understand that such cases as this can well be accounted for on the principle of instinct alone—in fact it seems to me that a great number of these animal actions are the result of principles analogous to those in man. I am not sure whether Mr. Morshead wishes to put forward the view that the whole of the intellectual functions of man are simply instinctive also (several voices, No, no); but it seems to me that much was laid down in that direction. Nobody will dispute that many of our intellectual actions are instinctive or automatic.

* Such anecdotes show the lower animals to be possessed of both instinct and intelligence, qualities without which they would not have served the purpose of their creation.—Ed.

The CHAIRMAN.—I think the author says a certain part of them, but when they pass to a certain point that is not so.

Mr. Row.—Very well. I observed repeatedly on reading the paper that one important matter is left out, and that is the formation of our habits. The fact is that after certain of our habits are formed, they seem to become what we call instinctive, and many have become to a certain extent automatic, which were clearly not automatic in their origin. There is a theory which is not mentioned in this paper, and that is the theory of transmitted habits. Transmitted habits, accumulated by and coming from our ancestors, seem to me to be a matter which it is very difficult to conceive ; but there certainly are some startling facts in support of the theory. Finally, I cannot agree with Mr. Morshead's remarks on our personal freedom and on our belief in that freedom.

Rev. Prebendary IRONS.—The writer of this paper seems to imagine that it is in the interest of religion to believe that animals are automatic. Surely there could be no more serious mistake than to put the matter thus. Let us discover the exact truth and conform our theories to the facts, but do not let us for a moment suppose that religion is committed to the question one way or the other. True religion and real facts are not in contradiction with each other. Since the truths of religion stand on a solid foundation, no facts can come into collision with them. With regard to the paper itself, I think that its facts are carefully put together, and that there is much ingenious expression and clearness of thought, if we concede the author's philosophy at the outset ; but to a person like myself, wholly differing from his philosophy, the paper is only interesting as a theory worked out by one whom I am merely watching, in order to see how he does it. The mistake of the paper is that it has altogether left out the physical necessities of the universe. We cannot admit a physiology and psychology apart from physical science ; and the laws of physical science, although now more understood than ever, have not as yet touched the primary philosophical question of causation. The principal point at the bottom of these inquiries is, in what sense these animals are causes,—and also in what sense we are causes. There lies the whole of the issue. I do not see that certain of the propositions in this paper have any sense whatever, from my own point of view. This is a strong thing to say, and I explain it in this way. The author of the paper speaks of so many abstractions, and of so many effects and powers of the existence of which I feel entirely ignorant, that I may be excused for considering it an entirely unintelligible view. I have been accustomed to say that the individual,—the man, the *ego*,—is a cause, and wherever I recognize an *ego*, even of an inferior kind, I recognize the origin of a certain amount of active causation. Thus, I speak of myself as a cause, and certain acts come from me as the cause ; but the abstractions used in this paper appear to me to be unintelligible on the ground of any sound philosophy. Abstractions unfortunately play a remarkable part in metaphysics. To say, I think, I feel, I remember, is intelligible ; and yet I am not a mere compound of thought and feeling and memory. I myself am a

unit ; and that is the only philosophy that I can adhere to. You might as well tell me that my leg is made up of walking and running, as say that I am made up of reflecting and thinking, or any other abstractions. It is I who reflect. I am a thinking being, and I exercise my power of thought in an infinite variety of ways, for which, perhaps, I have not an infinite variety of expression. You will see, therefore, that I cannot even quote from this paper to criticise it, I differ so widely. I have arrived at the conclusion that it is only suited for the consideration of those who hold some modification of Locke's opinions. Mr. Row has given us some reasons for throwing aside the extraordinary attempt to consider all animals as automata ; but few, after all, will ever maintain that animals are only a species of machines acting from "springs," to which certain names are given, but which, whatever names may be given, are only names after all. How we are to regard them is another question.

Rev. J. FISHER, D.D.—I consider the paper to be a very able one, and very well written from the writer's standpoint ; but I take a different standpoint myself. I am inclined to go with the writer generally, for I think he has studied the subject more than I have, but I cannot go with him in this. The paper is on psychology, and psychology has nothing at all to do with automata. An automaton has no psychology in it ; and in the very hypothesis that animals are mere automata, psychology is altogether left out of the question, for there is no room for it. An automaton does not live, an animal does live ; an automaton does not feel, an animal does feel ; an automaton has no self-impelling movement, an animal has. Psychology, therefore, is altogether thrown out by the hypothesis that an animal is a mere automaton. An animal has instinct : a man has instinct, and a child has instinct, as well as lower animals ; and in proportion as the organism, so to speak, or the animal rises in intelligence, the instinct becomes less and the reasoning powers, of course, become greater. An animal has instinct, but it has something more besides. Is it by instinct that the elephants at Astley's perform their movements ? Is it by instinct that dogs will do so many things which we know they do ? Man has little instinct because he has little need for it ; but, on the other hand, he has intellectual powers, and by these he is guided. I think the writer of this paper has argued well from his point of view, but then his point of view is not mine, and for a Christian to widen his circle in this way is only to make room for unbelievers. There are many things in the paper which are open to exception : for instance—the author speaks of instinct as being the sole source of action in animals ; he explains the passionate action of a dog, as springing from self-defence. Then he speaks of abstraction and generalization in the brain, but the brain has nothing of the kind. All these things are open to exception, but they seem to arise in consequence of a wrong impression in the writer's mind, that it is necessary to establish a differentiation between man and the lower animals, other than those which we know to exist.

Mr. DIBDIN.—I do not think that the discussion does justice to the paper. With regard to Dr. Irons' remarks, he will find that Mr. Morshead distinctly

disowns any teleological argument. He only takes what he considers to be the facts, and argues and infers from them. Then it should be remembered that the paper now before us, only deals with one portion of the subject, for it is really in continuation of another paper, read on a former occasion.* I think, however, that we find our main difficulty in the fatalistic argument, and that this paper does not meet it.

Mr. J. RENDALL.—I consider that one of the difficulties in dealing with the paper, arises from the fact that it uses some words with indistinct meanings, as, for instance, the word automatic; which Dr. Irons has used in a sense widely differing from the sense in which it is used by the author, who gives a definition of the word as follows:—

“A difficulty having been raised on a former occasion as to the meaning of the term ‘automatic,’ I give a definition of Dr. Carpenter’s, which expresses the meaning in which I have employed it. He defines an automaton as ‘a machine which has within itself the power of motion, under conditions fixed for it, but not by it.’”

Now he evidently does not mean what most people mean by the word “machine,” because he applies it to living beings.

The Meeting was then adjourned.

MR. MORSHEAD’S REPLY.

As the remarks which have been made on my paper evidence a certain amount of misconception as to its general bearing, I think the most appropriate reply will be a short explanation of the object with which it was written.

The moral consequences of the Darwinian theory of evolution are not, perhaps, of much importance; for, although it removes the first creative act to a more distant epoch, yet it does not, professedly or necessarily, exclude the idea of an originally miraculous creation. But intimately connected with this theory—I do not say proceeding from it, inasmuch as it existed long before the time of Darwin,—there is another, which, so far as its moral consequences are concerned, is of the very first importance, I mean the theory expressed in the quotations which formed the text of my first paper on this subject. “The intellect of vertebrate animals is identical, as their organism is identical; thus gradually descending, passing through the orang from man himself to all the mammalia”; and again, “From animals to man everything is but a chain of uninterrupted gradation; therefore, there is no human kingdom.”† The consequence of this theory of intellectual gradation is, that it leaves us the following alternative,—either we must deny the distinctive attributes of humanity, or we must extend these attributes to the lower animals. If there is less difference, as has been stated, between the chimpanzee and the Bushman than there is between

* See Vols. III. and V. for Mr. Morshead’s former papers.

† Pouchet, *Plurality of the Human Race*.

the Bushman and the European, we must either invest the chimpanzee with the attribute of moral responsibility or we must withhold this attribute from man. Viewed in this light, the conception that all the intellectual and moral attributes of man are merely higher developments of similar attributes existing in the lower animals, is one which strikes at the root of the doctrine of moral responsibility. This theory is much in favour with sceptical writers, and I believe it to exist, more or less distinctly formulated, in the minds of a far greater number of educated persons than is commonly supposed. It is not, however, the province of this Institute to deal primarily with the moral bearing of scientific questions; and my inquiry was addressed entirely to the facts on which the theory was based; the arguments contained in my paper being directed chiefly against the attempts which have been made, in conformity with the theory in question, to obliterate the distinction between man and brute.

I think Mr. Row will find that the points raised by him have been anticipated. The sense in which I used the phrase "natural sagacity" is explained in sec. 8 of the paper. The question of transmitted habits is a very interesting one, but it hardly came within the scope of my argument.

In reply to Dr. Irons, I will point out that it is impossible to establish a distinction between man and brute without considering the attributes of each separately. It was held both by Descartes and Aristotle that animals are automata.

The objections of Dr. Fisher apply principally to my terminology. I used the word psychology to express the attributes of the $\psi\upsilon\chi\eta$ collectively, and therefore as including the appetites and passions, which I showed to be plainly automatic, in so much as they produce actions without the intervention of the rational will. Of course this is an extension of the sense in which the term is usually employed, but the extension is perfectly legitimate. I do not mean, however, to compare the wonderful mechanism of the animal with the automaton chess-player at the Westminster Aquarium.

It is an error to suppose that the term "automatism" is inapplicable to living creatures. An automaton is, as a matter of fact, a machine of human construction, and, therefore, destitute of sensation; but the absence of sensation is not included in the essential idea of automatism. What I mean when I speak of animals as automata is that they are constructed in such a manner as to act of their own accord under particular conditions. This conception in no wise derogates from the wisdom of the Creator; for a tree is as certainly a piece of Divine workmanship as an animal, and yet it has not even "automatism." Every impulse of anger or fear is automatic; in fact the word is continually used to distinguish involuntary from voluntary actions.

I am sorry that Mr. Dibdin omitted to indicate the defect in my argument against fatalism; had he done so, I might have been able to supply it.