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JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.

VOL. IX.

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

EDITED BY THE HONORARY SECRETARY.

VOL. IX.



LONDON:

(Published for the Institute)

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P R E F A C E.

THE Ninth Volume of the *Journal of the Transactions of* the VICTORIA INSTITUTE is now issued. It will be found to contain contributions from the Rev. Canon Birks, Professor of Moral Philosophy at Cambridge; the Rev. J. L. Challis, F.R.S., Plumian Professor of Astronomy at Cambridge; Principal J. W. Dawson, F.R.S.; Mr. E. W. Gosse; Mr. J. E. Howard, F.R.S.; the Rev. Prebendary W. J. Irons, D.D.; Rev. A. I. McCaul, M.A., Lecturer in Hebrew at King's College, London; Mr. G. S. Morris, Professor of Modern Languages and Literature at Michigan University; Dr. H. A. Nicholson, Professor of Natural History at St. Andrew's University; the Rev. B. W. Savile, M.A.,—the value of whose paper is enhanced by the remarks of Dr. S. Birch, President of the Society of Biblical Archæology;—the Rev. R. Thornton, D.D.; and Canon Titcomb, M.A.

The increasing outside demand for the "Transactions" of the Institute may be taken as a certain indication of the esteem in which they are held as they become more known. It is gratifying to observe that some of the papers in the *Journal* have been translated, and that many are now used as the bases of lectures: this has begun to be the case even in India, where translations of English literature advocating

views tending to scepticism are becoming only too common. The welcome accorded to the "Transactions" in America is also worthy of note.

The progress of the Society, due in no small degree to the great interest taken in its welfare by those who 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 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.

F. PETRIE,

Hon. Sec. and Editor.

DECEMBER 31, 1875.

JOURNAL OF THE TRANSACTIONS

OF THE

VICTORIA INSTITUTE,

OR

PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.



ANNUAL GENERAL MEETING,

HELD AT THE HOUSE OF THE SOCIETY OF ARTS,*

MONDAY, JUNE 15TH, 1874.

MR. C. BROOKE, M.D., F.R.S., P.R.M.S., IN THE CHAIR.

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

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

Progress of the Institute.

1. IN presenting the EIGHTH ANNUAL REPORT, the Council desires to congratulate the members and associates on the general improvement that has taken place in the Society's position during the last twelve months. This improvement is mainly due to the steady support of those already associated

* On account of important business, both in the House of Lords and in the House of Commons, the President and several leading Members were absent. The meeting was one of the largest yet held.

with the Society, an increased number of new members and associates; and to its greater popularity. Last year reference was made to the necessity of its supporters being raised to 500, of whom 400 should be members. This latter condition has not as yet been attained, but might be, by a slight effort on the part of the members and associates. It should be added that the increased expense for offices now renders this strength barely sufficient.

2. Three vacancies in the list of Vice-Presidents have been filled up by the election of the Rev. Principal T. P. Boulton, LL.D.; W. Forsyth, Esq., Q.C., LL.D., M.P.; and C. B. Radcliffe, Esq., M.D.; also two vacancies in the Council, by the election of the Rev. Principal J. Angus, M.A., D.D., and J. Bateman, Esq., F.R.S., F.L.S.

3. It is hoped that the Institute will ere long be in a position to set aside a sum annually, which shall be sufficient to pay a secretary, and so revive an office, the duties of which have been provisionally performed by the Honorary Secretary, since January, 1871.

4. The terms under which the Institute holds its present premises being unrenovable, owing to their dilapidated condition, the Council is under the necessity of taking others, in selecting the position of which it will be necessary—considering the requirements of the members—to endeavour to secure offices easy of access, and near the present central position.

5. The number of societies exchanging Transactions with the Institute is increasing, and the library has received many valuable additions. It is hoped that ere long, by the aid of the members, the Institute will possess that which is much needed—a good library of reference.

6. The Council regrets to announce the decease of the following valued supporters of the Institute; first among whom should stand the name of one of its Vice-Presidents, the learned and gifted Rev. Walter Mitchell, M.A., who, from the time he delivered the inaugural address, ever sought to advance the interests of the Society, so far as it lay in his power; A. Gailey, Esq. (Foundation Member); Rev. G. G. P. Glossop, M.A. (Member); Admiral E. P. Halsted, R.N. (Foundation Member); T. Hunt, Esq. (Foundation Member); D. Ivall, Esq. (Foundation Associate); Rev. R. T. Lowe, M.A. (Foundation Member); Major I. P. Carruthers Wade (Member); T. Windeatt, Esq. (Associate).

7. 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 May, 1873.....	27	7	245	138
Deduct deaths ...	—	—	7	2
			238	136
Withdrawn	—	—	5	7
			233	129
Hon. For. Corre- spondents, &c.	—	—	4	2
			229	127
Changes	—	+1	-9	+8
			220	135
Joined between May 1st, 1873, and June 1st, 1874	—	2	44	55
	27	10	264	190
	37		454	
Total			491*	

Hon. Foreign Correspondents and Local Secretaries, 10.

Finance.

8. The Audited Balance Sheet of the Treasurer for the year ending 31st December, 1873, is appended, showing a balance in hand of £25. 11s., after the payment of every debt up to the last day of the year. It will be observed that the Balance Sheet has been divided into two portions, one headed "General Account," exhibiting a balance in hand of £8. 15s. 7d. (after defraying the cost of the completion of Volume II., as well as the expenses connected with the issue of the *Transactions* of the current year, *i.e.* Vol. VII.); the other entitled the "Special Fund for Library," &c., showing a balance in hand of £16. 15s. 5d. The total amount now invested in the New Three per Cent. Annuities is £508. 11s. 1d.

It may be noted that a considerable portion of this year's

* The Total number on the 1st of January, 1871, was 201.

contributions to the Endowment Fund has been given by those unconnected with the Society.

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

	1869.	1870.	1872.	1873.
Members	1	2	1	8
Associates	—	—	1	4
	—	—	—	—
	1	2	2	12

10. The estimated ordinary assets of the Institute for the current year, exclusive of arrears and of new subscribers, are as follows:—

Annual Subscribers.		
268 Members, at £2. 2s.		£562 16
193 Associates, at £1. 1s.		202 13
Vice-Patrons, Life Members, and Life Associates.		
(Dividend on £508. 11s. 1d. Three per Cent. Stock)		
		15 0
Total		<u>£780 9</u>

Meetings.

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

The Identity of Reason in Science and Religion. By the Rev. R. MITCHELL. (Dec. 1, 1873.)

Magnitudes in Creation and their bearings on Biblical Interpretation. By the Rev. J. H. TITCOMB, M.A. Paper on the same, by Professor CHALLIS, F.R.S.; with communications from the Astronomer Royal's Department, the Radcliffe Observer, and Professor Pritchard, F.R.S. (Jan. 5, 1874.)

On Buddhism. By the Right Rev. Bishop PIERS C. CLAUGHTON, D.D., &c., with communications from Professors CHANDLER and BREWER. (Held at the *House of the Society of Arts*, Jan. 19.)

The Contrast between Crystallization and Life. By JOHN ELIOT HOWARD, Esq., F.L.S. (Feb. 2.)

The Brixham Cavern and its Testimony to the Antiquity of Man—examined. By N. WHITLEY, Esq., Sec. Royal Inst. of Cornwall. (Feb. 16.)

On the Rules of Evidence as applicable to the Credibility of History. By W. FORSYTH, Esq., Q.C., LL.D., M.P. (March 2.)

On the Harmony between the Chronology of Egypt and the Bible. By the Rev. B. W. SAVILE, M.A. (INTERMEDIATE MEETING, March 16.)

The Principles of Modern Pantheistic and Atheistic Philosophy as expressed in the last works of Strauss, Mill, &c. By the Rev. Prebendary C. A. Row, M.A. Paper on the same, by Professor CHALLIS, F.R.S. (April 13.)

On the Ethical Condition of the Early Scandinavian Peoples. By E. W. Gosse, Esq. (April 20.)

On Biblical Interpretation in connection with Science. By the Rev. A. J. McCaul, M.A., Lecturer at King's Coll. (May 4.)

On the Principle of Adaptation in Mind and in Nature. By Professor G. S. MORRIS, of Michigan University, U.S. (May 18.)

ANNIVERSARY. (At the *House of the Society of Arts*, June 15.)

12. During this session the Council has found it necessary to increase the number of ordinary meetings (the number of intermediate meetings being proportionately reduced), the importance of many of the papers submitted requiring that they should obtain that permanent record in the Transactions which is given to all read at ordinary meetings.

13. The meetings during this session have been well attended; that of the 19th January was held at the large hall of the Society of Arts, the rooms of the Institute not affording adequate accommodation.

Publications.

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

15. The Council is much gratified in being able to state that Part VIII. with the table of contents, &c., completing Vol. II., was published in January. The *Journal of the Transactions* is therefore now complete from the commencement.

16. The importance of securing a wider circulation for some of the most important of the publications, and so extending the sphere of the Society's usefulness, has induced the Council to publish a "people's edition" of its most popular papers and discussions, to be sold at a price only covering the cost of production: as yet three papers have been published in this form:—

The Annual Address for 1873, by the Rev. Principal Boulbee, LL.D., Vice-President.

The Rules of Evidence as Applicable to the Credibility of History. By W. Forsyth, Esq., Q.C., M.P., Vice-President.

The Principles of Modern Pantheistic and Atheistic Philosophy. By the Rev. Prebendary C. A. Row, M.A.

The Council has also, with a view to carrying out the Sixth object of the Society, commenced the translation of foreign works; Professor Hüber's greatly valued German reply to Strauss being the first undertaken.

17. The results of the sales of the Institute's Publications have almost doubled in each succeeding year since 1870.

Conclusion.

18. In conclusion, the Council desires to state that the future of the VICTORIA INSTITUTE rests in no small degree with its present supporters; that it was needed and can do good service has been fully proved; and that it ought to be no small Society, considering the interests at stake, and the important objects which it seeks to accomplish, all will acknowledge.

Signed on behalf of the Council,

SHAFTESBURY, *President.*

The HONORARY TREASURER, Mr. W. N. WEST, then read the following Balance-sheet :—

DONATIONS TO THE ENDOWMENT FUND.

1873.

	£.	s.	d.
C. J. BEVAN, Esq.	10	10	0
Right Rev. the Bishop of DERRY	5	0	0
C. W. H. WYMAN, Esq.	1	1	0
	<hr/>		
	£16	11	0
	<hr/>		

DONATIONS TO THE LIBRARY FUND.

Paid prior to 31st December, 1869.

	£.	s.	d.
S. MORLEY, Esq., M.P.	100	0	0
I. BRAITHWAITE, Esq.	25	0	0
R. MULLINGS, Esq.	10	0	0
Dr. J. H. WHEATLEY	10	0	0
H. W. BLEBY, Esq., B.A.	5	0	0
T. PROTHERO, Esq.	3	3	0
A. J. WOODHOUSE, Esq.	3	3	0
W. N. WEST, Esq.	2	2	0
G. WILLIAMS, Esq.	1	1	0
Rev. J. H. RIGG, D.D.	1	1	0
	<hr/>		
	£160	10	0
	<hr/>		

Paid during 1870.

	£.	s.	d.
ROBERT BAXTER, Esq.	52	10	0
W. McARTHUR, Esq., M.P.	21	0	0
JOHN NAPIER, Esq., <i>Glasgow</i>	10	0	0
W. VANNER, Esq.	10	0	0
T. W. MASTERMAN, Esq.	5	5	0
S. D. WADDY, Esq., Q.C., M.P.	5	5	0
CHARLES BROOKE, Esq., F.R.S.	5	0	0
Dr. FRASER	5	0	0
Vice-Admiral HALSTED (the late).....	5	0	0
	<hr/>		

Carried forward ... £119 0 0

	£	s.	d.
Brought forward	119	0	0
Rev. C. KEMBLE, M.A.....	5	0	0
Rev. W. NIVEN, B.D.	5	0	0
S. PETRIE, Esq., C.B. (the late)	5	0	0
Rev. J. H. A. WALSH, M.A. (the late).....	5	0	0
Rev. A. DE LA MARE, M.A.	3	3	0
Rev. R. THORNTON, D.D.	3	3	0
A. V. NEWTON, Esq.....	3	0	0
Rev. J. B. OWEN, M.A. (the late)	3	0	0
Captain JASPER SELWYN, R.N., <i>Tring</i>	3	0	0
Rev. W. H. BATHURST, M.A.	2	2	0
E. CHANCE, Esq., J.P. <i>Malvern</i>	2	2	0
W. H. INCE, Esq.	2	2	0
JOHN SHIELDS, Esq., <i>Durham</i>	2	2	0
Rev. G. R. BADENOCH.....	1	1	0
J. LEWIS, Esq., B.N., <i>Southampton</i>	1	1	0
Rev. Preb. C. A. ROW, M.A.	1	1	0
Very Rev. Dean PAYNE SMITH, D.D.	1	1	0
Rev. J. H. TITCOMB, M.A.	1	1	0
G. C. HARRISON, Esq.....	1	0	0
W. PAYNE, Esq.	1	0	0
J. SHAW, Esq., M.D., <i>Boston</i>	1	0	0
Rev. C. SKRINE, M.A.	1	0	0
	<u>£171</u>	<u>19</u>	<u>0</u>

1872.

	£.	s.	d.
A. McARTHUR, Esq.	42	0	0
Per Admiral HALSTED, R.N. (the late).....	2	2	0

1873.

C. W. H. WYMAN, Esq.	1	1	0
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Total £377 12 0

The Right Rev. Bishop RYAN, D.D.—I have been called upon to move the following resolution :—“That the report of the Council now read be received, adopted, and circulated among the members and associates.” I did not anticipate having to speak ; hence my remarks must be brief. No doubt those of us, and perhaps most here, who have been brought into contact with

serious and earnest minds, have found that a twofold division has existed for a long time among men with respect to religious questions. In the case of many the difficulty is to get them to follow the precepts of the religion of which they profess to have no doubt ; but with others the difficulty is to get them heartily and honestly to attend to the evidences of the religion about which they do profess to have doubts : the difficulties of this class of persons have been immensely increased in our day. To many people in all ranks of society, and of all degrees of education, the way of inquiring minds inclined to doubt has been made very difficult indeed ; but I agree with the Bishop of London that it is not so much the duty of the clergy to take up this subject in church, because those who go there go to be strengthened and encouraged in the belief and practices of a religion which they do not doubt ; and, therefore, it does not seem to be the part of the clergy to introduce these subjects too frequently in mixed congregations. It must, however, be the part of somebody to deal with such matters ; and I am thankful for the labours of this and other societies having somewhat similar objects. To show the value of their work, I will mention one instance. The other day, in a town in one of the Midland counties, I heard this gratifying fact, that a man who had been denying with great ingenuity, skill, perseverance, and zeal, the existence of the one Eternal God, and even the existence of a Providence, retracted his mistaken opinions in the presence of 3,000 people assembled in a large meadow. He gave several reasons for his changed convictions, and one was, that he found the Atheists were never engaged in trying to do good to their fellow-citizens, but only in abusing Christians. He put the argument for design in a very remarkable light : he said that if there was no such a thing as a Creator and Designer, we were forced to this conclusion, that the results and effects of blind force were far more perfect than the results and effects of the most clever intelligence, and that, of course, was a *reductio ad absurdum*. At all events, it affected his mind and the minds of others ; and I mention this to show you that the principles which you endeavour to carry out, are at work in the various towns of the Midland and Northern counties where they are certainly wanted ; for Atheistic almanacs and other works are being circulated in large numbers in these towns. It is very interesting to have one definite instance of the way in which those who struggle for the principles this Society upholds, are rewarded by seeing those principles spreading. I have much pleasure in moving the resolution. (Cheers.)

Mr. H. CADMAN JONES.—I beg to second the resolution.

The resolution was unanimously agreed to.

Lieut.-General R. F. COPLAND-CRAWFORD, R.A.—Sir : The resolution entrusted to me, and which I beg to move, is, "That the thanks of the Members and Associates be presented to the Council and Honorary Officers for their efficient conduct of the affairs of the Victoria Institute during the past year." Those who have listened to the report which has just been read ; those who have been present at the reading of any of the many papers during the past twelve months ; and all who have perused the Transactions of the Society, must assuredly come to the conclusion that those administering

the Institute's affairs are entitled to our grateful acknowledgments for the wise zeal and energy which they have shown. It is always an agreeable duty to propose a vote of thanks ; but in this instance it is shadowed over by the very great loss the Institute has sustained in him who, this time last year, occupied the chair which you now fill. I refer to our amiable, gifted, hard-working, and devoted Vice-President, the late Rev. Walter Mitchell. I am sure that all who have witnessed his conduct in the chair, and at our different discussions, must have admired the courtesy, the gentleness, and yet the firmness, with which he ever advocated what he believed to be in the interests of truth. Turning now to another point,—one which was very recently the subject of a paper read before a meeting of this Society, and to which all leading geologists were invited—I would say that whatever may be the period which is suggested or veiled under, if it be veiled under, the expression “ six days,” Hugh Miller was justified in summoning to his aid the testimony of the rocks in order to sustain the Mosaic account of the world's creation, and its subsequent arrangement and adaptation to the conditions of the things and creatures which were to be brought upon it. And recently we have had other testimony brought before us ; the very depths of the ocean have been sounded, and living creatures have been found where it was supposed no living creatures could exist : such a fact warns us equally with the testimony of the rocks, that we should be careful in recognizing new theories, and not over-hasty in interpreting the voice of Nature, for we do not yet understand her language or appreciate what she teaches ; and until we really know what Nature speaks, and understand her language, we are not in a position to come out with dogmatic views, now often used to cast doubt upon the Divine word, and upon Him who gave it, and to dethrone God from His kingdom, and from superintendence over His own works. Bishop Ryan has referred to *design*. Design pervades the whole domain of Nature, and the more we study her the more we shall acknowledge this fact. I further maintain that as regards ourselves there is no one who has moral aptitudes in his soul for good, or who feels a tendency to evil, who does not know that these are conditions within him, the one being the offspring of a Being who is loving, and holy, and good ; and the other being the consequence of the fall. Originally we were created upright, and with aptitudes for all that is great and good ; but sin entered in, and now men would assault even the purity of Heaven. Yet still is the Spirit bearing witness with our spirit, and testifying to us what we are, the destiny before us, and the hope that maketh not ashamed. May I exemplify this in the case of one well known to us, the late Admiral Halsted, — a man who never swerved from his work ? It was my privilege to be present with him when he was dying. I repeated to him these words :—

“ How sweet the name of Jesus sounds
 In a believer's ear ;
 It soothes his sorrows, heals his wounds,
 And drives away his fear.”

He lifted up his eyes and hands, and his words were : " Sweet, sweet, sweet ! I know Him, I know Him ! I love Him, I love Him ! I bless Him, I bless Him ! " and, laying his head on the pillow, he never raised it again. May we be able to say the same at our dying hour. These remarks are not altogether impertinent to our object, for why do we want to clear away the mist that men cast on the Bible ? Is it not that we may see clearly that that blessed book is the word of the living God, which speaks to us and tells us that there is a loving Saviour, a glorious Heaven, and a great Atonement, and that there is a bright and a heavenly rest for those who look in all simplicity to Jesus.

Rev. W. B. BOYCE.—I rise to second the resolution, which has been so ably proposed, and am happy to find that the labours of this Institute have had the effect of lessening the assumptions of excellent, but, as I think, mistaken men,—who are too much attached to materialistic and pantheistic philosophy. They now speak with less confidence, and they speak, too, with some respect of this Society. When the Victoria Institute was first formed, it was sneered at as a very ridiculous thing,—as something which was only founded for clergymen to play with, and to keep a few women and children in intellectual bondage. But the tone is altered now. You will see in the Transactions, papers of a most important character. The Institute has, by its work, compelled public opinion to change, and no member can look at the eight volumes of Transactions which have been published, without being proud of this Society. I am not in accord with everything which has appeared in the volumes ; I do not like the attempts which one or two have made to reconcile Moses with Science, for Science has not yet arrived at that perfection at which it may be taken as a perfect standard of truth in the works of God. I believe in the opposition of this Institute to the materialism and pantheism of the age, and am happy to find that the Society is prospering, and that we publish cheap editions of some of the most important papers in the Transactions, such as may interest the mass of the people. I am glad also to hear that we are beginning to translate important works, which otherwise perhaps would not appear in our language. I regret that my many duties do not enable me to attend the meetings ; but the very complete way in which the Transactions are issued, enables me to read the papers which are produced at those meetings, and to be well acquainted with the Institute's work.

The motion was unanimously agreed to.

Mr. J. E. HOWARD, F.R.S.—I have been requested to return thanks, on behalf of the Council, for the very kind way in which you have responded to the vote of confidence in the doings of the Council during the past year. I feel that our position, as a Council, is one requiring much wisdom, delicacy, discernment, and tact ; and that we really do deserve much of your sympathy in the sometimes difficult and laborious duties which we have to perform in connection with the examination of papers offered for discussion. We all of us are united in the one desire to fulfil the responsibility thrown upon us in the best way we can ; and are thankful for having our hands upheld in the

somewhat difficult task of upholding the truth and guarding against error; while at the same time we give the needed scope for discussion on subjects that are properly brought before us, and which we introduce to the Institute. In all these matters it has been my pleasure, so long as I have been a member of the Council, to be very happily associated with those who compose that body; and I am sure the harmony and good feeling which have always existed in the Council will commend themselves to you all. I have little or nothing further to say, except to ask your help in every way in which you can give it; and your prayers that the Council may rightly discharge its onerous duties.

Mr. W. N. WEST (Hon. Treasurer).—I beg to thank the meeting for the vote of thanks it has passed to the honorary officers, Captain Petrie and myself. My duties are light, but Captain Petrie has difficult and arduous duties to perform, and on his behalf I beg to thank you for the vote you have just passed.

The CHAIRMAN.—I think the Members and Associates of this Institute should be made acquainted with the fact that the flourishing condition of our Society at the present moment is, to a very great extent, due to the exertions of our Hon. Secretary (Cheers); and certainly in making the objects of the Institute personally known to many people, who might be supposed likely to join our ranks. As one of the Council myself, I am quite certain that a great deal more of our present success is due to the individual exertions of our Honorary Secretary, than is due to the collective exertions of all the rest of the Council put together. This is a fact which ought to be known to all the Members and Associates. (Cheers.)

Dr. JARDINE.—The resolution which I beg to move is “that the following be the Council and Officers for the ensuing year”:—

COUNCIL AND OFFICERS FOR 1874-75.

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

Vice-Presidents.

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

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

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

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

Honorary Foreign Correspondents.

CONSTANTIN DE TISCHENDORF, LL.D., D.C.L.

Principal J. W. DAWSON, LL.D., F.R.S. (and others).

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.

Hon. Foreign Secretary.—EDWARD J. MORSHEAD, Esq., H.M.C.S.

Council.

ROBERT BAXTER, Esq. (*Trustee*).
 Rev. A. DE LA MARE, M.A.
 Rear-Admiral E. G. FISHERBOURNE, C.B.
 R. N. FOWLER, Esq. (*Trustee*).
 WILLIAM H. INCE, Esq., F.L.S.,
 F.R.M.S.
 ALEX. M'ARTHUR, Esq., M.P.
 ALFRED V. NEWTON, Esq., F.A.S.L.
 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 C. A. ROW, M.A.

Rev. J. H. TITCOMB, M.A.
 J. A. FRASER, Esq., M.D., I.G.H.
 Rev. G. HENSLOW, M.A., F.L.S.
 Rev. CHARLES GRAHAM.
 T. W. MASTERMAN, Esq.
 H. CADMAN JONES, Esq., Barrister-at-
 Law.
 Rev. J. G. WOOD, M.A., F.L.S.
 Rev. W. ARTHUR, D.D.
 C. R. BREE, Esq., M.D., F.Z.S., &c.
 JOHN ELIOT HOWARD, Esq., F.R.S.
 Rev. G. W. WELDON, M.A., B.M., F.L.S.
 Rev. Principal J. ANGUS, M.A., D.D.
 J. BATEMAN, Esq., F.R.S., F.L.S.

I must plead a good reason for making a bad speech, namely, that I had no idea of being called upon to speak. The last resolution thanked the officers who have gone; the present resolution refers to the officers who are to come. The report of those who have passed has been so flattering and satisfactory, that I hope the officers who now take their place will not only do as well, but, if possible, even better than their predecessors, and I am sure the whole Institute will unite with me in this wish. I am warmly interested in the work for various reasons. We live in no common times. The enemy is coming out with a formidable front in a way that it has never adopted before, and I think an open battle is far better than anything else. I hold it to be the duty of every one interested in this subject, to put on his armour, and to endeavour to fight this great battle, because it is a battle that must be fought before long, and it should be fought upon its own merits. Instead of being angry with some of our opponents, we should sympathize with them. There are distinguished men of first-rate talent and decided honesty of purpose among them, but often betraying marvellous ignorance. These often ask us to abandon our religious opinions; but we may say to them, "You must give us something better before you take away our hope." I maintain that religion is a cement that binds all people together. Take it away, and man becomes one of the most selfish and insufferable animals on the face of the earth. If those I have alluded to had their way, they would land us in the greatest barbarism that could befall us.

J. RENDALL, Esq.—I have much pleasure in seconding the motion. I read the papers which are published by the Institute, and can honestly say that they are well worth reading. I do not know all the members of the Council. Some of them, I suppose, are more or less ornamental, and others, more or less useful; but from what I have read of the papers prepared by several of them, I believe the useful preponderates. Some of them are both useful and ornamental, as I can testify. (Laughter.) As to the Honorary Secretary, when we have heard such facts as that the number of Members of the Institute goes on increasing by over a hundred, year after year, I can only echo the hope that has already been expressed, that our future officers will do as well as their predecessors. I trust the number may be a thousand by this time next year. Work has never been better

done in any society of this kind than it has been done in the Victoria Institute. (Cheers.)

The CHAIRMAN.—Before the Address is read, it is customary to ask if any member has anything to urge, or any remarks to make, in regard to the general management of the Institute ?

Dr. E. HAUGHTON rose and proposed a resolution, which not being seconded, fell to the ground.

The original motion was then put to the meeting, and unanimously agreed to.

The HONORARY SECRETARY.—I have to move the following resolution :—
“That all moneys received on account of the Institute be paid in the ordinary manner into the bankers’, and that all cheques shall be drawn under the authority of the Council.” This is the custom in the Institute, but there is no bye-law to that effect. I also propose, in regard to the Auditors, “that one Auditor be on the Council, and that the other may be elected from among the Members and Associates who are not on the Council.”

Mr. A. V. NEWTON.—I second the motion. It merely makes two formal alterations in our laws which require no argument.

The resolution was then agreed to.

The Rev. ROBINSON THORNTON, D.D., Vice-President, then delivered the following Address :—

ANNUAL ADDRESS.

I. **A** STRANGE kind of wonder seems to pervade us as we pass through some complete and well-arranged collection of arms, and note the various instruments of offence and defence which it exhibits to our view. Brought face to face with a series, historically arranged, of practical developments of the least amiable portion of human nature, we are amazed at the great variety of the means employed in each age to work out, or to impede, the same unhappy end. We begin with clumsy and ponderous maces, spears, and axes, whose uncouth forms tell of violence more than skill, and the equally ponderous helm and hauberk, forged with equal labour, and equal lack of artistic refinement, to encounter them. Then come the weapons borne by warriors of a more advanced and artistic age ; lighter, yet from their very lightness more difficult to ward off, and so calling forth from the artisan of defence an exertion of skill and judgment more than equal to that of him who constructed them, and far above that of the armourer of earlier and ruder times. And so we are led on, step by step, to our own days, when the science of destruction and preservation seems almost to be surpassing

itself, and giving us a hope of certain peace from the utter hopelessness of war.

The interest with which we view all that is thus presented to our sight becomes a melancholy one, when we reflect that one half of the skill and labour whose results we behold was expended for the single purpose of destroying human life, and the other half for the purpose of shielding the destroyer. The pictures of battle-fields, which, at once as embellishments and illustrations, make the armoury complete, only intensify the feeling by showing how, with varying appliances, men from age to age tried to solve the one terrible problem—how to kill and yet to live.

Some such a feeling comes over us as we examine the sceptics' armoury, the varied forms of the weapons from time to time brought into play by Unbelief against the Christian faith, and the varied methods of attack; as we review, at the same time, the varied modes and means of defence resorted to by the champions and upholders of Christianity when assailed. We seem, I think, to wonder and to grieve that so much thought, so much ingenuity, so much labour, so much power, so much earnestness, should have been spent in the endeavour to take away man's moral and spiritual life by leaving him nothing to live for; to ruin his peace by wresting from him that most peaceful of all privileges, the privilege of saying, "I believe."

There is this comfort, however, that whereas in military warfare the arms of defence and offence usually belonged to each party alike, and both equally sought to preserve themselves and destroy the others, in our warfare the two are quite distinct. We may be pained at the sight of arms, but we exult in reviewing the armour. The assailants seek only to destroy, while we and ours are standing on the defensive only, and are endeavouring not to slay, but, while preserved ourselves, to give to our opponents that life and peace which their aim is to annihilate.

PERIOD OF UNSCIENTIFIC DENIAL.

II. The scepticism of a century and a half ago took in most instances the form of a vulgar Deism. Paltry cavils were raised against the details of the Old and New Testament, such cavils as had been long ago suggested by Tryphon, Porphyry, and Celsus, and answered by Justin and Origen. Interpolations in the original text of the Scriptures were suggested, wherever anything like definite teaching was found, or where

arguments could be drawn from the marvellous agreement of one part of Scripture with another. In short, the sceptical mind seems to have been possessed with the extraordinary fancy,—a fancy which has not altogether disappeared even at the present time,—that from the year 100 downwards, Christians habitually devoted their time to interpolation and forgery, and evinced an astonishing amount of cleverness in their performances; that no sooner was any important work produced and brought to the knowledge of the Church, than Christian intellect was brought at once to bear on it, and all flew to insert in it passages which might tell in favour of their peculiar doctrines and practices: so that, instead of those virtues which we are, groundlessly, in the habit of attributing to our predecessors in the faith, their excellence consisted in an extraordinary power of successful forgery, and the monastic *scriptorium* and the student's cell were both alike devoted to the corruption of the text of the Scriptures, and the dissemination of interpolated manuscripts. The science of textual criticism was in its infancy, and could scarcely then be used on the side either of sceptics or believers. Sometimes the charge of interpolation was dispensed with, and a sweeping accusation of utter falsehood was brought, with a rude refusal to listen to argument or evidence. The scientific unbeliever did not and could not exist; he was to be the production of a later age, the positivist and secularist man of the nineteenth century, developed by a process of unnatural selection out of the gorilla sceptic of the seventeenth. There was no geology in those days, and no chemistry. Philology was not, when Sanskrit was unknown, and Arabic looked upon as a strange, barbarous dialect; when people commonly believed that English was derived from Latin, Latin from Greek, and Greek from Hebrew, the primeval and original tongue. Nor could there be any scientific history, when Livy was credited and Herodotus disbelieved. Towards the close of the period, perhaps, some intimations of a coming alteration in the character of the warfare were given in a bombastic imitation of Lucretius, containing his Atheism without his philosophy, and in kindred works, now quietly mouldering in that limbo of decay which is reserved for useless and unfounded negations. Here and there appeared, no doubt, some works—few and far between, though not at all angelic—of a more dangerous because more enlightened character; more subtle, and more thorough-going. But as a whole the scepticism of the eighteenth century did not require, and indeed did not afford a place for, such an Institute as ours: it was met and combated by treatises on the Christian evidences, which we still value, though their imme-

diate work is over, and above all by the immortal "Analogy of Religion."

PERIOD OF SCIENTIFIC DOUBT.

III. The end of the last and commencement of the present century witnessed the rise of a new school of opponents of Revealed religion: a new workshop for offensive weapons was opened, and a new style of weapon fabricated. The clumsy Deism of a past age was succeeded by a far more elegant and refined Theism, and the rude arguments or ruder denials of the previous generation were exchanged for something very different. Men began to patronize rather than to repel. "How beautiful the poetry of Scripture, how wise many of its precepts, how lovely the character assigned to the alleged Founder of Christianity! what a pity we cannot accept the Bible! what a real pain we feel at being precluded from believing in the Christ!" The period which now commenced, contemporaneously with and because of the rise and increasing study of inductive and experimental science, may well be termed that of Scientific Doubt; as the one which preceded it may be called that of Unscientific Denial.

The method of historical criticism which is connected with the name of Niebuhr was probably the first, certainly the earliest which became conspicuous, among the weapons of the sceptical armoury. Niebuhr had shown that many obviously legendary tales which are mingled with early history (particularly early Roman history) are not absolutely to be rejected as pure figments of a poet's or a rhapsodist's brain: they contain the truth, though in the letter they do not express it; they can all be interpreted by means of the higher criticism, and hermeneutic intuition of the historian, and yield to us valuable information as to the thoughts and modes of feeling, the political sentiments and revolutions of opinion, of ages long gone by. It was natural enough to suggest that this higher criticism should be applied to the sacred writings. The Greek term *myth*, lately introduced into the language to express the significant legend handed down from unhistoric or prehistoric times, was seized upon with avidity, and applied to the histories in the Old and New Testament. Abraham and Moses, Elijah and Daniel, became mere personified conditions of national excitement; the story of Joseph and his brethren, which seems to us to carry the impress of truth in its touching simplicity and artless pathos, is a mythical representation of an early trade between Egypt and Syria, and of some myste-

rious ethnological connection between the Hyksos usurpers of Noph, and the Bedawin sheikhs of Canaan.

But the most remarkable offspring of this scientific mode of misinterpreting the Scriptures appears in two works, one many years subsequent to the other, both differing considerably in method and in detail, but both exhibiting the same animus and the same principle;

“Facies non omnibus una,
Nec diversa tamen, qualem decet esse sororum.”

I mean, of course, those two fancy “Lives of Christ” which we know by the names of their authors, Strauss and Rénan.

The former handles his subject as we might expect a German philosopher to do. Christ (I cannot bring myself to employ our Saviour’s Holy Name in discussing sceptical writings, and I therefore use His title) is with Strauss a mere idea personified. Whether this personified idea was attached to the name of a real person or not, is of little consequence. The preaching, the miracles, the suffering, the resurrection, are merely modes of telling us that the yearning after a national life, and perhaps a Theocracy, continued to agitate the minds of Israelites long after the Roman Empire had suppressed their separate nationality; and that their hopes, though rudely dashed to the ground, were nevertheless indestructible. The self-consciousness of the nation was as lasting as that of the individual, and survived everything but annihilation. In process of time men began to see that this personification of the national spirit might be made to include the yearnings of humanity itself after something higher and purer; hence the tale of the admission of the Gentiles to the Christian covenant. And finally, the personification itself was adored: martyrs bled, and confessors suffered for a deified figment of Oriental imagination.

Rénan, on the other hand, gives us a romance. He leads us among cool groves, and fields of fragrant lilies, over bold hill-tops, and through shady valleys. He takes us to the fountain-side; he bids us, like the Reubenites in the Song of Deborah, to tarry among the sheep-folds and listen to the piping of the shepherds. Christ with him is a real person, a fascinating enthusiast, half believing in himself, and making others wholly to do so. Without being deliberately untruthful, he lends himself to occasional deceit—for what Oriental would do otherwise? And so, when his enthusiasm, or that of his disciples, has gone so far as to become obnoxious to the stern reality of Roman rule, he suffers as Romans always made such dangerous

characters suffer, especially after being tolerated as Romans always did tolerate. But so firmly were his words imprinted on the minds of his enamoured followers, such literal credit did they give to all the dark, mysterious sayings he let drop about himself and his future, that they pictured them to themselves as absolutely true and as actually fulfilled; he was present to their "mind's eye" as clearly as if he had risen from the dead; and when the mental picture vanished from a spiritual retina which was too feeble to maintain it, Christ its subject was affirmed to have returned to the heaven from whence he came.

I am not here pretending to give a résumé or analysis of the two works, but rather attempting to sketch in outline the impression left by them on the mind as to the general drift of their argument. Both are marvellously ingenious, and have a certain, or rather an uncertain, kind of beauty about them: a beauty like that attributed by Bentley to Pope's *Iliad*; "a very pretty poem, Mr. Pope, but you must not call it Homer;" or, to speak more seriously, like St. Augustine's "quædam defectiva species et umbratica vitiis fallentibus." But the grand fallacy, the *πρῶτον ψῆδος*, in them, and in the whole Historico-critical argument against Scripture, is that the Scriptures do not come to us as legends, but as real history: it is assuming the whole question to attribute to them a legendary character. The criticism fails utterly when applied to matter for which it was never intended; and by so employing it we may arrive at the most absurd results, and explain away the most undoubted facts. Archbishop Whately, in his "Historic Doubts of Napoleon Buonaparte," showed the ridiculous conclusions to which we may be brought by the misapplication of the Niebuhrian criticism. We will try another instance, in a somewhat different style. Let us take the Wars of the Roses; we shall be able to find in the history of this period not a disputed succession, but a conflict between the landed proprietors and the artisans.

"In this political myth or saga" (we may conceive our critic to say) "we meet with two distinct sets of names of alleged monarchs, which undoubtedly represent events and interests personified. The kings on one side are all named Henry, those of the other are either Richard or Edward. In the name Henry, properly *Hain-ric*, rich in groves or forests, we see personified the class of land-owners; a view which is confirmed by the correct interpretation of the name by which they called themselves, Lancaster. This curious but significant word, compounded of the British *lan* (our *lawn*), a field, and the Latin *castrum*, a castle, shows that these forest-proprietors,

occupiers of land and castles, arrogated to themselves a nobility derived at once from the old British autochthonous inhabitants of the land, and from the Roman colonists. The wife of the last Hain-ric is with equal significance called Marguerite, *daisy*, the produce and ornament of the field.

“The names on the other side are also significant, and equally conclusive. Richard is *Ric-art*, riches or power of the artisan; Edward is *Eadu-art*, happiness or prosperity of the artisan; the two are respectively personifications of the power and of the prosperity of the working classes; and are spoken of together as belonging to the house of York, or Yorick, a name evidently derived from *gear-ric*, rich in *gear*, or machinery. We have a hint of the pauperized and oppressed condition of this class in the neighbouring Scandinavian kingdom given us in the compassionate exclamation put by Shakespeare into the mouth of the Danish prince, Hamlet: ‘Alas, poor Yorick!’

“We are now in a position to interpret the whole legend. The reign of the so-called Eadu-art, the Third of the name, points to a long-continued period of freedom and prosperity of the working class. At his death the crown devolves, not upon his son, Eadu-art (whose common title of Black Prince seems to indicate some supremacy belonging to the workers in metal), but on a grandson, Ric-art; in other words, the artisan class obtain supreme power. This power does not bring them *eadu*, prosperity, but, on the contrary, leads to a revolution, which places Hain-ric on the throne; that is to say, transfers the supreme power to the land-owners. This supremacy of the landed aristocracy lasts through three periods, of rise, brilliancy, and fall, symbolized by the three successive kings bearing the name of Henry. The last of the three becomes feeble; the land-owners’ power diminishes, and they endeavour, but too late, to conciliate, and to ally themselves with, the artisans; at least, so much we gather from the statement that Hain-ric named his son Eadu-art, and that that son was slain by his rival and namesake of the party of York. The adhesion of a Ric-art, surnamed *War-ric* (powerful in war) to the Lancaster party would seem to indicate that those of the artisan class who were enrolled in a regular army showed the usual tendency of the military, from whatever rank they are drawn, to incline to the aristocratic or monarchical side.

“Hain-ric falls before Eadu-art, and once again the old drama is enacted. Eadu-art, son of Eadu-art the victorious, succeeds for a short time, but prosperity is soon destroyed by overweening power being lodged in the hands of the artisan: Ric-art assassinates the youthful monarch, and is in his turn,

after a few unquiet years, himself overpowered by another Hain-ric, whose marriage with a princess of the Gear-ric or artisan party bearing a Hebrew, that is, a religious, name, appears to hint somewhat obscurely at a reconciliation effected between the two parties by the mediation of the ministers of religion. It is not improbable that the name of Tudor, given in the legend to him and his family, may be derived from *twa* and *duru* (two doors), and so may signify the access opened for both parties alike to the honours and emoluments of State offices."

This is all very ridiculous ; but I do not think it is a very gross caricature of the higher criticism, as it is proposed to apply it to the sacred records. Surely it is clear that to treat as legend what comes to us as history, and then call it un-historical because it has been so treated, is as great an error as to argue that $2=3$, because $d \cdot (x + 2) = d \cdot (x + 3)$.

But the sceptic will not confess himself beaten. He possesses that *μῦθς θάρσος*, or bluebottle courage, which Homer so amusingly describes as inspired into one of his heroes ; he buzzes still about the point from which he has been repelled : just as though the base metal of confuted-error, if only it be pertinaciously maintained, were, by some mystic process of sceptical alchemy, converted into the solid gold of undoubted truth.

The historical discoveries of the earlier Egyptologers were for a time alleged against Revelation. But the force of the Egyptian arguments was not great. The most prejudiced sceptic could not refrain from seeing that the authority of the books of Scripture, even if they were looked upon as in a great part legendary, was quite as good as that of a half-understood, half-misunderstood inscription placed by a superstitious king or priest in a heathen temple ; a discrepancy between the two did not necessarily prove the Bible to be in the wrong. The worshippers of Isis and Osiris, of Pasht and Anoub, were quite as likely to exhibit prejudice, and indulge in a little quiet manipulation of facts, as the votaries of the God of the Hebrews. Besides, it was soon found that the artillery brought from Egypt partook a little of the dangerous nature of rockets in warfare—it was apt to go off on the wrong side.

As to the Assyrian and Babylonian discoveries, I am not aware that any one has had the hardihood seriously to allege them against the biblical records. On the contrary, they have put a new weapon of defence into our hands ; and, while confirming the truth of Scripture history, have poured a flood of light upon its interpretation.

The giant strides made by the positive experimental sciences,

and the wonderful discoveries arrived at by those who prosecuted researches in the various branches of physics, produced another set of weapons to use against those writings on which the Christian faith is based. So numerous were these discoveries, and so rapidly did they succeed one another, that the whole of Nature seemed to have been ransacked, when but a beginning had been made; and consequently men began to draw conclusions, as if the period of search and investigation were ended, when in truth it had scarcely commenced. Thus a hasty and imperfect generalization from inadequate facts produced conclusions which seemed to be, and indeed to a great extent were, inconsistent with certain statements of Scripture, as popularly understood. Geology especially was held to reveal a state of things absolutely incompatible with the Mosaic account of the Creation and maintenance of the universe. In short, there appeared upon the stage a new type of sceptic, the scientific unbeliever. "I must believe my eyes," was his argument; "I cannot deny the truth of what I hear and see and feel: and induction is infallible; law rules all phenomena, and the human mind is free from the possibility of error, when it elicits, by a rigorous logic, the eternal truth which underlies each group of varied facts presented to the senses. You, on the other hand, offer for my acceptance certain books, whose authority rests on testimony alone; and these books I find to contain propositions irreconcilable with those conclusions to which I have been led. I am bound, by the necessity of human intellect, to reject your books, and to adhere to my own opinions."

Such I take to be a general statement of the arguments of the scientific unbelievers. And, indeed, there was every reason why they should be induced to employ them; the wider opening of the field of science seemed in the first instance naturally to lead to a review, if not a curtailment, of the domain of faith. Nor must it be forgotten that,—just as the study of mathematics disposes the mind of the student to be dissatisfied with anything like mere probability, anything, in fact, short of actual demonstration, and the intellectual digestion which is habituated to the syllogism nauseates and rejects the enthymeme,—so the mind which is accustomed to the inductive process, to experiment and interrogation of Nature, becomes singularly averse to the reception of testimony, and the discussion of that which is unseen and invisible. Scripture, a testimony received on testimony, Scripture, which deals with the visible and sensible only in reference to the Eternal, Immeasurable, and Invisible, was not likely to approve itself, *à priori*, to the purely positive understanding.

It is curious to see how this intellectual temper shows itself in dealing, not with religion, but with a kindred subject,—that of Moral Philosophy. The habit of dwelling on the laws of physical phenomena, to the exclusion of all others, has, not unnaturally, but most unhappily, led to the denial of all responsibility, and of the difference between right and wrong, save only as regards the effects of each action on the general utility, not as regards the character of the agent, and the essential nature of the action. In short, the mere men of science ultimately become thorough-going Fatalists. “Place a man under certain circumstances,” they say, “and he must inevitably act in a certain way. There is no such a thing as absolute morality; men are under a natural necessity of obeying the conditions under which they find themselves; actions differ only *à posteriori*, according to their results after performance: they cannot be said to have any character *à priori*. Integrate a moral phenomenon between limits *a* and *b*, your result is a good action; integrate the same between *p* and *q*, and your result is a bad one; humanity is but the *x* and *y*, the variable substratum, so to speak, in the grand equation of phenomenal being.” And thus we find Mr. Buckle, alleging—or, to speak more correctly, insinuating—as an argument against moral responsibility the theory of averages. This he illustrates by the curious fact that the number of letters posted without direction, throughout England, bears a nearly constant ratio to the total number posted. There is, therefore, he argues, a law that so many people per annum out of so many forget to direct their letters; consequently, the person who commits this error does it under a necessity, in obedience to a higher law, and therefore is not culpable.

The reply is patent. The fact that the percentage of undirected letters is invariable shows that people are just as careless in one year as in another, no better and no worse; a conclusion of which I do not know whether we ought to feel proud or ashamed. Perhaps under the new educational system the percentage will diminish. But it does not prove that the will of each individual person was irresistibly impelled, either wittingly or unwittingly, towards the act of posting an undirected letter, so that he was withheld by an unseen and unperceived force from putting the address outside his letter as usual, and from recognizing and supplying the omission before the letter left his possession and became the property of the Postmaster-General.

A similar reply may be made to the whole of the Positivist propositions on the subject of morality. An exaggerated view of the necessary sequence of phenomena has led to the entire

elimination of the notion of will, human and Divine; the factor has been differentiated out: a method has been adopted which does not suit the subject matter, and the induction has been incorrect, since, in obedience to this method, moral facts have been left out of consideration, because dissimilar to physical facts, and axioms of high probability have been neglected, because unlike those of positive science.

The answers returned by the believers to the school of scientific and utilitarian sceptics have been in general based on the same principle. The opponents of revealed religion were for ever crying, "Doubt everything; take nothing on testimony; like Pyrrho or Descartes, be prepared to doubt even your own existence; forget all that you have ever accepted because you were told it; give up all that you have ever believed, and elaborate it over again, for acceptance or rejection; Doubt alone can lead you to Truth. One thing alone is true, that is, the inductive method; it is this alone by which we may escape the errors of the vulgar; this alone

ἔσθ' ὄρου
 χρῆσάμενος δὴ βασάνῳ
 ἐπὶ τὰν ἐπίδαμον φάτιν εἶμι.

Our induction has overthrown the testimony to, and the testimony of, Scripture; and so you will find it, when you have worked out the problem as we have."

"Very true," rejoined the believer, "so far as it goes. Doubt and Induction are of the essence of Experimental Philosophy. There nothing must be taken on trust; everything must be verified by experiment and examination; no proposition can be acquiesced in relative to phenomena or phenomenal laws which cannot be reached as a conclusion by means of induction from those phenomena. But there are conditions subject to which your inductive method must be applied, and there are limits to its applicability. Evidently if a man had to doubt and examine into everything and take nothing on trust, he might reach the age of an antediluvian patriarch before he could breakfast in comfort, prudently plant a row of cabbages in his garden, or conscientiously hazard a remark about the weather. How many people who assent to the doctrine of the revolution of the earth about the sun, and habitually act upon belief of its truth, have worked, or can work, the simple problem of elliptic motion? And it is perfectly clear from your own admission that one proposition at least is not to be attained inductively—namely, that which asserts the infallibility of induction; or else poor man would be compelled to be perpetually traversing an intellectual asymptote, ever working

towards, but never reaching, that point of contact which should inductively prove his Induction to be what it claims to be, the only method and the certain method of arriving at Truth. The fact is, that this method of yours is not of universal applicability. There is a region in which it fails, and in that region lie the truths which we offer for your acceptance. To employ your method upon them, and to insist upon their being submitted to it, is just the error of the historical critic who should apply his method to the story of Napoleon Buonaparte or the Wars of the Roses; just the error we complain of in the critic who does apply it to the Scriptures.

“Further, it is necessary for a true induction that facts be certain and complete. Are you sure that you are in possession of all the facts, and that they have been accurately observed? ‘Life,’ Poisson said, ‘may be represented by an equation, could we only be certain of the variables and constants:’ but till these are all accurately ascertained, the biological $X=0$ must remain a meaningless formula. Just so the scientific arguments against Scripture, or supposed Scripture, would be of the highest importance and cogency, were we sure of the completeness of the induction, and the absolute clearness and correctness of the facts.” That these were not certain in the early days of scientific scepticism will be evident to any one who will compare a geological manual of 1834, or even 1844, with one of the present year. “So then,” the believer in Revelation went on to say, “as you are not yet sure of your facts, and, indeed, cannot always be certain of your senses, till their report is verified; as you have as yet examined but an infinitesimal part of the Great Book of Nature; and as the method you apply to your facts and your subject matter in general is not applicable to mine, I prefer to adhere to my opinions, and, while gladly receiving your conclusions,—so far as they are founded on a deliberate and complete, or at least wide, generalization,—within their own province, I still claim for myself the right, as I acknowledge and urge on you the duty, of moving at times in spirit within the pleasant land of Faith.”

PERIOD OF ATHEISTIC POSITIVISM.

IV. For a considerable time, indeed I may say till within the last decade, the scientific and historical sceptics were generally Theists. They admitted, or did not deny, that there was, or might be, a Personal Creator and Preserver of all things. They admitted, or did not deny, that there were, or might be, marks of design in Creation. They admitted, or

did not deny, that there was something to be said in behalf of Christianity, though they did not themselves allow its cogency, and usually declined to listen to it. But we now find ourselves in a new period of scepticism : a new armoury has been opened. We are now no longer contending with Theists, who will admit the argument from design, and bear with those praises of the Creating Power and Love which flow unbidden and almost involuntarily from our lips, out of the abundance of our hearts, when we study and tell of the marvels of the physical and moral universe. The school of our opponents, like the Internationalists, imprints on the first page of its manual, "This Society declares itself Atheist," and, with the French Revolutionists of the last century, has carried by an overwhelming vote that proposition which to the Psalmist appeared to be evolved from the heart's depth of human folly, "There is no God." In fact, we have reached an epoch of systematized Atheism, an absolute and more than Sadducean refusal to admit or hear of the existence of the Supernatural or the Transcendental : and whereas even Fichte would acknowledge the Infinite as a third with the Ego and the Non-ego in the triad of Existence, those with whom we have now to deal will admit of no element higher than humanity ; and sketch out for us an engaging form of the grand drama of Creation, from which the part of the Creator is omitted. This system has its apostles, who lecture, alas ! to not unwilling hearers, on "the good cause," "the emancipation of humanity from thralldom," "the elevation of man by the refutation of those fables of a superior Power which retard his intellectual development and limit his enjoyment of existence." One of the earlier thinkers, or rather of the forerunners, of this school, to whom I have already alluded, the late Mr. Buckle, distinctly lays down the principle that the prosperity of a country depends upon its rejection of religious restraints. He flatly contradicts Jehoshaphat's exhortation to his people, "Believe in the LORD your GOD, so shall ye be established ; believe His prophets, so shall ye prosper." In proportion as a nation is religious, in that same proportion, according to him, it is held back from the possibility of attaining happiness or greatness ; as it divests itself, little by little, of Religion, so it begins and continues to flourish. In short, he either deliberately confounds Religion with grovelling Superstition, or is unable to see the difference between the two, in his haste to arrive at the grand conclusion, in which I believe Mandeville forestalled him, that all religions are equally false, and nearly equally mischievous.

There is much wisdom, the wisdom of the serpent, in this altered tactic of the unbelieving school. David's "fool" is

guided by no intellectual folly. Once admit a Personal Creating God, and you admit the possibility, nay, the probability, of a revelation; the being of the Supernatural; the possible existence of a higher Law which may overrule that which we are able to discover; and that inferiority and imperfection of humanity which Aristotle could lay down as an axiom for a *reductio ad absurdum*, εἰ μὴ τὸ ἄριστον τῶν ἐν τῷ κόσμῳ ὁ ἄνθρωπος ἐστίν. But the Atheist is not troubled with any of these. The argument from design, which touches a mind that admits the vaguest Theism, has no force for him. For him soul and spirit, providence and adoration, Omnipotence and Omniscience, are only unmeaning terms foisted into language by debasing superstition, and nothing is true save that misty ring of unceasing self-evolution, which,—like the circling storm-clouds that, as astronomers tell us, are whirled by giant winds round the body of Jupiter,—is swept on through space by an all-controlling Fate.

As a natural consequence, the sceptic of the present day ignores Christianity. He takes for granted that it is now given up. He quietly assumes that every mind worthy of the name must long ago have surrendered the last lingering relics of that exploded delusion. He simply blots out of his book of history the grand tale of the Christian Church, or, if he permits it to remain, treats it only as a melancholy obstacle which perverse ignorance allowed for a time to obstruct the pathway of human development. To any one who ventures to talk to him of Scripture, or of the teaching and example of the Founder of Christianity, he replies with a quiet smile of mingled pity and contempt, as who should say, "All that has been long ago discussed and done away with. Every thinker knows now that the Bible is a late and not very clever forgery, and marvels how men could so long have tolerated a book which, though its writers here and there show some poetic genius, and even approach a simple sublimity, is defaced and defiled by those patches of human passion and error which form a dark crust upon its surface." Do we allege the pure morality of the Old and New Testament, he partly denies it, partly considers it taken from Confucius, Manu, and Socrates. Is a not unlikely coincidence of sentiments and expression found between passages of the New Testament and others in a treatise of the Talmud, or a Sura of the Koran, it only shows to him that the Christian forgery must be dated later than A.D. 500 or A.D. 622. In short, as I have said, we are confronted in the present day not by doubting Theists, but by Atheists, who meet us with a foregone conclusion, obstinately and scornfully upheld, against the doctrines which we maintain.

And this leads to a third point in which the scepticism of the present period has changed ground. We used to be told to disregard authority, even the very highest, to doubt everything and every one, to be satisfied with nothing that we had not examined and verified for ourselves; but the tone is altered now, and the despiser of authority has been converted into its champion. "Can you believe what the acute and judicial mind of Voltaire rejected? Has not such and such a great thinker avowed his utter disbelief of Christianity, and can you dare still to plead for it? Has not every true man of science now given up the Bible; and after that can you venture to say a word in its favour? Has not a great living authority expressed his astonishment at the clumsiness of much in Nature, and do you still talk of an infinitely intelligent Creator?" In a word, there is no one who uses more freely the *argumentum ad verecundiam* than the sceptic of the present time. But it is only the old tale—"Have any of the rulers, or the Pharisees, believed on Him? but this people, who knoweth not the law, are cursed." And surely, if we chose to retort the argument, we might have something to say: a Grote and a Mill have not done so very much more for their fellow-men, have not contributed so very much more to the advancement and well-being of humanity, than a Wilberforce or a Whewell; we may compare at no disadvantage, as to intellect and general usefulness, Bossuet with Voltaire, Johnson with Hobbes, Filippo Neri with Machiavel, Manzoni with Mazzini.

I cannot forbear alluding to another point which must be remarked in the scepticism of late years, and that is its extreme narrow-mindedness and illiberality. There was something captivating in the openness and fairness of the unbeliever of a quarter of a century ago. He was as tolerant as an old Roman. You might worship Christ, provided you did not interfere with the Goddess of Reason; you were free to go the way that suited you, provided you did not try to drive others into it. Nay, you were free to proselytize, if you could, so that you said and did nothing in disparagement of his adoration of pure intellect: even Christianity was better than a vacuum. But this tolerant temper is fast vanishing, and a deadly enmity to all definite religion is taking its place. We have heard of the *odium theologicum*, we know something of the *odium scientificum*: but I suspect we have yet to fathom the profundities of the *odium atheisticum*.

CONCLUSION.

V. I have endeavoured to give a brief sketch of the different characters of the assaults made by unbelief on Revealed Religion. It only remains that I venture a few suggestions as to the character of the religious armoury at the present time, and the temper of the Christian warrior as he goes to the intellectual battle-field. And first let me express my conviction that, if in any contest, certainly in this, *fas est et ab hoste doceri*; nay more, we owe very much to our opponents for what they have caused us to learn. Their attacks have led to a better acquaintance with the language of Scripture, a fuller comprehension of what it does and what it does not mean, a more accurate conception of what it is intended to be, and what it is not intended to be, for mankind; may I not add, a greater admiration of its marvellous comprehensiveness, such that a book proceeding from an inconsiderable Oriental people adapts itself to the varied habits, opinions, and modes of thought of widely different individuals, races, and epochs in the world's history? I maintain, without fear of contradiction, that Holy Scripture has been far better known and more valued since the time when it began to be more fearlessly and audaciously impugned and depreciated.

Our attitude towards those conclusions which are alleged against Christianity should be one of uncompromising firmness, and yet not of obstinate contradiction, but of doubt. The advice the earlier sceptics gave us as regards our faith may be very fairly adopted as regards their science. Doubt, we must remember, is antagonistic to Faith; unless it be that "honest doubt" of which we have heard so much, and which means, if it means anything, a readiness to acquiesce in higher truths, if only a little of that dim nebulosity in which they are too often needlessly enveloped be cleared away. But doubt of any kind, if it does not take the form of a despairing Pyrrhonism, is rather an aid to real science. Very beautiful was the ancient myth which made Iris the daughter of Thaumas,—the rainbow-hued personification of multifarious science the offspring of that wonder with which men first gazed upon the varying phenomena of Nature. No less truly may we say that Doubt is the honest though sometimes rude friend of Iris, preserving the tints of her bow from unsuitable juxtaposition and inharmonious admixture. Doubt of facts till they are verified, doubt conclusions till they are shown to be necessi-

tated by the facts,—but then, cheerfully admit them both. There can be nothing more injurious to the cause of Truth than an obstinate and prejudiced refusal to assent to what is fairly proved. In religious morality our pious rule is “Do your duty, whatever it costs, and trust in God, Who will bring all right.” In religious dealing with science let our rule be the same, “Assent, as a matter of duty, to what your opponent demonstrates by legitimate proof; the God of Truth will show you its connection with His own Truth. It may be that in resisting a logical conclusion you may be destroying a weapon which would ultimately be of the greatest value, not to your adversary, but to yourself.”

But especially I would urge this temper of doubt in the matter of alleged contradictions. There are many propositions, hypotheses, theories, which have been vaunted by one side and branded by the other as opposed to Revealed Religion, which after all are not inconsistent with it. I remember an occasion on which, at a large scientific meeting, the subject of spontaneous generation was discussed, and one or two speakers gave an account of experiments made by themselves in which bacteria and vibrions appeared in liquors which, after boiling, had been enclosed in hermetically-sealed tubes. The obvious answer to this would have been for some one to state—as was afterwards done, I believe, though not at that time—that he had performed the same experiment exactly, and that the bacteria and vibrions were not produced. In fact, several speakers expressed their doubt of the accuracy of the experiment. But one individual rose, and with somewhat unnecessary *empressement*, declared that no one should rob him of his Bible; that the Bible told him that God made all things, and that he would die before he surrendered his faith. Now none of the speakers had even suggested that God did not make those bacteria; the experiments only went to show that the Creator did not always employ the same method in producing living creatures; and the opponent's declamation was shown to amount to this, that he would not be robbed of his *own notion* of what the Bible told him, the explanatory addition, in fact, which he had made to the word “created” in the sacred volume. There was no necessary contradiction between the teaching of the Bible and the doubtful proposition that animated life of the lowest type sometimes shows itself without the ordinary conditions of generation.

Again; many, both believers and unbelievers, imagine that if the supposed discovery of traces of pre-Adamite man were confirmed, it would go very far to invalidate the authority of the Scriptures, and would, at all events, be inconsistent with

the Biblical cosmogony. Is this so certain? I am far from saying it has yet been satisfactorily made out, or even that reasonable grounds have been shown for thinking it probable, that any rational beings in human or even in gorilla form did exist before Adam: but is it so clear from the words of the Bible that there could not have been a prior type of humanity which appeared and disappeared in one of those periods of mundane existence, anterior to the present state of things, at which Scripture hints, though it makes no definite revelation?

The same may be said with regard to a scientific theory,—or perhaps I ought more correctly to say hypothesis,—of the present day, without some allusion to which this paper would be thought incomplete: I mean that of Evolution. Is it satisfactorily shown that, as some will have it, the hypothesis is at variance with the teaching of Scripture? True, many of those who hold and teach it combine with it the elimination of all design and intelligence from the great work of Nature, and an absolute denial of the Personality of the Creator. This part of their teaching is certainly inconsistent with Revelation. You cannot hold that God is a mere all-pervading force, and yet that “in the beginning God created:” you cannot reject design, and yet allow that “He saw, and, behold, it was very good.” But surely one need not maintain that an Evolutionist must be an Atheist or Pantheist, and cannot be a Christian; one cannot see that Christianity is at all affected by the truth or falsehood of the Evolution theory, whether the latter be, as some say, a sham induction from misunderstood, distorted, inadequate, invented particulars, or, as others tell us, a physical Gospel, an indubitable, irrefragable truth, supported by an absolutely complete induction from a perfect chain of well-ascertained and undeniable facts. It has not yet been shown that the God of Scripture cannot possibly have willed to create, or rather to preserve and amplify His creation, according to the rule of Evolution.

The growing intolerance which characterizes the sceptical tactics should teach us to be tolerant,—liberal in the best and truest sense of the word. Let us give our opponents full credit for endeavouring to seek the Truth. It is a hackneyed remark that Truth is many-sided: we must not fail, therefore, to remember that there is much more error and falsehood in negation than in affirmation. The science which is unhappily opposed to us may be,—nay, most often is,—true after all: our adversaries' view of the Truth is taken from a different stand-point to ours, so that they are in the right when they affirm, and fall into deadly error only when they begin to deny; and denial

on our side might not necessarily preserve us from being in the wrong. And yet tolerance has its limits; there is a point where true liberality stops. There is no real tolerance in acquiescing, for the sake of peace, in what we know to be untrue. Genius has by some been defined to be the power of seeing remote similarities. This genius is to my mind a kind of Cocles, mighty, but one-eyed. It would be imperfect without the power of seeing points of difference also; and these two powers themselves require to be completed by the presence of a judicial faculty, a power of estimating the value of points of agreement and difference, and deciding whether they are essential or merely accidental. Such a genius we must call to preside over our contests for the Faith; so that, while we tolerate all that is tolerable, we may make a firm stand against all that is really incompatible with the essence of our Christian belief.

Though we must, as I have already hinted, be extremely cautious not needlessly to mix up Science and Religion, and we of this Institute must above all remember that we are associated not as scientific Christians, but as Christian men of science, to examine, on scientific principles, the statements of non-Christian men of science,—there is one religious truth which we must earnestly contend for; and that is, the Personality of God. We must contend for it, as well as the conclusions which directly flow from it, because it is a scientific as well as a religious truth; the grand axiom of Natural Theology. Theology is a science, and a possible one. I once heard a speaker—a scientific man—use this unfortunate expression in defending some rather daring statements from the opposition made to them on religious grounds: “I do believe in Religion, but I do not believe in Theology”: and this claptrap was actually applauded by those who ought to have known better. What he *meant* was, I suppose, that he declined to assent to all the propositions about things Divine which men had imported into Religion, Natural or Revealed. But what he *said* in effect was, either that he believed in Religion, but not in a God, a most extraordinary statement; or else that there was a something, namely God, cognizable by man, of which he refused to admit a science; an assertion painfully unscientific, for of everything that man can know there is a science, and Theology is the science of God, so far as He permits Himself to be known by man. And so (to return to our point) we must, as men of science, maintain devoutly and inexorably, as one of those axioms which are common to all science, the Personal Being of the One First Cause.

Such are the cautions as to our method and temper which I would venture to suggest to this Institute, and to all who are with us in spirit. It would be presumptuous to say, in the words which Göthe puts into the mouth of his hero,

“Und gedächte jeder wie ich, so stünde die Macht auf
Gegen die Macht, und wir erfreuten uns alle des Friedens.”

Peace there can hardly be, so long as humanity is what it is, prone to worship itself rather than its Maker. But of this I am sure, that a quiet, large-hearted, and yet firm maintenance of the great truths of our Religion in the face of the glare and din of new discoveries, amidst all the confusion which necessarily arises when, as now, old landmarks are broken up,—a temperate and enlightened defence of our Christian inheritance against those who would bid us fling it away as effete, tainted with the superstition of the past, and dimmed with the rust of ages, will, with the blessing of the Great Author of all, be the happy means of preserving many a soul from the eddying whirlpool of Atheism, or the dreary desolation of a Pantheistic wilderness.

The Right Hon. the Lord O'NEILL.—I rise to move,—“That our best thanks be presented to the Rev. Dr. Robinson Thornton for the Annual Address now delivered, and also to those who have kindly read papers during the session.” I am but a humble learner in the work brought before this Institute, and therefore can only say that I listened to the lucid sketch given by Dr. Thornton, of the progress of scepticism, and of the manner in which scepticism should be met, with very profound respect and admiration. As to the second part of the resolution, I am scarce competent to say a word, because this is the first evening I have had the honour of being present, therefore I have not had the advantage of hearing the papers this year; but I have not been inattentive to the publications of the Society, some of which I have read with great interest and profit; and am sure that if the course delivered this year be at all like those I have read for previous years, they must be such as most of us would be desirous of returning thanks for. I have much pleasure in proposing the resolution which I have read.

The Rev. Principal J. H. RICE, D.D.—I have great pleasure in seconding the vote of thanks just moved, and feel it a great honour to do so. It is quite impossible for us to do justice to such an Address as that to which we have listened, and I will not attempt to do so, but we feel our thanks. The Address has been truly criticised as a very lucid, and a very able review of the scepticism of the last two centuries. It is impregnated, as all that Dr. Thornton writes is, with allusions which show a range of reading that very few of us can hope to emulate; but notwithstanding

this, the general course of thought has been so clear and able, that I feel certain we shall all endorse the words already spoken, and the purport of the language of the resolution itself. I am sorry to say that I have only heard one of the papers that have been read this year—a singularly able one—but I have looked into some of the others, and I have great pleasure in seconding the resolution. (Cheers.)

The motion was agreed to.

Dr. THORNTON.—I have to express my thanks for the privilege of being permitted to deliver the Annual Address, and also for the resolution you have just passed. Let me impress upon you to do all you can to keep up the numbers of this Institute, for I am sure we shall not do the great work which lies before us without the necessary numbers. We want members and money very much indeed. I have often applied to people to join the Institute, and they have said, “We cannot, because we are not scientific.” This is no reason why they should not do so. When our noble President was first requested to join us, he replied, “I am not a scientific man”; but it was represented to his Lordship that we had the science already, and wanted his patronage for it. And so I say we want your support: I think I may fairly quote the maxim which was found in the pocket-book of the individual whose trial lately interested us all,—“Some people has plenty money and no brains: other people has plenty brains and no money.” Applying that to ourselves, I may say: “Some people have plenty of money and no science: other people have plenty of science and no money: why should not those who have plenty of money and no science give to those who have plenty of science and no money?” (Cheers and laughter.)

The Right Rev. BISHOP PIERS C. CLAUGHTON, D.D.—I have the happy task of proposing a vote of thanks to our excellent Chairman, and wish that I had some better title to represent you; but except now and then coming to your meetings, and once reading a paper, I have been a very unworthy Member of this excellent Institute; yet I give it my hearty sympathy, for I believe it is doing a great and good work, and when we attend its meetings we always hear something that we may carry away, and which makes us better able to grapple with and to fight that terrible enemy which is now abroad. Let me say it is very important that we should always keep on our guard against strong language; there was nothing in the Address read to-night inconsistent with that. We should have great patience with our opponents; we should not revile them or encourage a feeling of contempt. We should remember that of all men they are most to be pitied. I do not mean anything insulting to them, far from it; but if there is any man for whom we should feel a deep pity, it is the man who, having once had a great capacity for it, has let slip his faith. What can the doubt of the sceptic give us in place of that? Let us go out to the world, and if we are not able to meet the objections that are urged, let us patiently and lovingly hold our tongues. I am certain that this Institute does a good work, and I can assure you of my great sympathy with its objects. (Cheers.)

The Rev. Prebendary W. J. IRONS, D.D.—I beg to second the resolution. In taking a retrospect of the past year, it is due to the memory of our late Vice-President, the Rev. W. Mitchell, that we should acknowledge his services to this Institute and to the cause of Christianity. He was long with us in our arduous work, and laboured to the last, heart and soul, with simplicity, knowledge, and truthfulness. During the past year we have lost another scientific name,—in his own department inferior to few,—I mean Richard Thomas Lowe, who was shipwrecked last month in the *Liberia*, in the Bay of Biscay. He was one who, in his Lincolnshire Parsonage, regularly waited for our papers, and read them with interest; one whose life, from the time he was a youth at Cambridge till his dying day, was a life of science as well as a life of purity and piety. His record is to be found not merely in the Church, but in the scientific history of this country; and his cabinets, which I trust will be carefully preserved, will testify to those who come after, the definiteness, the minuteness, the honesty, the zeal, of his life-long effort in the cause of Science. When I spoke to him not long ago, in the presence of others, on some topics bearing on the great objects of this Institute, and while listeners were in some consternation at certain scientific results, he replied with his usual great modesty,—“At present we are but tabulators of facts. I am a collector and nothing more. A future generation must fix the theories; we will provide them with the materials.” He was anxious to the last to testify his unshaken faith in God and Christianity. He devoted all the leisure he could command, to furnishing to his countrymen that which I hope will be fully appreciated by many, as I know they are by the few to whom they are accessible,—those carefully-manipulated notes, which even now surprise one in looking over his subjects. This testimony is due to one who if not recognized as a great man, only failed of that recognition through his intense retirement and modesty. We should feel thankful that God has granted to this Institute such a measure of success that noble hearts and clear heads and scientific understandings like his, have come to us from the beginning, and have remained with us to the close of their career. There is yet one other topic which I will refer to, arising out of Dr. Thornton’s admirable Address, it is this:—I am quite sure Dr. Thornton has hit the right point when he tells us that the battle of the future in this country will not be a battle for any of the mere externals of our religion; but it will have to be, on our side, a defence of the very personal existence of God. We must gird ourselves for that. I hold that implies, at length, the Creeds of the Church. It implies more, no doubt, than that acknowledgment which suffices for a Membership of this Institute. I do not desire to intrude on the special thoughts, feelings, or distinctive opinions of any member of the Institute; but I am bound to say that here, in this Institute, though we admit all who are professing Christians, and would hinder no man from the proper discussion of any truth connected with the Gospel of God; and although we should not wish to force anything on the attention of any man, to a larger extent than fair reason and earnest argument would justify; yet, in the future, we,

must prepare for something more than this. While we admit that "un-denominational religion" has brought us together, may that bringing together lead to higher results, and to a more intimate knowledge of those truths which we hold in common. We must have something more than a merely sentimental religion, if we wish to grapple with the positive Atheism of the coming day. Nor am I disposed to fear for the result in entering into the controversy on the ground of pure reason. There is no part of the Christian religion which clashes with the human intellect. "'Tis Reason our great Master holds so dear," I have quoted these words before in this Institute, "and I do not believe," said Berkeley, "that any man can serve God against his reason." Let us fearlessly enter into this controversy, only keeping men to the point. I have regretted to find that some arguments which had been powerfully adduced in this Institute have been quietly ignored outside, and the old objections, and what are called "difficulties," have been revived, even within the last twelve months, by persons who knew that these difficulties have been completely met. A man who superficially skims the surface of a religious topic, frequently does not hesitate to come forward with boldness, and state what he calls "his difficulties," though he would be obliged to acknowledge that he has not taken the pains to fathom them, and has no intention of going on with the intensely difficult work, which "difficulty" answering involves. I have no patience with the characteristics of that mind which goes sedulously to work to pick up difficulties, and then will not wait for their solution. For a man who seizes upon any grave subject, or matter which deserves investigation, is bound, as an honest man, quickly to let it alone, or else to grapple with it as a thinker. (Cheers).

The CHAIRMAN.—At this late hour I will not occupy your time any further than to return you my best thanks for the honour you have done me.

[The Annual Meeting being concluded, the Members, Associates, and their friends assembled in the Museum of the Society of Arts, where refreshments were served.]

ORDINARY MEETING, MARCH 16TH, 1874.

A. McARTHUR, Esq., M.P., IN THE CHAIR.

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

MEMBER :—C. Aldin, Esq., Queensbury, South-road, Clapham Park.

ASSOCIATES :—Rev. T. Aveling, Kingsland ; Rev. H. St. G. Reade, M.A., late Sch. Univ. Coll., Oxon, Head Master of the Godolphin School, Hammersmith.

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

- “Proceedings of the Royal Society.” Part 150. *From the Society.*
 “Proceedings of the Royal Institution.” Part 59. *From the Institution.*
 “On Ocean Currents.” By J. Croll, Esq. *From the Author.*
 “The Mersey Papers.” By Rev. R. Hitchman. *From the Author.*

It was further announced that, with regard to last month's discussion on the Brixham Cavern, the Geological Society had been communicated with, and had kindly arranged for inspection all the flint “implements” found in the cavern.

The following Paper was then read by the Author :—

ON THE HARMONY BETWEEN THE CHRONOLOGY OF EGYPT AND THE BIBLE. By the Rev. BOURCHIER WREY SAVILE, M.A., M.V.I.

WHEN the very learned Joseph Scaliger, animadverting on Eusebius, burst forth in a paroxysm of chronological enthusiasm, “Hail venerable Olympiads, ye guardians of time, ye vindicators of the truth of history, ye bridlers-in of the fanatical license of chronologists !” he bore witness to the

immense importance of every nation possessing an authoritative era for computing the records of the past, and as a guide to unborn generations in the future.

2. Probably at no period has there ever been such a variety of conjectures concerning the age of man on earth as those put forth by the learned in the present day. The late Baron Bunsen contended that "man existed on earth about 20,000 B.C., and that there is no valid reason for assuming a more remote beginning of our race."* Mr. Jukes, a distinguished English geologist, places the age of man at 100,000 years. Professor Fühlroth affirms in his work, "Der fossile Mensch aus dem Neanderthal," that "it reaches back to a period of from 200,000 to 300,000 years." Dr. Hunt, the late President of the Anthropological Society, not content with the comparatively modest chronology of the Brahmans, which allows the human race an antiquity of 4,300,000 years, according to Sir William Jones, affirms that man has really existed on earth for the prolonged period of 9,000,000 years! While Professor Huxley, though cautiously declining to commit himself by naming a definite number of years, having affirmed in his lecture "On the Fossil Remains of Man," that the human race was existing "when a tropical Fauna and Flora flourished in our Northern clime," *i.e.* during the Carboniferous era, we might fairly credit his theory concerning the antiquity of man with 9 or even 90,000,000 of years! Indeed, in his speech at the Norwich meeting of the British Association, he asked his audience if the distribution of the different types of skulls did not "point to a vastly remote time when the distant localities, between which there now rolls a vast ocean, were parts of one tropical continent? And if so, does it not throw back the appearance of man on the globe to an era *immeasurably more remote than has ever yet been assigned to it by the boldest speculators?*" †

3. I need scarcely point out not only the extreme variety of these conjectures, but also the extreme want of anything like reason to induce our acceptance of them. The learned of

* *Egypt's Place in Universal History*, iii. xxviii.

† A French speculator boldly declares that "The horse was killed and eaten in Europe before having been made a domestic animal for the use of man, from the commencement of the quaternary (*i.e.* the post tertiary) up to the period termed the age of bronze; that is to say, during a period which cannot be estimated less than 300,000 years."—*Les Origines du Cheval domestique*, par C. A. Piétrement, quoted by M. Chabas in his *Etudes sur l'Antiquité Historique, d'après les Sources Egyptiennes*, pp. 1, 2,

ancient times held very different views respecting man's antiquity. Bishop Newton, in his 14th "Dissertation on the Prophecies," mentions "an old tradition both amongst Jews and Christians, that at the end of 6,000 years the Messiah should come and the world be renewed," apparently assigning that period to man's age on earth. This view appears to be confirmed by the epistle ascribed to Barnabas, who writes: "Consider, my children, what that signifies—God finished them in six days, which means that in 6,000 years the Lord God will bring all things to an end."

4. Hence the natural anxiety which has been manifested by so many to ascertain the age of the human race since the creation of our first parents in Paradise; for I dismiss, as totally beside the mark, the question of the age of the world, which so many confound with the antiquity of man. How wide the variations of different chronologers are in respect to this may be seen in Hale's "New Analysis of Chronology"; where upwards of 120 different opinions are given, and which the writer says "might be swelled to 300," while in his own list the difference is so great that the first exceeds the last no less than 3,268 years.

5. Although the chronology of Scripture points distinctly to a period of about 6,000 years since the creation of man I purposely avoid entering upon the difference between the Hebrew and the LXX. chronology, though I unhesitatingly give my preference to the former), it is to the age of man since the Noachian flood that we have now to consider. And the arguments in favour of the Hebrew chronology, confirmed, as I shall endeavour to show, by that of Egypt, may be summed up under the following heads:—

(a.) The actual number of the present population of the world would, according to the calculated rate of increase from the three sons of Noah on their exit from the ark be reached in between 4,000 and 5,000 years.

(b.) The comparatively modern date of arts, sciences, and inventions.

(c.) The low date of all *authentic* history, whether Egyptian, Babylonian, Assyrian, Indian, or Chinese, none of which can be traced earlier than B.C. 2400. Champollion considered that "no Egyptian monument was really older than B.C. 2200;" and certainly Egypt affords the earliest positive evidence of man's existence on earth. *

* It is a curious fact that in the celebrated letter, which Alexander the

(d.) The moral reasoning which forbids the supposition of so vast a period of gloom and barbarism as the theory of the opponents of Scripture chronology demands.

6. It may be well, therefore, to mention that of the two most distinguished chronologers of modern times, Archbishop Usher and Clinton, the author of "Fasti Hellenici," while both alike reckon a period of 1,656 years, from Adam to Noah, the former dates the fall of man at B.C. 4004, while the latter places it as B.C. 4138, the difference between the two computations resting upon the exact interval between the Exodus of Israel and the building of Solomon's Temple; and I shall presently ask your attention to some Egyptian evidence on this much controverted portion of Scripture chronology.

7. I conclude we are all agreed in considering that the absence of any definite eras in very early times is the cause of the endless disputes on the subject of ancient chronology. With the exception of one instance, mentioned in 1 Kings vi., respecting *the era of the Exodus*, as it might be termed, but which I shall have occasion to show is certainly not Scripture, and the recently discovered *era of Noubti* amongst the monuments of Egypt, referring to a period somewhat earlier in the world's history, we have no evidence before the eighth century B.C. of the ancients having adopted any plan so simple for correcting chronology as that of the system of *eras*.

8. Of the eras with which we are most familiar, and which have necessarily tended to confine the variations of chronologers within a small compass, they may all be comprised within the limit of a few centuries, and three of them appear to have come into existence within the space of less than twenty-six years.

Great wrote to his mother Olympias, with the narrative he had received from the Egyptian High Priest Leo, who had extracted the same from the national archives, a term of 5,000 years is assigned to the Assyrian kingdom, while in the more authentic Greek history only 1,300 years are reckoned for the same period. So the Egyptian chronology gives 8,000 years to the duration of the Persian empire, counting to the time of Alexander, while among the Greeks only seven centuries are allowed for the same. St. Augustine, who records this, suggests a possible explanation that "the Egyptians are said to have formerly reckoned *only four months to their year*," though even this reckoning would make the Egyptian chronology longer than the Grecian. From which Augustine wisely concludes that if this "differs widely in this matter of chronology from the credible account, how much less can we believe these documents, which, though full of fabulous and fictitious antiquities, sceptics would fain oppose to the authority of our well-known and divine Books of Scripture."—Augustine's *City of God*, lib. xii. c. 10.

The well-known Greek era of the Olympiads is reckoned from B.C. 776; the still better-known Latin era A.U.C.—*i.e.* the building of the city of Rome—is computed, according to Varro, as B.C. 753; or, according to Fabius Pictor, as B.C. 747,—the very year on which the Babylonian era of Nabonassar, according to the canon of Ptolemy, commenced. The era of the Seleucidæ is dated from B.C. 312; and our own era, which was invented by the Roman abbot Dionysius Exiguus, who flourished towards the close of the sixth century, is computed, as is well known, from January 1, A.D. 1, though, probably, a few years after the true date of the birth of Christ.

9. Notwithstanding the existence of the eras already mentioned, and that the ancient dates (from the time of the Olympiads, *i.e.* 776 *before* to the year 238 *after* the received Christian era) have been accurately adjusted, according to the computation of Censorinus, who wrote during the last-named year, there are still differences amongst chronologers, not merely on such minor points as the true date of the conquest of Jerusalem by Titus, possibly owing to the idea of a suppressed consulship during the time of the Antonines, which necessarily affects all the intervening dates for about a century; but such important and well-established events as the birth and death of Christ have been the subject of endless differences and controversies amongst chronologers in the present day.

10. As the true date of the crucifixion is one of those points on which recent discoveries in Egypt have thrown considerable light, I shall take the opportunity of examining this matter in detail. Let me introduce this subject by expressing my full concurrence in the opinion expressed by Dr. Farmer in his valuable "Chronological Introduction to the History of the Church," in which the learned American writer seeks to prove "That our Lord's ministry began in the fifteenth year of the associate government of Tiberius, and the twelfth year of his sole reign, and was ended by His crucifixion in the nineteenth year of that associate government. That the year of our Lord's birth preceded the common Christian era six years, having taken place in the 747th of Rome, the year silently adopted by the French Benedictines in their learned work on the 'Art of Verifying Dates.'" (Preface, vii.)

11. The date of the birth of Christ was very fully considered by Nicholas Mann about 140 years ago, in his "Treatise" on that subject; and the conclusion at which he then arrived has been confirmed in a still more learned treatise published at Leipzig in 1869, by A. W. Zumpt, entitled "Das Geburtsjahr

Christi ; geschichtlich-chronologische Untersuchungen." Both works agree at fixing the birth towards the close of B.C. 7, *i. e.* six years before our Christian era ; and which accords with the overwhelming amount of evidence in fixing the date of the Passion at A.D. 29.

12. The historical testimony that the crucifixion took place during the consulship of the Gemini, a date as well ascertained as that of the Council of Nice, is, with the exception of Epiphanius, a Greek father who flourished in the fourth century, perfectly uniform. Whether we regard the earliest authorities, such as the apocryphal Greek Gospel of Nicodemus, written in the middle of the second century, or the words of Tertullian at the close of the same, who writes : " In the fifteenth year of the reign of Tiberius Christ suffered, whose sufferings were completed *within* the time of the 70 hebdomads under Tiberius Cæsar, Rubellius *Geminus* and Rufus *Geminus* being consuls, in the deviating of March at the time of the Passover ; " * the undeviating testimony of history shows that the Passion took place in the year which answers in our era to A.D. 29.

13. The testimony of Tertullian is peculiarly valuable on this point ; not only because he wrote of an event so comparatively near to his own time (which might be compared to an historian of the present day mentioning the time when the Hanoverian dynasty ascended the British throne), and he tells us that the " *Acta Pilati* " † was his authority for the statement, but also because he enters into such minute details, which agree to the year A.D. 29, and to that year alone. Thus, the singular fact that both the consuls on that memorable year bore the same name must have been well known to the primitive Christians, and handed down by tradition unto the time of Tertullian—the truth of the crucifixion having taken place during the month

* Tertullian *Advers. Jud.*, § 8.

† The Romans possessed something like our *Annual Register* in their *Acta Senatus* and *Acta Divina Populi* ; as it was customary for the provincial governors to send the acts of their governments to Rome for the Emperor's use. Hence Pontius Pilate sent to Tiberius an account of the crucifixion, to which Justin Martyr alludes in his *First Apology*, written about the middle of the second century, saying, " And that these things were so done you may know from the *acts* made in the time of Pontius Pilate." So Tertullian in his *Apology*, written a few years later, when speaking of the crucifixion, resurrection, and ascension, says, " Of all these things relating to Christ, Pilate himself, in his conscience already a Christian, sent an account to Tiberius, then Emperor." (*Apol.*, c. 21.)

of March not only agrees with the testimony of St. John (xviii.) that "it was cold" during that period, but also with the fact that those Christians, who commemorated the crucifixion as an anniversary, observed it as late as the fourth century, on the 17th of March*—and I shall endeavour to show presently, by the aid of an Egyptian monument, how exactly the further test of Tertullian "within the time of the 70 hebdomads" is fully confirmed.

14. One more testimony, much earlier than that of Tertullian, as to the true date of the crucifixion, is to be found in the records of a nation detailing contemporary events. Eusebius, the great ecclesiastical historian of the fourth century, states that he had discovered certain letters from the King of Edessa addressed to Jesus Christ, which, he says, "were taken by himself from the archives of that city and translated, word for word, from the Syriac language." After quoting these letters in full, Eusebius goes on to say that "the following things are subjoined in the Syrian tongue," viz., that after the ascension the Apostle Thaddeus was sent to Edessa, where he performed many miracles, &c.; adding these words, "this was done in the 340th year," i.e. of the era of the Seleucidæ, which synchronizes with the year of our era A.D. 29.†

15. The allusion of Tertullian to the crucifixion having occurred "within the time of the 70 hebdomads" refers to the famous prediction of the prophet Daniel, that "the Messiah was to be cut off" at a certain period in the history of Israel, and which caused pious Jews, like Simeon and Anna, to be "waiting for the consolation of Israel" at the time of our Saviour's birth. Thus we read in Daniel ix. 26, how it was foretold that, counting from the time of the issue of a certain decree for rebuilding the broken-down walls of Jerusalem, there should be 7+62, i.e. sixty-nine weeks of years, or what Tertullian calls "hebdomads," which equal 483 years, at the expiration of which the Messiah would be cut off, i.e. put to death by crucifixion at Calvary. That such is the meaning of this famous prophecy, on which, as Sir Isaac Newton is reported to have

* Epiphanius says that the Christians, nicknamed *Quartadecimans*, who observed Easter as the Apostles and the primitive Christians did, "kept their Pasch on the 15th of the Kalends of April (i.e. March 17), grounding their reasons for so doing upon certain information contained in the *Acta Pilati*, respecting the day of our Lord's crucifixion." (Epiphanius, *Hæc.* 50, *Quart.* n. 11.)

† Eusebius, *Eccles. Hist.*, i. ch. xiii.

said, "the Christian religion rests," we may gather from comparing the expression in Daniel, "after the sixty-two weeks shall Messiah be cut off," with the words of our Lord when speaking of His own resurrection—"after three days and three nights," at the expiration of which period He would, as He had foretold, rise again. Even so at the expiration of the sixty-nine weeks or hebdomads* the Messiah would be cut off.

16. The difficulty which commentators have had to contend with in the interpretation of this prophecy, so far as it relates to "the cutting off of the Messiah" at the expiration of the sixty-nine hebdomads or 483 years from the time of the decree for building the walls of Jerusalem, has been the impossibility of reconciling the usual dates for the accession of King Artaxerxes, who granted the decree, with the requirements of the prophecy. Scripture shows that there were four edicts granted to the Jews after the Babylonish captivity by certain Persian kings, viz. by Cyrus, Darius Hystaspes, and two by Artaxerxes Longimanus in the seventh and twentieth years of his reign. Of these four edicts the first three relate exclusively to the building of the Temple, and the order of public worship therein.† The fourth edict, viz., that granted in the twentieth year of Artaxerxes, and so fully detailed in chapters i. and ii. of Nehemiah, alone relates to the building of the city and the broken-down walls of Jerusalem, and consequently it must be this decree with which the prophecy of Daniel is at all concerned.

17. It is most important, therefore, that we should find the true date for the accession of Artaxerxes, from which the Scripture writers, like Ezra and Nehemiah, evidently date the beginning of his reign, and this we are enabled to do by the modern discovery of an Egyptian monument, which throws light upon an important point of history in a very singular way. Archbishop Usher, and Whiston, a learned divine who wrote much on prophecy at the commencement of the last century,

* It is important to notice an unfortunate omission in our English Bible of the definite article in this passage of Daniel, which reads "after 62 weeks" in place of the undoubted Hebrew reading "after the 62 weeks," showing a reference to the 7 weeks mentioned immediately before, and proving that it included the whole period of the 69 weeks or hebdomads. It is, therefore, worthy of note that the LXX., Aguila's version, and the Arabic, all repeat the word "seven" in this verse, and read it thus:—"After the 7 and the 62 weeks."

† Cf. Ezra i. vi. vii.

alike held the opinion that Artaxerxes ascended the throne some nine years earlier than the date (B.C. 465) commonly assigned to that event, according to Ptolemy's canon, for which they had the following evidence. Thucydides, who was born B.C. 471, and who may therefore be regarded as a contemporary writer, states that when Themistocles fled from Greece to Asia "in the company of a certain Persian, he sent letters to Artaxerxes, newly come to the kingdom," in which he referred to his own duty as ruler of the Athenians "in resisting thy father, Xerxes, who invaded me," &c.* Plutarch, in his "Life of Themistocles," relates that Charon, of Lampsacus, affirms the same thing, and that "the opinion of Thucydides seems most agreeable to chronology." Now, it would require a very prolonged investigation of the internal evidence of the history of Thucydides, who gives no dates, to discover the exact year for the flight of Themistocles; we must, therefore, be content with the statement of Eusebius, who states in his "Chronicon"† that it took place in the fourth year of the 76th Olympiad = B.C. 473, *i.e.* eight or nine years earlier than the date of Artaxerxes' accession according to Ptolemy's canon.

18. Now, this conclusion has been confirmed in a remarkable manner by some Egyptian monuments, which are very clearly represented in Burton's "Excerpta Hieroglyphica." I believe the late Dr. Hincks, so distinguished for his skill in deciphering the cuneiform inscriptions, was the first to call attention to the importance of the monuments at Hammamat, on the Cosseir road, or highway from Persia to Egypt, near the Red Sea. They were erected by a Persian official named *Artemis*, who records that he "held office in Egypt during five years of Cambyses, thirty-six years of Darius, and *twelve years of Xerxes*." Although this is no proof that twelve years, in place of the twenty years assigned to him in Ptolemy's canon, was the full extent of Xerxes' reign, it appears to support the view that according to some *twelve years* was the extent of his sole reign, as is fully confirmed by another monument at the same place, which speaks of the sixteenth year of Xerxes and the fifth year of his son Artaxerxes as connumerary years. I think this certainly proves the truth of Whiston's theory, who says, "about the twelfth year of Xerxes he made his youngest son Artaxerxes king-regent, under the direction of his prime minister

* Thucydides, *Hist. of Grec. War*, i. § 137.

† Olymp. LXXVI. iv. Themistocles in Persas fugit (*Euseb. Pamphili Cæsariensis Chronicon. Divo Hieronymo Interpret.* Basil. anno 1535.)

Artaphanes. Nine years later, Artaphanes sought to set up for himself, having a sort of regent power for seven months; was slain by Artaxerxes, who thereby had a *second* beginning of his reign, as he would have a third at the time of his father's death; Thucydides taking the first as reckoned at Greece; Ptolemy's canon the second, as reckoned at Babylon, and Josephus the third."* That a different mode of reckoning the accession of various kings in ancient times by sacred and secular historians alike, may be seen in the several instances of Nebuchadnezzar, Tiberius, and Augustus Cæsar.

19. The result of this investigation appears in what has been already set forth, that Nehemiah, the cupbearer of King Artaxerxes, dates the accession of his master to the throne in the same way as Thucydides and Charon of Lampsacus, and not according to the usual computation of Ptolemy's canon. Assuming then that Artaxerxes was taken into partnership with his father in the twelfth year of Xerxes' reign, B.C. 474, the twentieth year of the son's associated reign, when the decree was granted to Nehemiah to rebuild the broken-down walls of Jerusalem, must be reckoned at B.C. 455; and as Nehemiah tells us he received the commission "in the month *Nisan*," the same as the more ancient name of *Abib*, the first of the Hebrew months, in which the Passover was observed, we may fairly suppose that it was at the time of the Passover that Nehemiah received the decree so favourable to his own people from the king. Bearing then in mind the prophecy of Daniel, that from the issuing of such a decree to the cutting off of the Messiah was to be a prolonged period of 7 + 62 hebdomads, or 69 in all, *i.e.*, in reality 483 years, we may easily calculate that period from the Passover B.C. 455, and we are brought to the Passover A.D. 29, when, as I have shown on historical testimony, the crucifixion took place. It is somewhat remarkable that in these two years the Passover was celebrated on exactly the same day. According to the astronomical tables, the new moon (by which the Jews regulated the beginning of the year) commenced in the years B.C. 455 and A.D. 29, on the 4th of March; consequently the 14th day of the Moon, when the Passover was kept, must have fallen in both those years, on what answers to our 17th of March, the

* Whiston's *Literal Accomplishment of Scripture Prophecies*, p. 73. Archbishop Usher in his *Annals*, and the learned Petavius in his *Rationar. Temp.*, par. ii. p. 154, alike adopt the same conclusion respecting the accession of Artaxerxes as being eight or nine years earlier than the canon of Ptolemy allows.

day on which, according to some of the early Christians,* the crucifixion really took place.

20. Remembering that this interpretation of a very famous prophecy has been confirmed by the valuable testimony of the Egyptian monuments, I propose to ask your attention to the further confirmation which those monuments afford to the truth of Biblical chronology, as understood by the ancient Hebrews; and inasmuch as this is rather a complicated subject, I would select a particular point in Egyptian history for the purpose of testing how far the chronologies agree, and then calculate backwards and forwards in order to prove further agreement in the same.

21. Although it is commonly said that sacred and secular chronology do not come into contact until the time of the Babylonish Captivity, *i.e.* during the sixth century B.C., when one, as it were, ends, and the other has its more certain beginning, almost all chronologers are agreed that an event as early as the building of Solomon's temple is a fair starting-point on which the various computations may be said to rest. Scripture chronology places the date of that event at B.C. 1014, which is confirmed by secular chronology in this way. It is a well-ascertained date that Carthage was taken and destroyed by Scipio in the fourth and last year of the third Punic war, which answers to B.C. 146. Solinus and Cato both say that Carthage had then existed 737 years, which would fix the date of its building at B.C. 883. Menander, the Ephesian (who, according to Josephus,† "wrote the acts done both by the Greeks and Barbarians under every one of the Syrian kings," in whose annals the building of Solomon's Temple is specially mentioned as having occurred during the reign of Hiram, King of Tyre, in accordance with the historical statements of 1 Kings v.), gives 155 years from the building of Carthage to the commencement of Hiram's reign, which would bring that event up to B.C. 1038. Hiram reigned, according to Menander, for a period of thirty-four years, and his reign would therefore terminate B.C. 1005. It is quite clear from Scripture, that Hiram was contemporary with both David and Solomon for several years; and according to this computation it must have been in the twenty-sixth year of his reign, which synchronized with the fourth of Solomon's, that the Temple of Jerusalem was begun to be built. Bunsen, who has gone into this matter with very deep research, and based

* The Quartadecimans, see note to end of § 13.

† Josephus, *Contr. Apion.*, lib. i. §§ 17, 18.

upon a different mode of computing the event, concludes that "the year B.C. 1014 is proved to be the year of the building of the temple on coherent critical grounds, and differs very little from the ordinary computation."*

22. Having thus ascertained the date of the building of Solomon's Temple, I proceed to point out the remarkable synchronism it affords to the chronologies of Israel and Egypt. The first step in this investigation is to ascertain the exact date of the Exodus of the Israelites under Moses, from their Egyptian bondage. If we accept the authorized version of 1 Kings vi. 1, as the correct reading, all dispute amongst those who believe in the infallibility of Scripture must be at an end; for in this verse (the sole instance of any mention of an era, alluded to or hinted at in Holy Writ) it is stated that "in the 480th year after the children of Israel were come out of Egypt, in the fourth year of Solomon's reign over Israel, in the month of Zif, he began to build the House of the Lord."

23. Counting 480 years from the year B.C. 1014, the date of building Solomon's Temple, we are brought to B.C. 1494, as the time of the Exode, according to what appears to many to be Scripture authority. But we have conclusive evidence that the words "in the 480th year," etc., are an interpolation as late as the third or fourth century of the Christian era. For, first, it does not agree with the summation of years given in the Old Testament, especially a passage in Judges xi. 26, which shows that in the time of Jephthah, the children of Israel had then been occupying the land of promise upwards of "300 years," which would leave only fifty-six years for the interval between Jephthah and Saul, in place of between one and two centuries, such as the book of Judges teaches. Nor does it agree with the chronology of the New Testament, as we find St. Paul distinctly declaring that the rule of the Judges alone until Samuel, lasted "about the space of 450 years" (Acts xiii. 20). Secondly, None of the Jewish writers, such as Demetrius or Josephus, nor of the Christian fathers, such as Theophilus of Antioch or Clement of Alexandria, could have known of such a passage, for their chronology of that period is essentially different. Thirdly, Origen, probably the best authority of the true text of Scripture of his own age, in his "Commentary on St. John," quotes Kings vi. 1, without the disputed clause as follows: "They prepared timber and stones to build the house; and in the fourth year of Solomon's

* Bunsen's *Egypt's Place in Universal History*, book iv. part v. § 1, A. IV.

reign over Israel," etc., omitting all mention of the words "in the 480th year of Exode," which clearly were not in Origen's copy of the LXX. or of the Hebrew; for had they been in either, Origen would surely have inserted them, as they are the most important words in the text. If I am not mistaken, Eusebius is the earliest authority who gives the passage in dispute; and we may therefore conclude, that between the time of Origen (third century) and Eusebius (fourth century) it had some how or other crept into the text.

24. It is certain that this disputed clause was unknown to both Jewish and Christian writers, from the fact that one and all compute a longer period between the Exode and the building of the Temple than the present Hebrew text allows. Thus Demetrius of the third century B.C., and Josephus of the first century A.D., computed the interval at 592 years; Theophilus, Bishop of Antioch in the second century A.D., at 580 years; and Clemens Alexandrinus at 573 years; showing sufficient agreement without any servile copying from each other, when there was no regular era for the period in existence, to afford the approximate estimate of the opinion of chronologers, as to what was the real interval between the Exode and the building of the Temple. And we have now a remarkable secular testimony on this very point. Theophilus, besides giving his own computation of this interval, which he places at 580 and 540 years, according to various readings, says: "There is an account among the Syrian archives about the building of the Temple in Judea, which King Solomon built 566 years after the Jews went out of Egypt."* When we recollect that Hiram, King of Tyre, materially assisted in the building of the Temple, and that Josephus mentions, on the authority of Menander, the historian of Tyre, with what care they recorded important events in their annals, we are warranted, I think, in assuming that, according to contemporary and impartial evidence at the time when Solomon's Temple was built, 566 years had elapsed since the Exodus of the children of Israel.

25. Having ascertained from secular historians the date of Solomon's Temple as B.C. 1014, by adding 566 years on similar authority, we obtain 1580 B.C. as the date of the Exode; and this may be confirmed by the following Egyptian evidence. At the time of the death of the last of Joseph's brethren, there were 126 years unexpired † of the 430

* Theophilus, *Ad Autolyc.*, lib. iii. §§ 22, 24.

† The following table exhibits the Biblical chronology of the 430 years:—

years from Abraham to the Exodus of Israel. By adding 126 to 1580 we arrive at the year B.C. 1706—the very year of a remarkable synchronism in the histories of Israel and Egypt. In the first chapter of the Book of Exodus it is recorded that “Joseph died and all his brethren and all that generation”; and then in the verse but one succeeding it is written: “Now there arose up a new king over Egypt, which knew not Joseph.” In the 6th of Exodus, v. 16, mention is made of the death of Levi, the brother of Joseph and the last living member of that generation, as we may fairly presume, at the age of 137. According to the computation of all the events recorded in Scripture as having happened during the 430 years from the call of Abraham to the Exode, Levi’s death took place B.C. 1707; and, according to Egyptian chronology, the overthrow of the Shepherd Dynasty by Pharaoh Amosis, and the rise of the celebrated eighteenth Dynasty—an event as important in the annals of Egypt as the Norman Conquest in English history—occurred, according to Manetho, as interpreted by Brugsch* and others, in the following year of B.C. 1706.

26. Having thus arrived at a remarkable synchronism in the

	Year of Call.	B.C.	
Abraham’s visit to Egypt when 75	1	2010	Gen. xii. 1, 4, 10
Isaac born when Abraham was 100.....	25	1985	„ xvii. 1, 21
Isaac married Rebecca when 40	65	1945	„ xxv. 20
Jacob born when Isaac was 60	85	1925	„ xxv. 26
Abraham’s death at 175	100	1910	„ xxv. 27
Joseph born when Jacob was 91	176	1834	„ xlv. 6; xlvii. 9
Joseph sold into Egypt at 17.....	193	1817	„ xxxvii. 2
Isaac’s death when Joseph was 29	205	1805	„ xxxv. 28
Joseph Viceroy of Egypt when 30	206	1804	„ xlv. 46
End of the seven years of plenty	213	1797	„ xlv. 29, 47, 54
Jacob in Egypt in the second year of famine	215	1795	„ xlv. 6
Jacob presented to Pharaoh when 130...	215	1795	„ xlvii. 9
Jacob’s death when 147	232	1778	„ xlvii. 28
Joseph’s death when 110	286	1724	„ i. 26
Death of Levi, Joseph’s brother, when 137	303	1707	Ex. i. 6; vi. 16
Rise of the king who knew not Joseph...	304	1706	„ i. 8
Moses born	350	1660	„ ii. 1, 2
Moses flies to Midian when 40	390	1620	Acts vii. 23
The Exodus when Moses was 80	430	1580	Ex. vii. 7

* *Histoire d’Egypte*, par Henri Brugsch, Canon. Chron. des Rois d Mènes jusqu’à Nectanebos II.

histories of Israel and Egypt, I proceed to trace back the chronology of those nations from the earliest times in order to show how they mutually confirm and support each other. And to those who deny the application of Pharaoh Amosis to the "new king which knew not Joseph," as recorded in the book of Exodus, I will ask them to give due weight to the argument derived from *chronology* both before and after the time of the Exode in favour of its truth; as also to the argument from *history* which has been so ably set forth by my friend Canon Cook in his valuable *Excursus* on Egyptian matters, given in vol. i. of the "Speaker's Commentary of the Bible."

27. Having ascertained the date of the Exode as B.C. 1580, we count back the 430 years spoken of in Exodus xii. 40, in order to arrive at a Scripture date for the call of Abraham, and which must be dated as B.C. 2010. But as this relates to the duration of the sojourning of the Israelites in Egypt, it will be necessary to examine the text with some care in order to ascertain the exact meaning of Scripture on this important point. The authorized version, as a translation of the Hebrew, reads the passage thus: "Now the sojourning of the children of Israel, *who dwelt in Egypt*, was 430 years." And as some have contended that this means the Israelites were actually in bondage to the Egyptians during the whole of that period, it may be well to point out that our present reading does not necessarily imply this, for it merely asserts that though their "sojourning" lasted for 430 years, it was only during a portion of that time that they dwelt in Egypt; which view is confirmed by the inspired writer of the Epistle to the Hebrews (xi. 9), who says: "By faith Abraham *sojourned* in the Land of Promise, *as in a strange country*, dwelling in tabernacles with Isaac and Jacob, the heirs with him of the same promise." And this view is confirmed by the reading both of the Samaritan Pentateuch and the LXX. version, all of which MSS., as the learned Kennicott* in his celebrated "Dissertation" has pointed out, are uniform on this matter, and read the text as follows: "Now the sojourning of the children of Israel, *and of their fathers, when they sojourned in the land of Canaan and in the land of Egypt*, was 430 years." The New Testament confirms this reading by St. Paul's assertion in Galatians (iii. 16, 17), that "the promises to Abraham and his seed were confirmed by the law (given at Sinai), which was 430 years *after*" they had been first made.

* Kennicott, *Dissert.*, ii. pp. 164-5.

28. That the Jews of all ages so understood the text may be seen by this. Demetrius,* who flourished in the third century B.C., reckons 215 years from the call of Abraham to the going down into Egypt, 135 years from this last epoch to the birth of Moses, and 80 years from that to the Exode, which adds up, $215 + 135 + 80 = 430$. Josephus, in the first century A.D., expressly says that "the children of Israel left Egypt in the month Xanthicus, on the 15th day of the month, 430 years after our forefather Abraham came into Canaan, but 215 years only after Jacob removed into Egypt."† Both the Talmuds ‡ speak of the sojourning of the Israelites as including that "in Egypt and in all lands" besides. Aben Ezra interprets the words, as also does Joseph Ben Gorion, a Rabbinical writer of the tenth century, in the following way: "The sojourning of the children of Israel in Egypt and in other lands was 430 years. Notwithstanding they abode in Egypt only 210 years, according to what their father Jacob told them—'descend,' which in Hebrew signifies 210. Furthermore, the computation of 430 years is from the year that Isaac was born, which was the holy seed unto Abraham."§

29. The testimony of the early Christian writers is to the same effect. Eusebius|| distinctly says that it is "by the unanimous consent of all interpreters" that the text should be so understood. Augustine,¶ in his forty-seventh question on the book of Exodus, as well as in his work "On the City of God," taught that the 430 years included the sojourn in Canaan as well as in Egypt. And the historian Sulpicius** Severus says "from the entrance of Abraham into Canaan until the Exode were 430 years." These Christian interpreters of the Old Testament doubtless understood an argument, which some in the present day have strangely overlooked, that if the 430 years is to be counted only from the time of Jacob's descent into Egypt until the Exode, *the mother of Moses would have borne him 262 years after her father's death*, according to the Biblical computation, which all admit is a physical impossibility. On which Clinton has justly observed: "Some writers have very

* Demetrius, apud Euseb. *Præp. Evang.*, ix. 21, p. 425.

† Josephus, *Antiq.*, ii. xv. § 2.

‡ T. Hierosol. Megillah, fol. 71, 4. T. Babyl. Megillah, fol. 9, 1.

§ *Historie of the latter Tymes of the Jewes Common Weal*, by Joseph Ben Gorion. Translated by Peter Morwing. Oxford, 1567, pp. 2, 3.

|| Eusebius, *Chron. Canon. Liber Prior*, § 19.

¶ August., *De Civitat. Dei*, lib. xvi. § 24.

** Sulpic. Sever., *Hist. Eccles.*, I. xxvi. 4.

unreasonably doubted this portion of the Hebrew chronology, as if it were uncertain how this period of 430 years was to be understood. Those who cast a doubt upon this point refuse to Moses, an inspired writer—in the account of his mother, and father and grandfather—that authority which would be given to the testimony of a profane author on the same occasion.”*

30. Accepting, then, the date of 1580 B.C. for the time of the Exode, and counting back 430 years, we obtain the time of the call of Abraham as B.C. 2010. According to the Hebrew chronology, the call of Abraham bisects the whole interval between the Deluge and the Exode; and thus by counting back another 430 years we arrive at B.C. 2440 as the Biblical date for the Noachian Flood. And I think we have some incidental secular testimony in confirmation of the same. In the Chinese “Annals” it is stated that a conjunction of the planets Mars, Jupiter, Saturn, and Mercury in the constellation termed “*Shi*,” was assumed by the Emperor Chuen-hio as a very important epoch in the history of the world; and it has been discovered by the astronomer De Mailla that such a conjunction did take place on February 9th, B.C. 2444. † I do not lay any undue stress upon this synchronism, but think it possible that it may have a bearing upon the harmony between the chronologies of Israel and Egypt in a way which I propose now to endeavour to prove.

31. Although there is no positive evidence on any Egyptian monument (as there is of the Biblical record of the Temptation) that the Egyptians knew the story of the Deluge, it is more than probable that they had some tradition concerning it. In that remarkable work known as “The Book of the Dead,” which has been so skilfully translated by my learned friend Dr. Birch, of the British Museum, in the fifth volume of Bunsen’s work on Egypt, we find frequent mention of the name of Noah, variously written as *Nh*, *Nuh*, and *Noa*, who was worshipped in Egypt as “the god of water,” and who has been identified by Dr. Birch with the deified man who was entitled “the father of the gods,” and “the giver of mystic life to all beneath him.” According to Plutarch, the Egyptian tradition represents Noah under the last-named title; when Typhon, a personification of the ocean, enticed him into the ark, which, being closed, was forced out to sea through the Tanaitic mouth of the Nile; which things, says Plutarch, ‡

* Clinton, *Fasti Hellenici*, vol. i. p. 299, Appendix.

† See Chambers’ *Astronomy*, Oxford Clar. Press Edit., p. 42.

‡ Plutarch, *De Iside et Osiride*, § 13. Plato also, in his *Timæus*, § 5,

“were done upon the 17th day of the month *Atayr*, when the sun was in Scorpio, in the 28th year of the reign of Osiris.” We recollect that it was “in the 600th year of Noah’s life, in the second month, and the 17th day of the month, the same day,” according to the book of Genesis, that the Flood commenced. And the fact that two such different authorities as Moses and Plutarch make mention of a great Flood beginning on the 17th day of the month, seems to show that they are speaking of the same event.

32. Accepting the date of the Flood as B.C. 2440, according to the Hebrew chronology, let us consider how far this agrees with that which is deducible from the Egyptian monuments and the papyri, which throw considerable light on that early portion of the world’s history. The colonization of Egypt could not have taken place until after the destruction of the Tower of Babel and the scattering of the families and descendants of Noah over the face of the earth, which Scripture places just one century after the time of the Flood; in other words, as having taken place *circa* B.C. 2340. Now, there is an incidental confirmation of this date, which it may be well to notice. M. Oppert, it is well known, has discovered among the cuneiform inscriptions a record of the building of the Tower of Babel and the confusion of tongues, in the time of Nebuchadnezzar, who speaks of the magnificent monuments which he had erected at Babylon, and amongst them one called “the *Temple of the Seven Lights of the Earth*, the most ancient monument of Borzippa, which a former king originally built 42 ages or generations ago, but did not finish it, since which time people have abandoned it, without order expressing their words.”* If we may reckon three ages or generations in round terms to a century, and compute from the era of Nabonassar B.C. 747, which was to the Babylonians what the Christian era is to ourselves, we obtain B.C. 2343 as the approximate date for the

appears to give an intimation of the Noachian Flood having been known to the Egyptians. *Atayr*, or *Athyr*, or *Athôr*, as it is variously spelt, was the *third* month with the Egyptians, who counted *Thoth* as the first month, and was supposed to answer to parts of January and February; but inasmuch as the first month was not fixed as ours, but varied according to the heliacal rising of Sothis, we are unable to conclude anything positive from Plutarch’s mention of the name. Berosus, the Chaldean historian, mentions that “the Deity Chronos appeared to Xisuthrus (the Babylonian Noah) in a vision, and warned him that upon the 15th day of the month *Dæsius* there would be a flood by which mankind would be destroyed.”

—Eusebius, *Chron.*, v. 8.

* *Expédition en Mésopotamie*, i. 208.

building of the Tower of Babel, according to the current chronology of that land.

33. It is a significant fact that there is no authentic chronology, whether it be Chinese, Indian, Assyrian, Babylonian, or Egyptian, that can trace back to an earlier date than that which we may compute from the Hebrew, as the Scriptural date of the Flood. It is true that many nations claim a higher antiquity for their beginning than the date already mentioned; but upon examination they all fail in the matter of authenticity. And Champollion went so far as to say that he had "demonstrated that no Egyptian monument was really older than the year B.C. 2200."* Later researches have discovered monuments about one century earlier than that date; the oldest one known is unquestionably a tablet now in the Ashmolean Museum at Oxford, from the tomb of a priest named SHERA, of the second of Manetho's dynasties; and which may be approximately dated B.C. 2300.†

34. The mention of Manetho's name will naturally lead us to consider how far his chronology is to be received as an authentic witness to what the Egyptians believed to be true. Notwithstanding the high estimation in which Manetho was held by the late Baron Bunsen, who considers him far more trustworthy than all the sacred writers put together, going so far as to say: "Truth have I sought at thy hand; truth have I found by thy aid;"‡ it may be proved without difficulty, from both the monuments and the papyri, as well as from his fellow-historian Eratosthenes, that in all that relates to the early chronology of Egypt, Manetho is perfectly unreliable; and until we come down to the time of the eighteenth Dynasty, either from the imperfect way by which the few fragments of history which bear his name, have been preserved, or from some other cause, there is no dependence upon him whatever. And, in order to show this, it may be sufficient to mention that in his first book, which contains all that we have of history of the first eleven dynasties, he gives a list of 192

* *Ancient Egypt: its Monuments and History*, p. 56.

† Some consider that the Pyramid of Degrees, of which there is a relic in the Berlin Museum, is older than the Oxford Tablet, assigning its age to the time of ATA, the fourth king of the first Dynasty; but there is no record or king's name to tell us in whose time this pyramid was built; whereas the Oxford Tablet contains the name of King SENTA, the thirteenth name on the list of kings in the Tablet of Abydos, which answers to the fifth king of Manetho's second Dynasty.

‡ *Egypt's Place in Universal History*, ii. 392.

kings, who "reigned during a space of 2,300 years and 70 days," making three of the kings of the sixth Dynasty reign on an average over sixty years each; while in the seventh Dynasty he mentions seventy Memphite kings, who altogether reigned only "seventy days"!

35. There are no less than three authentic testimonies which are completely subversive of what I cannot refrain from calling a wild and impossible theory. The newly-discovered Tablet of Abydos, which happily has that portion perfect that is wanting in the old Tablet of Abydos, which has so long adorned the walls of the British Museum. For the first eleven dynasties, the new tablet gives a list of fifty-eight kings in place of Manetho's 192; and inasmuch as other Egyptian monuments confirm the testimony of the tablet, we have in that "Sermon in Stones" a far earlier as well as a far more accurate witness to the chronology of Egypt. The tablet was erected by Pharaoh Seti, the head of the nineteenth Dynasty, in the fifteenth century B.C., whereas Manetho lived in the third century B.C., and therefore twelve centuries later.

36. If the Tablet of Abydos is subversive of Manetho, in respect to the number of kings before the time of the twelfth Dynasty, the Turin papyrus is no less so in regard to the duration of their reigns. For it states that from the time of Menes, the proto-monarch of Egypt, and the same as Mizraim, the grandson of Noah, according to Syncellus, there were only 355 years in place of "the 2,300 years and 70 days" specified by Manetho; for the Tablet of Sakkarah discovered by Mariette, like the tablet already mentioned, shows that in the order of succession the sixth Dynasty is immediately followed by the twelfth. All the Tablets in Egypt containing lists of the Pharaohs, may be compared to the series of English sovereigns, such as they are represented in the painted windows of the House of Lords or the figures on the walls of the Crystal Palace. It would be a strange perversion of lost history and chronology if any one were to assert that during the Caroline era several centuries had been omitted from the domain of history. Yet some of our Egyptologers have no hesitation in asserting that the rule of the Shepherds, whose names are omitted from the Tablet of Abydos, lasted some thousands of years in place of about a century, the authentic duration of that Dynasty, which Bunsen computes at 920 years. Lepsius reduces the period to 500 years,* while De Rougé elon-

* I would suggest the following considerations as a possible solution of this difficult question; viz., the duration of the Shepherd Dynasty in Egypt, which Lepsius estimates at 500 years, upon the grounds I conclude

gates it to 2,017 years. Such speculations can only be compared to the case of a foreigner, like M. Guizot, who has so ably written the history of the Commonwealth, if he were to speculate on its duration as having been either five or ten, or twenty centuries! For had the Shepherds reigned in Egypt as long as De Rougé supposes, they would have ceased to have been regarded as foreign conquerors, just as our Plantagenet kings were within two centuries after the Norman conquest. The impossibility of De Rougé's theory may be estimated by supposing the descendants of Julius Cæsar to have been ruling in England since the first Roman invasion, and the present generation of Englishmen, headed by a descendant of the ancient British kings, rising in rebellion against them, and expelling them from the country in consequence of their being foreigners!

37. The testimony of Eratosthenes, the celebrated librarian of Alexandria under Ptolemy Fuergetes, is in direct conflict with the chronology of his contemporary Manetho, as may be thus shown. Eratosthenes gives 986 years from the time of Menes, the proto-monarch of Egypt, to that of Pharaoh Nilus, whom Herodotus (II. 3) calls the son and successor of Rameses the Great. Dicaearchus, a Greek historian of the fourth century B.C., says, "From the time of Pharaoh Nilus to the 1st Olympiad there were 436 years."* Supposing Dicaearchus refers to the time when the Olympic games were first instituted by Iphitus, B.C. 884, this chronology would give 1320 as the date of the reign of Pharaoh

of the following fragment of Manetho's history respecting the Sixteenth Dynasty, "Of thirty-two Hellenic Shepherd Kings who reigned 518 years." There are grounds, from the little which Herodotus says respecting the building of the Great Pyramid of Ghizeh, that "Philition a shepherd, who at that time fed his flocks about the place," had something to do with the building of it. (See *Herod.*, lib. ii. ch. 124—128.) Now there are reasons for supposing that there were several invasions of Egypt by the Shepherds; and all that we can gather from the fragments of Manetho's history which have come down to us is just this; viz., that they are met with for the FIRST time in Egyptian history at the epoch of the building of the Great Pyramid, which for reasons given in this paper may be dated B.C. 2170; and, for THE LAST time, during the reign of Thothmes III., who succeeded finally in expelling them from Egypt during his reign, which began, according to Manetho, about the year B.C. 1642, or 518 years after the time when the Great Pyramid was built. I think, therefore, it is possible that Manetho, writing fourteen centuries after these events of history, may have meant by his 518 years for the duration of the "Hellenic Shepherd Kings," that they are to be found in Egyptian history both at the commencement and the termination of that period.

* Dicaearchi Mess. de Sesos. Rege Frag., as given by Bunsen in his *Egypt's Place in Universal History*, i. 712; v. 19.

Nilus, the successor of Rameses the Great, and in perfect accordance with the testimony of Eratosthenes, as well as with the general system of chronology that may be gathered from the monuments of Egypt. And if we add the 186 years mentioned by him as the interval between Menes and Pharaoh Nilus, we obtain B.C. 2309 as the date for the commencement of the Egyptian monarchy; and which approximately accords with the date for the dispersion of mankind after the overthrow of the Tower of Babel, according to our computation of the chronology of Scripture.*

38. In an event between the time of the first colonization of Egypt and the accession of the twelfth Dynasty, for which the Turin papyrus allows 355 years, we have a striking confirmation to the truth of this chronology. All authorities are agreed that the Great Pyramid of Ghizeh was built during the reign of Pharaoh Cheops, as Herodotus calls him, the twenty-first king on the Tablet of Abydos, and second king of Manetho's fourth Dynasty. The supposed age of the Great Pyramid has been calculated by Sir John Herschel, upon the assumption that the Polar Star could be seen by an observer standing in the passage leading to the chambers of that wonderful monument, and determined by him to fall within the years 2171—2123 B.C.† This theory has been further confirmed by Professor Piazzi Smyth, the Astronomer Royal of Scotland, who sums it up in the following words: "It would seem that the resulting conclusion should be in favour of a high probability, and something that *must* be admitted until more direct and positive evidence can be adduced on the opposite side—that if we could by a miracle overtake the time that is passed and revisit the Jeezeh Hill at the date of B.C. 2170,

* The best and most authentic Chinese chronology, on the authority of Confucius, gives B.C. 2334 as the commencement of the Chinese Empire. See Jackson's *Chronological Antiquities*, ii. 489.

† See Howard Vyse's *Pyramids of Ghizeh*, ii. App. p. 107; and Piazzi Smyth's *Life and Work at the Great Pyramid*, iii. 287. The following table will show the great variety of dates assigned by scholars to the building of the Great Pyramid:—

Le Suer dates it	B.C.	4975
Brugsch	"	3657
Bunsen	"	3460
Lepsius	"	3426
Poole	"	2352
Piazzi Smyth	"	2170
Palmer	"	1903
Sir G. Cornwall Lewis	"	993

Showing a difference of more than 4,000 years!

as indicated by the theory, we should certainly find some part or other of the building of the Great Pyramid then in progress; or, in other words, the operation itself would be abundantly visible from that computed point of time—even as the consequences of the operation are to be seen now, from the similarly computed point of space.”

39. Between the first colonization of Egypt and the rise of the twelfth Dynasty, the Turin papyrus allows an interval of 355 years; for we have authority in affirming that the sixth Dynasty was immediately succeeded by the twelfth; and this is a very important help towards a correct understanding of early Egyptian chronology. Mariette Bey, one of the highest of living authorities in such matters, discovered at Memphis a priest's tomb containing forty cartouches showing that the twelfth Dynasty was in immediate sequence to the sixth; all the intermediate ones mentioned by Manetho, which add so many years to his prolonged and incredible system of chronology, occupying the same position as our Saxon kings during the Heptarchy previous to the monarchy of Alfred the Great.

40. Osburn, in his “Monumental History of Egypt” (vol. i. ch. vii.), has adduced strong evidence in favour of Abraham's visit to Egypt occurring just previous to the accession of the twelfth Dynasty; and, according to our Biblical chronology, about the year 2010 B.C. Josephus, who lived when the temple records of Egypt still existed, relates that Abraham taught the Egyptians “arithmetic and the science of astronomy, for before he went to Egypt they were unacquainted with that sort of learning.”* Berosus and Eupolemus, both of whom flourished about three centuries before Josephus, confirm this statement respecting Abraham. And Osburn states that there does not exist a single record of any Pharaoh, or subject *with a date* previous to the time of Pharaoh Amenemes I., head of the twelfth Dynasty, whereas tablets belonging to his reign with dates inscribed upon them are not uncommon. Now in the sepulchral grottos of Bennee Hasan, on the banks of the Nile, there are still to be seen certain inscriptions belonging to the early kings of the twelfth Dynasty. Special mention is there made of what is termed “The Panegyry or Festival of the First Year”; which Poole† considers to refer to the commencement of the *tropical cycle*, *i.e.* a perfectly exact circle of the sun, moon, and vague year, and which he proves by an elaborate

* Josephus, *Antiq.*, I. viii. § 6.

† Poole's *Horæ Egypt.*, pt. i. § 11.

calculation, confirmed by the authority of Sir G. Airey, the Astronomer Royal, is fixed to B.C. 2005. By which means we obtain something approaching a synchronism between the chronologers of Israel and Egypt.

41. Believing that the commencement of the twelfth Dynasty may be approximately dated *circa* 2000 B.C., according to Egyptian chronology, and that this date agrees with the time of Abraham, according to the computation of Scripture chronology, we have the harmony of the two further confirmed on this wise. An existing tomb at Eilethya, in Upper Egypt, belonging to one of the nobles of Pharaoh Amosis, the first sovereign of the eighteenth Dynasty, who bore the rank of "Admiral of the Nile," contains a genealogical record of much importance.* The names from the time of the original founder of the family, who lived during the reign of the Pharaoh who immediately preceded the twelfth Dynasty, are recorded in regular succession from father to son through eleven descents; a descent, according to Herodotus (II. 14, 2), may be computed as a period of about 30 years; consequently, eleven descents, calculated from the time of the Pharaoh who immediately preceded the twelfth Dynasty, and which may be approximately dated at B.C. 2036, would represent a period of about 330 years, and bring us down to B.C. 1706, for the time of the conquest by the Shepherds by Pharaoh Amosis, and agrees with the date given by Brugsch and other Egyptologists, as I have before shown, for that event, as important in the annals of Egypt as the Norman Conquest is in the history of England.

42. Between the time of Abraham and the expulsion of the Shepherds from Egypt, the vicerealty of Joseph and the descent of Jacob with his sons into that country had taken place. One of the most noteworthy events connected with Joseph's rule, as recorded in Scripture, was "the seven years' famine," a matter of frequent occurrence in that land, where rain is so rarely known. Bunsen supposed he had discovered a synchronism between the chronologies of Israel and Egypt by pointing to a tomb-inscription belonging to the reign of the second king of the twelfth Dynasty, and therefore about the time of Abraham's sojourn in that country. The inscription has been deciphered by Drs. Birch and Brugsch, a portion of which reads as follows: "*When in the time of Sesertesen I. the great famine prevailed*

* Osburn, *Monum. Hist. of Egypt*, ii. 160. A full account of this important monument is to be seen in the Vicomte de Rouge's *Mémoire sur l'Inscription du Tombeau d'Ahmes, Chef des Nautoniers*.

in all the other districts of Egypt there was corn in mine."* This Bunsen pronounced to be "a certain and incontrovertible proof" of the seven years' famine in Egypt. Brugsch more wisely considers that Bunsen's conclusion is "impossible for reasons chronological,"† which seems to be the more correct view; for independent of the fact, that the reign of Sesertesen I. preceded that of Joseph's Pharaoh by fully two centuries, which compels us to reject this theory, if we note what is said in Scripture respecting the famine, we shall at once see the distinction between the two. "And the seven years' dearth was *in all lands*; but *in all the land of Egypt there was bread*. And the famine was over *all the face of the earth*. And all countries came into Egypt to Joseph to buy corn; because that the famine was so sore in all lands."‡ I can scarcely imagine that these two statements speak of the same event; for whereas the inscription specifies that the famine extended *over all Egypt*, save in that one Nome or district of which *Amenj Amenemha*, the occupant of the tomb, had been governor, Scripture records that the seven years' famine was *in all lands but Egypt*, where want was unknown through the wise provision of Joseph.

43. We have in the annals of another nation a very singular confirmation of the truth of the Scripture record respecting the seven years' famine, as well as of the time of its appearance. In the archives of the Chinese empire it is recorded that "in the beginning of the reign of *Ching-tang* there happened a drought and famine all over the empire, which *lasted seven years*, during which time no rain fell."§ According to Biblical chronology the seven years' famine in Egypt may be dated B.C. 1796—1789. According to the "Chinese chronology," the Emperor Kie, the immediate predecessor of Ching-tang, began to reign B.C. 1823, and Ching-tang died B.C. 1758. Kie is represented in Chinese history as the greatest monster of vice and cruelty ever known. His cruelties, which commenced in the nineteenth year of his reign, caused the nobles to rebel

* *Egypt's Place in Universal History*, vol. iii. p. 334. In the interesting *Memoir of Baron Bunsen*, published in 1868, his daughter writes: "My father received a communication (April 8, 1853) from Mr. Birch which greatly delighted him; that he had found an inscription on the tomb of an official in the time of Sesortosen, alluding to the *great famine* which had taken place; a confirmation of the opinion my father has held for years, that just under *that king Joseph* had lived." Vol. ii. p. 311.

† Brugsch, *Histoire d'Egypte*, p. 56.

‡ Genesis xli. 54—56.

§ History of China, collected out of Martinus, Couplet, and Du Halde, by Jackson, in his *Chronological Antiquities*, vol. ii. p. 456.

against him. And the confusion arising from the long civil war which ensued, makes the exact date of Ching-tang's reign less clear than it otherwise would be; but since the two reigns, which include a period of sixty-five years, contain the time of the seven years' famine in Egypt, we have fair grounds for assuming that in the two statements we have a record of one and the same event.

44. Mariette Bey's discovery of a stèle in the ruins of the great temple at Tanis (the Zoan of Scripture), bearing a date of "the year 400," affords further confirmation of the correctness of this chronology. The stèle was erected by Rameses the Great, in honour of "Sutech, the god of the Shepherds," in which mention is made of the 400th year of the era of Nubti at the time when the tablet was set up. Egyptologists are tolerably well agreed as to the exact meaning of the term Nubti. De Rougé considers that "the name Nubti belongs to the Dynasty of the Shepherd Kings, and that Rameses liked to trace back his genealogy to him," adding that "Nubti is the Egyptian name for the god Sutech."* I have endeavoured to show in a previous paper† the grounds for believing that *Sutech* was the national god of Syria, and that the Pharaoh who so readily recognized the power by which Joseph had interpreted his dream, saying, "*Forasmuch as God has showed thee all this,*" &c., accords with what Moses wrote—"A Syrian ready to perish was my father, and he went down into Egypt and sojourned there, &c." (Deuteronomy xxvi. 5.) Hence it is not improbable that "the era Nubti," or Sutech, may have taken its rise from Pharaoh's recognition of Sutech as "the god of the Hebrews"; and this agrees chronologically with what Egyptologists have assumed for the commencement of the Nubti era upon totally different grounds. M. Vincent, a member of the French Institute, asserts that B.C. 1801 is the exact year for the beginning of the era,‡ and Joseph's viceroyalty commenced, according to the Hebrew chronology, B.C. 1803. Now, counting on 400 years, we are brought to the date B.C. 1401, at which time all are agreed that Rameses the Great was reigning in Egypt. It is, of course, not certain when "the Nubti era" commenced, whether as I have suggested, or as Mariette considers with the commencement of the rule of the

* *Revue Archéologique*, 1864, vol. x. p. 130; and for Mariette's account of the stèle, see *Revue Arch.*, 1865, vol. xi. p. 169.

† *Journal of the Transactions of the Victoria Institute*, Vol. VI. p. 99.

‡ *Revue Archéologique*, 1864, p. 489.

Shepherds after the name of Nubti, whom he terms the Patriarch of the Shepherd Dynasty, and the same as the *Beon* of Manetho, whose name has been discovered on an Egyptian monument. Mariette Bey dissents from M. Vincent's interpretation of the Nubti era, but concludes that "we must reckon 400 years from some unknown year of Rameses the Great to an unknown year of the Shepherd King Nubti and nothing more."*

45. Between the time of Joseph's viceroyalty and the reign of Rameses the Great, *i.e.* during some year in the Nubti era, occurred that important event in the history of both Israel and Egypt, the overthrow of the Shepherd Dynasty, the rise of the king which knew not Joseph, and the commencement of the bondage of the children of Israel, from which they were released at the time of the Exode. I have endeavoured to show that the rise of this "new king" took place B.C. 1706, according to the concurrent testimony of Egyptian, Tyrian, and other secular chronologies, in agreement with that which we obtain from Scripture; and I think this a very strong argument in favour of those who contend that the Exodus took place during the time of one of the kings of the eighteenth Dynasty.†

46. I propose now to offer some more synchronisms between the histories of Israel and Egypt in order to confirm the truth of the Scripture chronology. It is much disputed as to the name of the Pharaoh in whose time the Exodus took place. Julius Africanus, in his transmission of Manetho, names *Amosis*, the first king of the eighteenth Dynasty, as the Pharaoh of the Exode. Canon Cook names Thothmes II.; Sir Gardner Wilkinson, Thothmes III.; others have considered the weight of evidence leans to Thothmes IV.; upon the grounds chiefly that his reign was a short and turbulent one, and that no trace has been found of his tomb in the royal burial-place of his Dynasty; though that of his successor, Amenophis III., is still to be seen in a valley adjoining the cemetery of the other kings.‡ Now, this may be explained either by the fact that he was drowned in the Red Sea along with the rest of his army, or, as Eusebius in the "Armenian Chronicle"§ describes him as the Pharaoh, under the Greek name of *Danaus*, who was expelled from Egypt in the fifth year of his reign by his brother; and

* *Revue Archéol.*, 1865, p. 169.

† For the arguments on both sides of this question, see Canon Cook's valuable *Excursus* in vol. i. of "the Speaker's Commentary."

‡ Wilkinson's *Thebes*, pp. 122, 123.

§ Euseb. *Chron. Canon. Liber Prior*, cap. xx.

that he fled to Greece, where he established another kingdom. Other authorities give the name of "Cecrops"* to the Pharaoh who first led a colony from Egypt to Greece. Accepting this as one of the traditional legends connected with the Exode of the children of Israel, we have a singular confirmation of the Biblical date for that important event. For the Parian Chronicle, now at Oxford, a monument of the very highest authority, inasmuch as it was engraved as early as B.C. 264, opens with this announcement: "Since Cecrops (a native of Sais, in Egypt, who led a colony to Greece) reigned at Athens, and the country was called Actica, from Actæus, the native, 1318 years have elapsed."† Now, $1,318 + 264 = \text{B.C. } 1582$, *i.e.* within two years of our computation of the date of the Exode according to the Hebrew chronology.

47. Another argument in support of this theory is to be found in the understanding of the Apis cycle. Not the least interesting or valuable of the many discoveries of Mariette Bey, so long the director of the Boulaque Museum near Cairo, are these at the Serapeum, "arising," as Bunsen justly says, "from the light shed on chronology by the sepulchral and votive tablets dedicated to the mummies of the Bull Apis from the eighteenth Dynasty to the Romans."‡ They commenced in the reign of Amenophis III., who succeeded Thothmes IV., as I have already shown, B.C. 1580; and the discovery by Mariette of sixty-four of these reminiscences of the mummied Apes, or Sacred Bulls, will give us a clue to the chronology of the period. It is well known that the Apis cycle represented a period of twenty-five years; and without attempting to enter upon the disputed question as to the exact period which each sacred Bull was permitted to live, it will be sufficient for our purpose if we notice that $64 + 25$ gives us in round numbers the sixteen centuries which intervened between the time of Amenophis III. and the Romans. But we have a more exact confirmation of the chronology in the following recorded fact. The death of the fortieth of the sixty-four Sacred Bulls is related as having taken place in the twelfth year of that Pharaoh Hophra, who is mentioned by

* Augustine says that "in the reign of Cecrops, King of Athens, God brought his people out of Egypt by Moses." (*De Civitate Dei*, lib. xviii. § 8.)

† *Marmora Arundelliana*, p. 6, Selden's edition, London, 1628. This is one of the few uninjured inscriptions when Selden published his work.

‡ *Egypt's Place in Universal History*, book i. § 1. See Bunsen's account of the Apis Cycle and the tombs of the sacred Apes, taken from Mariette's *Serapeum*, fol. Paris; *Choix de Monuments*, 4to., Paris, and other works which treat on this difficult subject.

Jeremiah as reigning at the time when those Jews (who were not carried captive to Babylon) fled to Egypt, which took place, according to our Biblical chronology, B.C. 589. Hophra reigned rather more than eighteen years, according to the concurrent testimony of Brugsch* and Lepsius, from B.C. 590—572; consequently his twelfth year would fall within B.C. 580—579. Reckoning the Apis cycle at twenty-five years from the commencement of Amenophis III.'s reign, B.C. 1580, the end of the fortieth cycle would fall in the year B.C. 580, the twelfth year of Pharaoh Hophra's reign, and the very one recorded on an Egyptian monument as the date of the death of the fortieth Sacred Bull.

48. An incident recorded by the Father of history affords, I venture to think, another possible synchronism between the histories of Israel and Egypt, in confirmation of the Biblical chronology. Herodotus (lib. ii. § 102) mentions the conquests of a Pharaoh under the name of "Sesostris" in Syria, where he erected pillars in commemoration thereof, stating that he had reduced to subjection those who withstood him by the might of his arms; but those, who submitted without a struggle, were specially designated by the proud conqueror as "a nation of women, *i.e.* unwarlike and effeminate." Sufficient remains of these memorials still exist on the rocks above the mouth of the river Lycus (now called *Nahr el kelb*), in Syria, to prove that they were erected by Rameses the Great, whose long reign (the British Museum contains a monument of his sixty-sixth year) extended from B.C. 1407—1341. On referring to Scripture, we have similar proof of the effeminacy of some of the nations of Syria at that exact period of history. For in the well-known story of Deborah—who appears to have ruled Israel for "forty years," according to Hebrew chronology, from B.C. 1361—1321, *i.e.* during the reign of Rameses the Great—when Jabin, King of Canaan, and Sisera the captain of his host came against Israel with his multitude of chariots and a mighty army, it is emphatically recorded in the book of Judges (iv. 9, 23), that they were conquered by "hand of a woman"; and it is likewise added, "So God subdued on that day Jabin the King of Canaan before the children of Israel."

49. A further confirmation of the accuracy of the Egyptian chronology during the period of the rule of the Rameses, of

* *Histoire d'Égypte*, par H. Brugsch, Canon Chronol. des Rois d'Égypte de Ménès jusqu'à Nectanebos II.; *Königsbuch der Alten Aegypter*, von C. R. Lepsius, Synoptische Tafeln der Aegyptischen Dynastien.

whom no less than twelve of that name were recognized as legitimate Pharaohs—the first two belonging to Manetho's nineteenth Dynasty, while the twentieth Dynasty was occupied in uninterrupted succession by the remaining ten. Lenormant* states, on the authority of the illustrious French astronomer M. Biot, that the commencement of the reign of Rameses III. is fixed by astronomical science to B.C. 1311, which very well accords with the date we obtain from Manetho for the beginning of that Dynasty. Palmer has called attention in his "Egyptian Chronicles" to a very remarkable confirmation of this chronology, which deserves a few minutes' attentive consideration, for it throws light on another important synchronism between the histories of Israel and Egypt.

50. Between the time of Moses and the reign of David all intercourse, as far as we gather from Scripture, had ceased. Indeed, it is not until the time of David's grandson that we have signs of intercourse between the two countries. Hence Bunsen considers that the reign of Shishak I., the first king of the twenty-second Dynasty, offers the "first certain synchronistic point in Egyptian and Asiatic history," of which we have the following proof. Scripture declares that "in the fifth year of Rehoboam, Shishak, king of Egypt, came up against Jerusalem, and he took away the treasures of the house of the Lord and of the king's house, and all the shields of gold which Solomon had made" (1 Kings xiv. 25, 26). According to the Hebrew chronology, the fifth year of Rehoboam = B.C. 971; and as Shishak began to reign B.C. 980, the ninth year of his reign, when he marched against Jerusalem, synchronizes with the fifth of Rehoboam. It is well known that Champollion discovered on the outside of the great Temple of Karnac, at Thebes, a lengthy record of the conquests of Pharaoh Shishak. Amongst them we find certain names which are to be met with in Scripture; such, *e.g.*, as land of *Mahanaim*, mentioned in Genesis xxxii. 2; the two *Bethorons*, which Solomon fortified, according to 2 Chronicles viii. 5; *Megiddo*, spoken of in 2 Kings xxiii. 29; but the most interesting of all is undoubtedly that which is read *as the kingdom of Judah*, the conquest of which Shishak records exactly as related in Scripture.

* Speaking of an instance of the Vague year of 365 days agreeing with the Solar year of $365\frac{1}{4}$ days, Lenormant says, "Les calculs de l'illustre Biot ont établi que cette coincidence rare et solennelle s'était produite en l'année 1300 av. J. C. Par conséquent nous pouvons insérer avec une certitude mathématique et absolue l'avènement de Rhamsès III. à l'an 1311."—*Manuel d'Histoire Ancienne de l'Orient*, vol. i. p. 300.

51. But it is not the historic fact, so much as the chronological synchronism which we need to prove, and this, as I have before remarked, has been very fully done by Palmer in his "Egyptian Chronicles." He calls attention to two Egyptian inscriptions, from which he draws the following conclusion. Pharaoh Shishak, before recording his conquests alluded to above, ordered the "chief architect of all Egypt for the time being to quarry stone for this purpose at Silsilis, and he recorded his sovereign's order by an inscription in the quarries, which, together with the work itself, was left imperfect at his death, but was completed by his son and successor. In this tablet, which is dated in the twenty-first year of the reign of King Shishak, the name of the chief architect to whom the order had been first given is recorded as *Hor-em-bes-ef*. Now, it is a well-known fact that in ancient Egypt it was customary for the son to inherit the employment or profession and even the dignities of the father, just as in England the office of High Constable was once hereditary in the family of de Bohun, or as that of Earl Marshal is held by the Dukes of Norfolk in the present day.

52. In another quarry on the Cosseir road, between Coptos and the Red Sea, there is another inscription dated the forty-fourth year of Amasis, who succeeded Pharaoh Hophra, and whose reign lasted until the year before the conquest of Egypt by Cambyses, which all chronologers are agreed in dating B.C. 525. In this inscription the chief architect of all Egypt of that time, by name *Aahmes-si-Nit*, has recorded on the rock the pedigree of his ancestors, who had each in turn been architects of all Egypt, going back to the twenty-fourth generation, *i.e.* twenty-three generations above his own. Now twenty-four generations calculated backwards at the ordinary rate of three to a century, would carry us up 800 years, from B.C. 525 to B.C. 1325, *i.e.* just before, as we have already seen, the reign of Rameses III. began. If, therefore, we reckon either down from that year B.C. 1325 or up from the year B.C. 525 at the afore-named rate of three generations to a century, we arrive at the years B.C. 992 to 959 for the eleventh name, which proves to be that of *Hor-em-bes-ef*, occurring just where it ought to do—*i.e.* during the period that we know from other sources Pharaoh Shishak was on the throne, and who had commanded his chief architect to record the order in the twenty-first year of his reign.

53. Palmer observes on this striking confirmation of the agreement between the chronologies of Israel and Egypt at this period of history:—" *Hor-em-bes-ef* is the chief architect of

Shishak I., named in the inscription of Silsilis as being already dead in the twenty-first and last year of that king. So *Hor-em-bes-ef* and Shishak I. may be regarded as contemporaries, representing one and the same generation from beginning to end; this generation beginning in B.C. 992, and ending in B.C. 957. And the reign of Shishak, which began according to the chronicle in B.C. 978—seemingly the later of two distinct accessions,*—ended after twenty-one years in B.C. 957; so that the chronological place and end of his reign, according to the chronicle, agrees perfectly with the place and end of his generation, according to the inscription at Hammamat. And his synchronism with Solomon and Rehoboam, according to the chronology of the Bible, is justified by both these Egyptian reckonings." †

54. These are the chief points which I have ventured to bring forward in proof of what may be fairly considered as synchronisms between the histories of Israel and Egypt, and in confirmation of what I believe to be the chronology of the Bible. I do not say the proof is perfect, nor do I doubt but that some may detect weak links in my chain of evidence, but I think the united testimony of so many synchronisms may be accepted as tending to confirm the truth and accuracy of what is commonly called the chronology of the Bible.

Far be it from me to attempt to dogmatize where the light is not so clear as we could desire, and where different conclusions are arrived at by those who are equally desirous of discovering the truth. Of this we have a remarkable instance in two deeply learned writers who have given much time and attention to that part of chronology where sacred and secular chronology are commonly said to meet, about the period of the Babylonish Captivity in the sixth century B.C. And, strange to say, the divergence between the two amounts to this: that whereas Mr. Bosanquet considers the common chronology of that period to be more than twenty years in error by *excess*, Mr. Parker, the Rector of Luffincott, considers it to be the same number of years in error by *defect*. Mr. Bosanquet holds that Darius the Mede, the son of Ahasuerus, mentioned by Daniel, is the same as Darius the Persian, the son of Hystaspes, described by the Greek historians, and that, consequently, the common chronology must be lowered, as I have already mentioned. ‡ Mr.

* Manetho, as interpreted by Brugsch, dates Shishak's twenty-one years' reign B.C. 980—959.

† *Egyptian Chronicles*, by William Palmer, M.A., pp. 592—596.

‡ Mr. Bosanquet's theory is to be found fully set forth in many letters

Parker, on the other hand, considers that between the time of Cyrus and the conquest of Persia by Alexander the Great, which all agree in dating B.C. 330, twenty years have, somehow or other, dropped out of sight and mind, and that, consequently, the common chronology ought to be raised by about that period. And this very divergence between two learned men, who have alike advocated their theories with great skill, will incline most people to be content with the canon of Ptolemy, which has the sanction of ages in its favour; besides being, as it is, the *juste milieu* between two extremes.

55. In confirmation of the truth of the common chronology at this period of history, I would adduce the testimony derived from a large number of clay seals discovered by Layard at Kouyunjik, the palace of Shalmanesar, near the ancient Nineveh, some of which are now in the British Museum. Amongst them are two hieroglyphic impressions, with the name of *Shabaka* in the usual cartouche, the second king of the twenty-fifth Dynasty, who reigned, according to Egyptian chronology, B.C. 733—721, and termed by Manetho Σίβιχως. The Hebrew of 2 Kings xvii. 4, which records the application of Hoshea, who reigned B.C. 730—721, to "So, King of Egypt," for aid against the King of Assyria, spells the name either as *Soa* or *Seva*, dependent upon the position of the vowel points; and the LXX. write it Σηγῶρ or Σῶα. This seal, therefore, assumes an important character, by showing the synchronism of the three monarchs of Assyria, Egypt, and Israel; and refutes, as I think, the proposal of lowering the chronology of the kings of Israel and Judah by twenty-five years, the effect of which would be to deny the contemporaneity of "So, King of Egypt," and Hoshea, which Scripture and the Nineveh seal alike combine to prove.*

56. This chronology may be further confirmed by the tablets in the British Museum, containing what is called "the Assyrian Canon," or the list of the Annual High Priests of Nineveh, extending from B.C. 938—648, with an interval of forty-eight years, representing, it is supposed, a period of confusion. Although it would trespass too much on our time to show how far the Assyrian Canon accords with the chronology of Scripture, I

to the *Journal of Sacred Literature*, about fifteen years ago; and also in his valuable work entitled *Messiah the Prince, &c., A Compendium of Sacred and Secular Chronology*. The Rector of Luffincott's theory is no less ably advocated in various works, such as *The Archons of Athens, The Parian Chronicle, A Light thrown upon Thucydides*, and especially in his volume exclusively devoted to the subject of *Chronology* in general, and his own special branch of it in particular.

* See Dr. Birch's note in Layard's *Babylon and Nineveh*, pp. 157—159.

would briefly notice three eclipses which seem to confirm the same. The time of Sennacherib's reign—the contemporary of Hezekiah, B.C. 726—698—has been confirmed by the record of an eclipse in an inscription at Nineveh, which says, respecting the commencement of his reign: "In the month *Tisri* (answering to our September) the moon was eclipsed, and the moon emerged from the shadow *while the sun was rising*." On referring to the celebrated French work, "L'Art de Vérifier les Dates," I find there was a *total* eclipse of the moon September 12th, B.C. 721, at six A.M. mean time for Nineveh; and inasmuch as this eclipse fulfils all the conditions required by the inscription, we can scarcely doubt but that it refers to the one which was visible at Nineveh in the commencement of Sennacherib's reign; and which agrees with the chronology of Scripture in making him thereby the contemporary of Hezekiah.

57. Again in the year answering to B.C. 809, when *Pur-el-salke*, according to the Assyrian Canon, was high priest of Nineveh, mention is made of "the sun having been eclipsed in the month of *Sivain* (June)" of that year, which is confirmed by the Astronomical tables which mark a solar eclipse as having been visible at Nineveh on the day which answers to our June 13th, B.C. 809.

58. The third eclipse mentioned in the Canon is that which occurred in the year of *Assur-nasir-habil's* accession, B.C. 930; and accords with the Astronomical tables, which give a solar eclipse, visible at Nineveh, on June 2nd of that year. And a mention is also made in that year of the death of Ahab, King of Israel, which took place, according to the Hebrew chronology, B.C. 900, during the high priesthood of *Dayan-Assur*, the thirtieth in succession from *Assur-nasir-habil*, his year of office must have answered to B.C. 900; in which we have a striking confirmation of the chronology which places the building of Solomon's Temple B.C. 1014, and the death of Ahab, which is dependent on that date, B.C. 900; instead of *lowering* it, as some have proposed to do, by a period of twenty-five years, the effect of which would be to date Ahab's twenty-two years' reign, B.C. 887—765, and to deny his being contemporary with *Dayan-Assur*, the High Priest of Nineveh, according to the Assyrian Canon, as explained by the solar eclipse of B.C. 930.*

59. Both Mr. Bosanquet and Mr. Parker, however, rest their conclusions respecting chronology upon what they consider to be its perfect agreement with that deducible from Scripture.

* For a full account of the Assyrian Canon, see M. Oppert's papers in the *Revue Archéologique* for 1868, pp. 308 et seq.

Eminent German scholars, who have given much attention to this subject, appear to have dismissed Scripture chronology altogether from their calculations. We have a notable instance of this in what is commonly termed "the sojourn in Egypt." I have already shown from both the Old and New Testament, and confirmed its accuracy, as far as may be, by Egyptian evidence, that from the call of Abraham to the Exode was exactly 430 years, of which number the Israelites sojourned in Egypt for half that period, or 215 years. Now, of three learned Germans, two of whom rank amongst the most eminent Egyptologists in the world, Lepsius states that "only ninety years intervened from the entrance of Jacob to the Exodus of Moses." Brugsch affirms that the Israelites were in Egypt the whole of the 430 years. Bunsen writes in one place that "the duration of the sojourn in Egypt was 1434 years"; while in another part of the same work he limits the time to 862 years. Such are the differences amongst eminent scholars on the subject of chronology, who refuse to Scripture that authority which is so justly its due.*

60. Permit me to conclude, while conscious of having done but scant justice to the important subject of the "Harmony between the Chronology of Egypt and the Bible," and fearful of having wearied you by the length into which I have been unintentionally led, in the words of an ancient author:—

"Here will I make an end; and if I have done well, and as is fitting the story, it is that which I desired; but if slenderly and meanly, it is that which I could attain unto."†

The CHAIRMAN proposed a vote of thanks to the Rev. B. W. Savile for his paper, and then, under the pressure of Parliamentary engagements, vacated the chair, which was taken by

Mr. J. E. HOWARD, F.R.S.—I think we must all feel much indebted to Mr. Savile for his elaborate paper. With reference to the sixty-nine hebdomads of Daniel, I believe the statements in the paper will be found very interesting when they are studied; but the way in which Mr. Savile has brought out that point cannot, I fear, at present, be done full justice to.

* Lepsius's *Letters from Egypt*, p. 475. *Histoire d'Égypte*, par H. Brugsch, p. 80. Bunsen, *Egypt's Place in Universal History*, iii. 357; and v. 77. Until German Egyptologists present the world with results somewhat more harmonious, we need not feel disquieted by the ridicule which Bunsen endeavours to excite against believers in the chronology of the Bible, when he says, "*einige weise Männer und Knaben England's schlau andeuten.*"

† 2 Maccabees xv. 37, 38.

I rather wish that he had referred to the two years which are in question with regard to the beginning of the Olympiads ; but a paper on that subject lately read before the Society of Biblical Archæology may be referred to with advantage by those curious upon the subject. I think that Mr. Savile has shown in some parts of his paper the very great accuracy of the Scriptures ; but in reference to that part of it which deals with the sojourn of Israel in Egypt, I would submit this consideration to the author,—whether the length of the period of the sojourn is not the cause of the great difficulty which we find in ascertaining the era of the Exodus. We are able, through the mists of antiquity, to trace some points somewhat distinctly. The date of the erection of the Great Pyramid is believed by some to have been fixed astronomically ; and there is a fair amount of agreement as to the time when Abraham was in Egypt, and as to the era of the expulsion of the Hyksos ; but, with reference to the question of the date of the Exode, we can only say, *Adhuc sub judice lis est*. The duration of the sojourn of Israel in Egypt is stated in Scripture very distinctly to be 430 years. In the 15th of Exodus the prophecy was, that the nation to whom they should be in bondage should afflict them evil for 400 years, and in Exodus we are told that the period of their sojourning in Egypt was 430 years. I cannot help thinking, though I know the difficulties in the way, that the Israelites were really 430 years in Egypt, and more or less under the oppression of the Egyptian policy for 400 years of that time. There is one chronology of the descendants of Ephraim in 1 Chron., chap. vii., which gives eighteen generations. This relates to no less important a point than the descent of the Leader of the host of Israel, and is as follows (see Osburn's "Monumental History of Egypt," ii. 630) :—The sons of

1. Ephraim.	10. Beriah.
2. Shuthelah (his firstborn, Numb. xxvi. 35).	11. Rephah.
3. Bered.	12. Resheph.
4. Tahath.	13. Thelah.
5. Eladah.	14. Tahan.
6. Tahath II.*	15. Laadan.
7. Zabad.	16. Ammihud.
8. Shuthelah II.	17. Elishama.
9. Ezer—Eliad.	18. Non.
	19. Joshua.

* It was an Egyptian custom to name the firstborn after his grandfather.
—(J. E. Howard.)

Thus giving a series which would coincide with the 430 years period. Again, after the expulsion of the Hyksos we have, according to Manetho, the whole of the eighteenth Dynasty, which comprehends at least sixteen monarchs, to place in that interval ; which, if it is so very much abbreviated, as is commonly done, does not appear to allow space for the Israelites amounting to such a multitude. I believe that the period has been too much abridged, and that the longer period is none too long to allow for the increase.*

Mr. J. ALLEN.—I should like to ask a question. Mr. Savile has spoken of some ages, and he has assigned thirty-eight years as the probable length of a generation. Is there any special reason for assigning such a length of time ; further than that, when it is multiplied by the number of generations, you obtain the period required ?

Mr. W. M. WALTERS.—The author of the paper has stated that, according to some Chinese historians, a conjunction of planets took place in the year 2440 B.C., which was the year of the Deluge. Now, if we go to Chinese history for a point of this kind, how far does it go to show that the Deluge was not universal ? If we admit history to show that a conjunction took place then, it seems evidence to prove that the Deluge was not universal, and therefore, in seeming to support the chronology of the Bible in one point, we appear not to do so in regard to the universality of the Deluge. Then as to Pharaoh Cecrops going into Greece, is not that against the Biblical narrative, which speaks of Pharaoh as being overwhelmed in the Red Sea ?

Mr. S. M. DRACH.—I believe, with regard to the Creation, that its duration originated from that verse in the Psalms which says, a thousand years are as a day ; and in the same manner, having set forth six days for the Creation, it was easy to say that it took 6,000 years. As to the duration of the captivity of the Israelites in Egypt, it is stated with great emphasis in Exodus, as having lasted 430 years, because, on the self-same day, “at the end of the 430 years, the hosts of the Lord went out from the land of Egypt.” The date of the building of Solomon’s Temple has been the subject of a great deal of discussion, Mr. Bosanquet believing that a period of 490 years exactly intervenes : thus the idea being that there was a special interval between the salient points of Biblical history,—between the Exodus and the building of Solomon’s Temple, and between the building and the destruction of that temple.

A MEMBER.—There is another matter to which I should like to draw attention for a moment. I have often been struck, when looking at the Egyptian monuments in the British Museum, with the thick lips and peculiar cast of countenance given by them to the Egyptians,—characteristics which it seems difficult to reconcile with the fact, that the date at which these monuments came into existence has to be carried back for many centuries before Christ. If we take the account in the Bible to be correct, and believe that all

* This subject has been taken up before. See Vol. V. p. 349, *et seq.*

the human race sprang originally from two persons, there seems to be a great difficulty in reconciling this idea with the features which we see in the large marble busts of Thothmes and others, because it must have required a very great number of years to have produced such a diversity of features from the time of Adam ; it must have required a much longer period than we suppose to have elapsed.* The question which I wish to ask is one that is founded on this point. It struck me, on looking at the photograph which has been produced from the Ashmolean collection, that it corroborated what I have myself noticed,—namely, that the character of face, the thick lips and the peculiar features of Egyptian statuary, did not belong altogether to the earlier specimens. I would ask Mr. Savile whether his attention has been at all directed to this point ; because, if it be true that the earlier specimens do not bear that marked development, it is rather an answer to that difficulty, in the way of ignorant persons, of accounting for such a very marked character at that time.

The CHAIRMAN (pointing to one of the drawings exhibited by Mr. Savile) : You should notice the features of this Pharaoh, supposed to be the patron of Joseph. He is one of the Hyksos or Shepherd kings, who were the descendants of Shem. The eighteenth Dynasty were descended from Ham, which makes a great difference.

Mr. SAVILE.—In replying upon this discussion, I must ask leave to make my answer as brief as possible. I have been obliged to curtail the paper in consequence of the limit of time at my disposal, but many of the subjects which have been mentioned by speakers are touched upon in the paper, and when it is printed you will be able to consider more in detail my reasons for arriving at such conclusions. As to the date of the erection of the Great Pyramid, which has been alluded to, I am sorry to say that Egyptologists differ about it to the extent of no less than 4,000 years ; *e.g.*, a French author, Le Suer, dates it at 4,975, and the late Sir George Cornewall Lewis, assuming the strange chronology of Herodotus to be correct, dates the erection of the Great Pyramid as B.C. 903, or a century later than that of Solomon's Temple ! The idea for estimating the approximate date which I have selected, *viz.* B.C. 2170, originated with Col. Howard Vyse, who lived at the Pyramids fifty years ago, and induced the late Sir John Herschel to work out an astronomical theory from it. He first of all assumed, that an observer standing in the passage of the Pyramid leading to the King's chamber, at the time

* Dr. Kitchen Parker, F.R.S., has called my attention to the distinct race the Americans are becoming, and how a short time has produced a considerable change ; he adds : "The Yankee is a good sub-species already, and a very fine type he is." Principal Dawson, F.R.S., in his address as President of the Montreal Natural History Society (May, 1874), says, in regard to changes culminating rapidly, and then becoming stationary, each "specific type has capacities for the production of varietal and race forms which are usually exercised to the utmost in the early stages of its existence ; and then remain fixed, or disappear and reappear, as circumstances may arise. Finally, the races fall off one by one, as it approaches extinction."—Ed.

the Pyramid was built, and looking out to the north aspect, would see the polar star of the period. This theory has been elaborately calculated by Professor Piazzi Smyth, the Astronomer Royal of Scotland, who has discovered that there is only one period in 10,000 years which would answer all the conditions of the problem, and which accords with the date B.C. 2170 ; and it is satisfactory to know that other things, particularly the duration of the Pharaohs, as shown by the recently discovered tablet of Abydos, tend to confirm that view. Then, with regard to the date of the Exode, two speakers have touched upon that question, which has been much controverted by many Scriptural commentators, as to the meaning of that famous text in Exodus, giving the date of the sojourn in Egypt. I have quoted in my paper the learned Dr. Kennicott, who published the best text of the Hebrew Bible in the last century, and who was firmly convinced that the true reading of that text is not confined to a "sojourning" in Egypt exclusively, as our Chairman considers, of 430 years, but to a sojourning in Canaan as well as in Egypt. That is in the text.

THE CHAIRMAN.—Not in the Hebrew.

MR. SAVILE.—Yes ; Kennicott gives it in the Samaritan Pentateuch. The question is as to the authenticity of the Samaritan Pentateuch. I only quote his evidence on the point, but cannot go into it. I would ask your attention to section 29 of my paper :—

The testimony of the early Christian writers is to the same effect. Eusebius distinctly says, that it is "by the unanimous consent of all interpreters" that the text should be so understood. Augustine, in his 47th question on the book of Exodus, as well as in his work *On the City of God*, taught that the 430 years included the sojourn in Canaan as well as in Egypt. And the historian Sulpicius Severus says, "from the entrance of Abraham into Canaan until the Exode were 430 years." These Christian interpreters of the Old Testament doubtless understood an argument which some in the present day have strangely overlooked, that if the 430 years is to be counted only from the time of Jacob's descent into Egypt until the Exode, *the mother of Moses would have borne him 262 years after her father's death*, according to the Biblical computation, which all admit is a physical impossibility. On which Clinton has justly observed :—"Some writers have very unreasonably doubted that portion of the Hebrew chronology, as if it were uncertain how this period of 430 years was to be understood. Those who cast a doubt upon this point refuse to Moses, an inspired writer—in the account of his mother, and father, and grandfather,—that authority which would be given to the testimony of a profane author on the same occasion."

To me, this seems to be a conclusive argument in favour of the view that the sojourning "in Egypt" only lasted for half the period of 430 years. Then Mr. Allen put a question which I expected would be asked ; namely, —how it was that I reckoned the length of a generation at thirty-eight years ? We have a monument belonging to the age of Nebuchadnezzar, referring to the confusion of tongues and the building of the Tower of Babel, as having occurred forty-two ages or generations before his time. Herodotus gives three generations to a century, making each between

thirty-three and thirty-four years. I have assumed thirty-eight years as the duration of each generation, and we have ample evidence that occasionally this duration is exceeded. Three generations of thirty-eight years each would include an interval of 114 years—a duration not uncommon in our own days. I may be entirely wrong in my assumption, and only venture to give it for what it is worth; but, after all, there is not such a very great difference between the thirty-four years of Herodotus and the assumption of thirty-eight years, from the Cuneiform monument, as the possible duration of an age or generation, according to the estimate of the ancient Chaldeans. As to the Chinese date of the Deluge, I remember that in Chambers's Astronomy, a writer brings the argument or inference forward in the same way. All we can say is that the Chinese had a tradition, that in a year which answers to our B.C. 2440, there was a conjunction which may have accorded with the date of the Deluge. If you look into Chinese annals you will not find any authentic Chinese history previous to the year 2300. Confucius, who lived B.C. 500, and who was to the Chinese what Moses was to the Jews, seems to admit that there is no earlier evidence of real history than that. Now 2300 B.C. would answer to the time when we believe the scattering of the nations occurred, and they quickly spread over Asia, about a century after the Noachian Flood. All authentic history, whether Egyptian, Assyrian, Babylonian, or Chinese, does not extend to an earlier date than 2300 B.C. All beyond that date is fabulous, legendary, and untrue. This fact is a remarkable confirmation of Biblical chronology. Further, there is a very singular confirmation of Biblical chronology, which I have already adduced in a paper that I had the honour of reading at this Institute three years ago, which relates to the seven years' famine in Egypt in the time of Joseph. It is expressly stated to have extended to "all lands," and to have lasted "*seven years.*" Now it is a proved fact that the Chinese annals do record a dearth lasting "*seven years,*" during which it is said that no rain fell, and these seven years do agree with the seven years of Biblical chronology as set forth in the Hebrew Scriptures. Then, as to the date of the Exode and Cecrops. I have adduced the testimony of a Greek inscription on a monument, now at Oxford, and known as the Parian Chronicle or Arundellian Marble, to show that at the period when the exodus of the Israelites took place, the Greeks had a tradition that their country was first colonized by emigrants from Egypt, and that Cecrops is mentioned as having fled from that country at that very period. It is not impossible, therefore, that this tradition, which was current in Egypt about twelve centuries (the date of the Parian marble) after its occurrence, may refer to the same thing. It is necessary to point out that the photograph of an Egyptian monument now in the Ashmolean Museum, which I produced at the meeting, affords very different evidence from that other monument at Oxford referred to as the Parian marble. In point of time, there were more than 2,000 years between the two; and the former inscription was adduced only on account of its very high antiquity. It belongs to a period

before the name of "Pharaoh" was known, to a king of the second Dynasty, and is undoubtedly the oldest authentic *proof* of man on earth which has yet been discovered, notwithstanding what sceptics may say to the contrary. With reference to the testimony of Barnabas and the 6,000 years, what I meant to say was, that from the time of Adam the age of mankind is supposed to have lasted about that period. With regard to Mr. Bosanquet, I have corresponded with him and studied his works very closely. He is a valuable writer, and a very learned man. I know his work on the Messiah ; but cannot assent to his interpretation of the important question about the 490 years, and my chronology conflicts with his, especially on those two most important dates, viz. the birth and death of Christ. I have looked at his arguments from every point of view, and am obliged to own that I think the weight of evidence is against him. Nevertheless, his object is the same as mine,—a desire to ascertain the truth and accuracy of what is Scripture chronology. As to the important point, that it was a comparative afterthought of the Jews to overthrow the tremendous weight of testimony as to the fulfilment of Daniel's prophecy respecting the death of our blessed Lord, they have skilfully endeavoured to alter the chronology in order to prove the falsehood of our Scriptures ; but I believe secular chronology is so clearly on our side that the Rabbinical chronology may be left to itself. With regard to another question respecting what may be termed the argument from "race," a gentleman has referred to the cast of countenance of Thothmes III. We all know that cast of countenance. We have an original bust of him in the British Museum, and, as it was carved when he was reigning, we may suppose that it is a true and accurate representation of that king. But I cannot quite agree with the member who has spoken as to the lesson we may derive from it. Thothmes III. had an elder half-sister, and that sister, I believe, was the veritable "Pharaoh's daughter" who preserved Moses, and who was the only instance of a queen regnant that we meet with in history during the long course of the Egyptian Pharaohs. She erected many magnificent buildings, and amongst them a beautiful obelisk, still standing amid the ruins of Thebes, on which is still to be seen the well-known term of "Pharaoh's daughter." She is known to have occupied the throne for nearly twenty years previous to the accession of Thothmes III., her younger half-brother. There is a fair inference that she offered the throne to her adopted child, Moses ; the Scriptures do not state it, but we infer that he who rejected all the treasures of Egypt, "and refused to be called the son of Pharaoh's daughter," did refuse the throne which his adopted mother, as Queen Regnant, alone had the power to offer. Rossellini, in his great work, has given a very accurate representation of this sister of Thothmes III., who is known by the name of Queen Hatasu ; but what is her countenance ? One in which there is the most beautiful intermingling of the Grecian and Roman features that I ever saw ! How do you account for that, if her half-brother in blood had the countenance of a negro ? I have a representation here of Pharaoh

Apophis, concerning whom all the authorities agree that he was the patron of Joseph, and I believe there is abundant proof of that. Here is the countenance of a Shepherd king, who was of the race of Shem, with the thick lips of a negro, as clearly developed as in the bust of Thothmes III., who was of the race of Ham. I have here also a representation of Queen Hatasu, whose nose is strictly aquiline, so that the argument which has been offered to us on the cast of features seems to fall to the ground. There is only one more point to be noticed. The Chairman considers that, as "in Ephraim we have eighteen generations between Ephraim and Joshua," it is fatal to my contention that the duration of the sojourn *in Egypt* was confined to 215 years. I have carefully studied the passage in 1 Chron. vii., where Ephraim's genealogy is given, and am constrained to the opinion that the true reading of that passage must confine the number of descents to eight in place of eighteen. Osburn, in his "Monumental History of Egypt," has adopted the larger number, and speaks of "this invaluable genealogy as settling the question of the duration of the sojourn." But how does he manage this? Simply by interpreting Ephraim, in v. 20, to mean *an individual*, and the same name, in v. 22, to mean *the whole tribe!* Moreover, in place of Ephraim being the father of Beriah, as is plainly declared in v. 23, he interprets the text of Ezer, *i.e.* one of his own grandchildren. To my mind, such a mode of interpretation must be fatal to all reasonable understanding of Scripture. I would therefore reply, with all respect to the Chairman, that the argument I have used in my paper in support of the shorter duration of the sojourn in Egypt, viz, that if it were otherwise, "Moses's mother must have given birth to her son 262 years after her father's death," seems to be conclusive that the sojourn of the Israelites in Egypt was only a moiety of the 430 years, and must again refer to Dr. Kennicott's able dissertation on this subject.

The Meeting was then adjourned.

REMARKS BY S. BIRCH, ESQ., LL.D.,

President of the Society of Biblical Archaeology.

BRITISH MUSEUM, 14th May, 1875.

Although chronology, owing to its uncertainty, has never occupied much of my attention, at your request I put down a few notes on Mr. Savile's very exhaustive paper. It goes over a deal of disputed ground, such as the date of the Nativity and Crucifixion, the general tendency of chronologists being to elevate the Nativity to B.C. 6. There is some proof that Xerxes and Artaxerxes may have reigned conjointly, as stated in § 18-19. There is, however, some difficulty about Xerxes, the Egyptian inscription mentioning him as at one time expelled, and that the true ruler of Egypt was Kabash, who reigned at least two years. As to the period of the visit of Abraham to Egypt, the dynasty at the time must be considered conjectural; but the date of the Exodus is generally placed after the reign of Menephah, of the XIXth, and not Amosis I., of the XVIIIth, dynasty; the reason, of course, being, that the name Raamses applied to the land given to Jacob, and the treasure city, must be that of a king of the XIXth dynasty. On the hypothesis that the text handed down of the Books of Moses has retained the names of these places as they were called in the days of Moses, there is this one point to determine the period of the Exodus. Take that away, and assume that the version is as late as the kings, and that the name of the fort and land was known as Raamses at the regal period, all synchronism is conjectural and external. If the Hebrews went in and out with the Shepherds, it is remarkable to find the expulsion of the Shepherds not alluded to in the Scriptures; but the version implies a new dynasty, though not necessarily an internal revolution. In § 31, *Nu* is the name of the "celestial water" or ether; but it is difficult to interpret the myth of Osiris in the manner there stated. In § 32, Oppert's translation is not now recognized. The passage referred to the destruction of a temple by time and rain, and the subsequent rebuilding by Nebuchadnezzar. The part about the confusion of tongues was erroneously translated, and had no such meaning. The chronology of the intermediate periods, 6-12, dynasty 12-18, is uncertain, and its length monumentally unknown (§ 40). The Festival of the First year, considered as a cycle, is an error. It occurs only at the time of Cheops, and the hieroglyphics have other meanings than the first month of the first year of a cycle. The age from king Nubti or Sutech to Rameses II.,

of 400 years, cannot be quite defined, for the reasons given by Mariette Bey.* The assignment of the Exodus to the reign of Thothmes II. is from computation and Josephus's account. Thothmes III. is impossible; Thothmes II. doubtful, and nothing is known of his reign; but Thothmes III. fought the battle of Megiddo with the Khita, and it is difficult to reconcile Egypt marching through Palestine to Mesopotamia, and yet so weak as to let the Hebrews settle in Canaan or Mount Sinai, where both monarchs held garrisons. It is quite right to quote, as in § 51, the genealogy of families in support of chronological hypothesis, but it is always necessary to be quite sure that the persons at the head of the list are identical with those otherwise found, as upon that the whole argument rests; and this fixed point is very often uncertain, owing to many persons about the same period, and even later, bearing the same name. The tendency of the family genealogies is to reduce the chronology.

Yours truly,

S. BIRCH,

CAPTAIN F. PETRIE.

Mr. W. R. COOPER, Secretary to the Society of Biblical Archæology, says:—"In regard to Mr. Savile's paper, I cannot consider some of the authors quoted quite trustworthy, notably the 'Acta Pilati,' Abgarus of Edessa (Cowper, the *Apoc. N. T.*), Usher, and Bunsen; many did not write from their own knowledge of the circumstances they recorded; I may add that the lists of Manetho are still too confused to settle any point definitely, and there are no certain Egyptian dates prior to Tirhakah, the star risings and astronomical observations being very carelessly recorded. (See Renouf, 'Calendar of Astronomical Observations in the XXth Dynasty,' in *Trans. Soc. Bib. Arch.*, vol. iii. p. 1.)"

Mr. SAVILE sends the following reply upon Dr. Birch's remarks:—I entertain so sincere a respect for any opinion expressed by my valued friend Dr. Birch, especially on the subject of Egyptology, that it is with diffidence I venture to reply to the brief remarks he has made upon my paper. The "twelve years" on the Egyptian monument, as the true length of Xerxes' sole reign, appears to me the only way of harmonizing the fact which Thucydides—an almost contemporary witness—records of his son, Artaxerxes, being on the throne when Themistocles fled

* See the whole inscription in *Records of the Past*, vol. iv.

from Greece to Persia; which event occurred (according to Eusebius's *Chronicle*) B.C. 473, — *i.e.* eight or nine years previous to the death of Xerxes, according to the Ptolemaic Canon.

I quite agree with Dr. Birch that the ruling dynasty at the time of Abraham's visit to Egypt must be "conjectural"; but cannot think it is so with regard to the time of the Exode; and I venture to refer him to Canon Cook's able dissertation on that subject in the first volume of the *Speaker's Commentary*; altogether I think the weight of evidence points to Thothmes IV. as the Pharaoh of the Exode, rather than to either of his two predecessors of the same name, to whom Dr. Birch alone alludes. As regards the name of "Raamses" being a guide to the time of the Exode, Dr. Birch has omitted to notice that this name is to be found amongst the royal family of the 18th Dynasty, as well as in the line of kings belonging to the 19th and 20th dynasties.

The mention of *Nu* or *Noah* as the "celestial water," § 31, must stand on its own merits; and I think we are warranted in supposing that the tradition respecting Osiris, recorded by Plutarch, may possibly have arisen from his knowledge of the Biblical statement concerning the Noachian Flood. I was not aware of M. Oppert's reading of the Cuneiform monument respecting the Tower of Babel and the confusion of tongues having been subsequently "recognized to be erroneous"; but if it be so, we may console ourselves with the fact that Mr. George Smith, the well-known discoverer of the Cuneiform record of the Flood, has also confirmed, from another monument, the Chaldean version of Babel as related in Scripture. I did not know that Mariette Bey had subsequently thrown doubts upon his own discovery of the tablet recording the Nubti era, as Dr. Birch says; which of course relates to the genuineness of the tablet in question, as there can be no doubt of the correct reading of "400 years," as given in all the copies of that monument. Palmer's application of the genealogical hypothesis, in order to show the harmony between the chronologies of Israel and Egypt, appears to be as perfect as anything of that nature can well be; and if such a fair system of induction be disregarded, it will be quite useless for any one ever to attempt to bring forward proofs of a similar nature.

In reply to Mr. Cooper's remarks, I would observe that the value of the quotations from the "Acta Pilati," and from the letters of "Abgarus of Edessa," must depend upon the credit which we may give to the testimony of Justin Martyr and Tertullian respecting the first, and that of Eusebius in reference to the last. Justin Martyr and Tertullian alike, speak of the "Acta Pilati" as if they were in existence in their own day, as they appeal to them in proof of their assertion concerning the founder of the Christian religion, and of his having been put to death in the reign of Tiberius. And as regards the interval of time between them and the events which they record, it may be compared to that of any historian in the present day describing an Act of Parliament passed in

the reign of George I. Eusebius states respecting Abgarus, king of Edessa, what he had found in the archives of the city and had faithfully copied, observing at the same time : "There is nothing like hearing the epistles themselves, *taken by us from the archives*, and the style of it, as it has been literally translated by us from the Syriac language." (*Ecl. Hist.*, i. c. xiii.) This may be compared to Froude the historian copying the Simanca MSS. relative to affairs which happened in this country at the time of the Reformation ; and no doubt has been thrown upon the admissibility of such evidence.

To the foregoing Dr. BIRCH replies :—It is with great reluctance that I take up my pen to offer a few additional remarks to those already given on the paper of my excellent friend Mr. Savile ; but as there has been some misconception about one or two expressions I have used, it is desirable, for various reasons, that an explanation of what they meant should be given. Mariette-Bey has never to my knowledge doubted the authenticity of the tablet of the 400 years ; but I have, and up to the present moment my suspicions are not allayed. The question with Mariette-Bey was, how it was to be computed who was the Shepherd king intended, and what was the year of Rameses II. from which it was reckoned : without these data determined little light is thrown on the chronology by it. For example — if the Shepherd Saites, or Salatis, as the lists give the name, is intended by Set-Nubti, then the 400 years are from the commencement of the Shepherd Dynasty ; if Nubti means the An-nub of the Turin Papyrus, the 400 years commence with Bnon, Bænon, or Beon. The question of Raamses has been so exhaustively treated by Egyptologists—especially Chabas, *Mélanges*, 1864, p. 108—that it is scarcely necessary to refer to it. The name of the prince in the grave of Der-el-Medinet, now in Berlin (Lepsius, *Königsb.*, Tav. xxi. No. 320), is the one straw by which it is attempted to connect the name of Raamses with the 18th Dynasty ; but the following reasons are urged against it ;—that it is not certain that this name is not that of Ramses I. before his accession to the throne ; that the name of the prince is written with one *s*, whereas that of Raamses or Ramessé is written with two, or a double *s*,—exactly as the names Rameses or Ramses of the kings of the 19th Dynasty ; that there is no known Egyptian instance of forts or cities being named after any person of lower rank than the sovereign, and that, with all his titles, the prince Rameses seems only an associated son or adopted successor of some unknown king ; that there are several examples in the Egyptian texts of cities, forts, and other places named after the monarchs called Rameses or Ramessu, of the 19th Dynasty. As yet the probability tends to the Exodus being at the time of the 19th Dynasty, supposing the text of Exodus to be contemporaneous with it.

ORDINARY MEETING, APRIL 20TH, 1874.

THE REV. PREBENDARY ROW, M.A., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following Presentations to the Library were announced :—

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| "Transactions of the Geological Society." Part 117. | <i>From the Society.</i> |
| "End of the Ungodly." By the Rev. R. Gordon. | <i>From the Author.</i> |
| "Funeral Oration." By the Rev. R. Gordon. | <i>From the Author.</i> |

The following Paper was then read by the Author :—

THE ETHICAL CONDITION OF THE EARLY SCANDINAVIAN PEOPLES. By EDMUND W. GOSSE, of the British Museum.

WE are all of us familiar with the outlines, at least, of the particular form of culture which Christianity superseded in the south of Europe. We know that in Greece the Gospel had to contend against an elaborate system of pure ethics fallen into decay, against a moral obliquity only the more impervious because it held the outward form of an earlier, far nobler morality, and against a system of literature and the fine arts, the most perfect in execution that the world has ever seen. In Rome, Christianity met with an opposition more crude and less insidious, partly because culture there took a less æsthetical and more practical form, and partly because the hands of the younger power were still muscular and vigorous. The opposing forces, however, were of the same inner nature, whether in Greece or Rome, and the immediate and obvious benefit exercised on society by the new religion was the creation of a moral conscience, and the scattering of spiritual salt over successive generations, whose predecessors, supplied as they were with every other requisite, had passed into a shameful state of ethical putrescence for the want of it. I propose to show this evening how totally distinct was the mission of Christianity to the peoples of the North; to sketch

before you the habits of thought peculiar to the heathen nations of Scandinavia; and to show in what respects they had learned, spontaneously, as one may say, the axioms of moral wisdom, and in what respects their condition left them with much of this quality to receive from the Gospel. In studying the relative conditions of Greece and Scandinavia, two famous collections of lyrical poems are of extreme, incalculable value in determining the state of the moral atmosphere at the introduction of the Christian religion; on the one hand, the Anthology of Meleager; on the other, the Edda of Sæmund Sigfussen. As the one gives us the fullest and most minute account we possess of the sentiment of later Greece, so the other contains, if not so exhaustive a store, still the gravest and most suggestive thoughts of the wisest of Icelandic skalds, and throws a vast deal of light on the moral philosophy of their age. It will, therefore, in preference to any of the prose Sagas, be taken as in some sort the text of my discourse, and I may be allowed at once to remind you that this celebrated work, though collected by an ecclesiastic, consists almost entirely of Icelandic lyrics, composed long before the introduction of Christianity by bards whose very names are lost. Sæmund flourished in the 11th century, when the literature of Iceland was passing from the creative into the critical period, and when no pains were spared to preserve the relics of an earlier and, although pagan, precious inspiration.

2. This is a convenient moment for acknowledging from what other sources I have drawn the information I lay before you to-night. Before all I must express my deep obligations to that masterpiece of learning, the *Danmarks Historie in Hedenold* of Professor Niels Matthias Petersen, a man of whom it was difficult to say whether he excelled more in graceful scholarship or in indefatigable patience of research, whose name is an honour to Denmark. Whatever this great work has not supplied me with, I have gathered from the *Altnordischen Studien* of Professor Weinhold, and from other useful books, whose names I need hardly specify.

3. The moral conscience of a people is reflected in its popular religion. The earlier Doric races did not differ more from the Greeks of the decadence than the warrior-gods of Homer did from the Indian and Egyptian deities foisted on the luxurious contemporaries of Rufinus and Petronius. Buddha reflects the changeless, meditative temper of the Hindoo; in Mohammandanism we have a fit faith for the restless, austere tribes that founded and dispersed it. Christianity alone takes no colour

from the psychological conditions that surround it, but moulds to itself men of every shade of temperament. The Scandinavian of a thousand years ago had no Bacchus or Aphrodite to dream of and imitate; but his deities were no less the mirror of his mind than these had been of that of his Græco-Roman neighbour. For him the great figure on the spiritual horizon was Odin, sailing through the ocean on his magic ship *Skidbladnir*, learning the auguries of fate from the dead lips of the embalmed head of Mimir, or, as in the *Vafthrúdnismál*, holding strange converse with still older deities on the primal cosmogony. The wild legends of Odin Allfather, in their mystery and vague sublimity, show at the outset the current in which the thought of the Norsemen flowed. The other inhabitants of Ásgard, the younger Æsir, partake of the same solemnity and force. Among them there existed the incarnation of good, Baldur, and the incarnation of evil, Loki, and these figures display in their very conception a clearness of vision in morality that one looks for in vain among the more cultured races of the South. The figure of Baldur, the impersonified goodness and beauty, against whom none of the destructive elements would exercise their function, is one of the most beautiful in the mythologies of the world, and the legend of his death, shot by the blind deity Hod, whose hand is directed by Loki, is too noble to have occurred to a debased or foolish people. Their cosmogony, with all the strangeness of its details, was not inconsistent with a shrewd kind of natural philosophy. It was believed that Midgard, the home of human creatures, was situated in the midst of the world, protected by a circular wall from the land of the Jötuns, the wild and lawless country that lay round the shores of the infinite ocean. Above Midgard, in a subtly-interwoven network, spread the roots of the ash Yggdrasil, the centre of the universe, under whose branches the high gods sat daily in judgment. The boughs of Yggdrasil covered the heavens, and its roots roofed the three divisions of the lower world, Midgard, and Hell, and the land of the malignant giants. This mystical ash-tree was regarded as the embodiment of vital nature, "as moved and ruled by the divine power, which had its seat in it as the soul has in the body." At its top an eagle sat, emblem of spiritual force; at its root lay Nidhëgg, the dragon of death, constantly gnawing it away. Four harts bruised its branches and bit its buds, significant, perhaps, of the constant destructive forces that war against nature. Up and down its trunk ran the squirrel Ratatösk, carrying the words of malice and discord between the

eagle and the dragon, type of the hourly strife between good and evil, between life and death, between light and darkness. Under the branches of Yggdrasil sat the Æsir, the high gods, in solemn council; they were waited on by three maidens, the Norns, who stayed in their chamber under the ash-tree till they were called on to determine the fate of the children of men. Were everything left to them, all would go well, but their beneficent purposes are thwarted by three dread sisters, the Evil Norns. The life of mankind is a constant struggle between the Good and the Evil Norns, and over all the turmoil and sorrow the serene gods watch in silence, constantly intervening through occult agencies, clothing spirits in a thousand disguises, vivifying stones and plants and beasts, incessantly interested in the motley life of man.

4. The notion of holiness, of the spiritual exaltation of a pure existence, seems to have occurred to the Scandinavians alone of pagan nations. It is not in Baldur, the beautiful and faultless God of the Morning, the type of invulnerable comeliness, that we find this thought carried out; the best myths of Apollo present just as bright a figure; but in Heimdall, the White God, the immaculate deity, who was born before the beginning of the world, without father, without mother, trained by nine mystic maidens, and nourished on the vital strength of the earth and the cold pure foam of the sea. He, the watchman of the gods, sits at the earthward end of heaven, and the rainbow springs from his feet. He sees all things and hears all things, and lying awake at night, listens to the grass growing all over the world. In his ineffable purity he sits alone, without passion or emotion, waiting for the end of all things. Under the roots of Yggdrasil he has hidden his great horn, but one day he will set it to his lips and blow, and all the worlds will hear it, and the very dead will rise.

5. There were twelve Æsir, above all of whom Odin Allfather sat supreme. Of these eleven were beneficent, one only evil and rancorous. Loki, hated of gods and men, was an incarnation of evil, presenting in some respects a parallel to the position we find Satan allowed to occupy in heaven in the book of Job. It was permitted to Loki to pervert the ways of men, to traduce them, and even to cause the counsels of the good gods to fail in their execution. After consummating his crimes by instigating the death of Baldur, the Æsir attempted to destroy him, as is related in the wild legends of the prose Edda, but in vain. His infinite cunning suggested to him so many metamorphoses that the gods themselves were baffled in their

efforts to get rid of him. He remained in heaven, an element of evil and discord.

6. Such, briefly sketched, were the cosmogony and mythology of the North. Conscious of the presence of evil, of the limited power of their gods to check or divert it, they waited for a happier condition in the dim future. A horrible age, they thought, would come at last, when all the fountains of the ocean would break up, the demon wolves would devour the sun and moon, horror would fall on all things, and the world be overwhelmed with ruin. Then, as the grim poem of the *Völuspá* tells us, Heimdall will stand up and blow his great horn. Through all the crash of worlds and chaos of dying men, the horn will thunder, and the *Æsir*, gathering up their robes for death, will meet before Heimdall in council. The ash *Yggdrasil* will tremble to the core. Clad in their golden armour, the *Æsir* will go out to fight with the powers of destruction. Odin will die first, and then all the rest. At last Loki will stand alone with Heimdall, wickedness face to face with holiness, and they will slay one another; then blackness and conflagration will engulf the universe.

7. But out of chaos and death a new and beautiful world will arise. The good *Æsir*, renewed in youth and loveliness, will come to inhabit it for ever, and thither the souls of good men will come when they are dead. Loki alone will not revive. There will be no jarring elements in the new heavens, and the renovated earth will exist in peace and holiness, a reflection of the calm of heaven. One single God, the Mighty One, will rule all things with beneficent wisdom, and will make firm his reign in perpetual peace. Such was the dream that comforted these virtuous pagans in their sorrowful struggle against conscious evil and error; a baseless dream, indeed, and the speculation of an ignorant people, but one not ignoble in itself, and not wholly unworthy to prepare their minds for the pure light of gospel truth.

8. It is necessary, in realizing the condition of a race of men separated by many centuries from ourselves, to be careful to avoid measuring them too much by our own standard, and judging them by opinions that spring from prejudice and custom. In the very outset of our examination of the habits of life in the North, we are confronted by a fact so truly obnoxious to our feelings, that we run the risk of being hopelessly scandalized at once. Immediately after the birth of a child, before the ceremony of initiation was performed, the infant's body was carefully examined, and if it showed signs of deformity

or debility, or in any sense seemed unfitted to struggle with the world, it was immediately exposed. To prevent ourselves from over-estimating the enormity of this custom, we must realize the ideal of the people, their determination to be a race of athletes or nothing. It was well enough for slaves or for Teutons to nourish ill-favoured or puny children: it would be ruinous for Norsemen. Their gods were heroes: Odin, king of men; Thor, of the gigantic hammer; Baldur, the essential loveliness; and the highest attainment of mortals was to ascend to a faint shadow of the perfect strength and beauty of the deities. Viewed in this light, the exposure of diseased and deformed infants presents nothing violently inconsistent with the moral standard of the people. The act had little in common with the horrible kinds of infanticide practised among many overcrowded Oriental peoples, where the poor children are put out of the way to indulge the parsimony or laziness of the parents. Again, such an infant had no spiritual existence, in the belief of an old Scandinavian. It was not till he grew to something of man's estate, and began to emulate the high deeds of the gods, that the soul in him was supposed to germinate. Until the process of initiation, which was, curiously enough, performed by sprinkling water over the babe, had been gone through, the father had absolute power over the child's life; but as soon as this sort of pagan baptism had been performed, the exposure of the child was regarded as murder, and punishable by law.

9. When the infant was not so unfortunate as to be doomed so miserably and so soon to end its life, it was prepared with the utmost rigour for a life of hardship and enterprise. Boys were more highly regarded than girls, and more pains were expended on their education. The bodies of young children were habitually bathed in cold spring water, and subjected to almost uninterrupted exercise in the open air. The first thing a boy learned was to handle arms and to kill. There were certain sports among the young men, to which no boy was admitted till he had slain an animal, just as for a grown man it was the greatest of disgraces never to have seen human blood. It would be easy to point to passages in the Sagas which prove that, so far from its being held a crime to kill a man in fair fight, mothers were accustomed to rejoice when their young sons distinguished themselves in this way, believing that the deed gave promise that the boy would prove a virtuous vikingr. In the magnificent opening of the "Lay of Helgi Hundingsbane," when, to the noise of shrieking eagles and the thunder of cataracts, the

Norns meet to bless the new-born Helgi, the highest gift they promise for him is, that he should be a most famous prince and the greatest of all the warriors of his time. Various means were resorted to to give strength and courage to the young hero. Bodily exercises of the fiercest kind gave his muscles the elasticity and hardness of steel, and it was thought that vigour could be given to the spirit by feeding on the flesh of wild beasts and drinking their blood. On such food, it was imagined, Baldur attained that consummation of masculine beauty, which it was the first desire of every youth to emulate; and the heroic legends abound with stories of great warriors, whose young limbs were invigorated with the raw flesh and blood of animals.

10. Never, probably, since the world began, save during one short century on the plains of Nemæa and Olympia, have men so perfect in vigour and shapeliness been seen on the surface of the globe as those who shot over the ice or galloped in frantic races over the hill-sides in the palmy days of pagan Scandinavia. We read in the Sagas of youths who could outstrip horses in running, who could swim and dive more nimbly than seals, or, like Olaf Tryggvesen, hew down men with a battle-axe in each hand. The exaggeration of a poetic narrative may have over-coloured these and similar statements, but it is impossible to deny that the universal testimony of early Northern literature proclaims the existence of a vigour and sturdy greatness in the ancient times of which the human race now knows nothing. The careful elimination of all elements of physical weakness, the unwearied and unsparing system of muscular training, the absence of those epidemic diseases that afterwards sapped the health of all Northern Europe, combined to produce a nation whose magnificent virility and well-balanced bodily perfection have hardly found a rival in the world's history.

11. A nation of athletes will be found to regulate itself by special and singular rules. Where the bodies of members of a community are mature and healthy, afflicted by none of the irritating maladies that attack the intelligence and the temper, a comparatively simple ethical code will regulate the public life. The outward existence may be one of turmoil and riot; the inner life will remain simple and serene. The meaner vices find no resting-place in pure and vigorous bodies, and the complex crimes of modern civilized peoples are scarcely known to the primal and untainted races. On the other hand, the athletic race, like the athletic individual, has special dangers to which it may fall a prey, has special vices which a milder form of life makes it easy to ignore. Trained in the perfect exercise

of a muscular frame, ready to handle arms at any moment, the Scandinavian grew up, as he was sure to do, a warrior. The fountain-head of all that was noblest and best in the greatest epoch of the race, the barren island of Iceland, was too poor a country to support a nation by agriculture or commerce. Its inhabitants were a race of aristocrats—the nobility of the whole of Scandinavia—and in the splendour of their manhood and the pride of their birth they regarded neighbouring nations with much the same scorn as the Hellenes regarded Persians or Sicilians. War, with its glory and its spoils, became the highest and only fit occupation for a gentleman, and the traditions of religion gave their approval. The great *Æsir* were gods of war. The most solemn oaths were taken by the implements of battle, as in the *Völundarkvida*, where *Völund* makes *Nidud* swear by ship, by shield, by steed, and by sword. But of all forms of the religious frenzy of fighting, there is none so strange as the tales told of the Berserker, those high priests of *Odin*, whose marvellous feats have given rise to so much bewildered controversy. The name of Berserk is familiar enough to us all, but the full meaning of the word is not so well known but that I may be excused in pausing to define it. The Berserk was a warrior, who went into battle in his bare shirt or sark, that is, unprotected by armour; it was believed that the flesh of these fanatics had become so perfectly hardened by exposure and by divine influence, that spear or sword could scarcely wound it, and that these men themselves were endowed with a superhuman strength, so as to be capable, during one of their fits of exalted excitement, of feats far beyond the power of ordinary mortals. The physical explanation of this extraordinary phenomenon, which rests on far too abundant evidence to be thrown aside as absurd, has never satisfactorily been given. It is certain that moods of furious afflatus would pass over whole companies of men, when they would seem to forego their mortal nature, and, becoming something more or less than men, would rush on what was called *berserksgánger*, an expedition of berserking. It was impossible for sane men to oppose these half-naked maniacs, who would fill the air with their howls, bite pieces out of their shields, rush through fires with their bare feet unscorched, and perform actions of the most unbridled violence. In later times, kings of the stamp of *Rolf Krake* kept a group of these men as a kind of body-guard, for it appears that this superhuman excitement might be directed into definite channels and prove of use to an army in moments of sudden emergency. The archetype of the Berserker was *Thore* himself, who put on

his Ása-strength, his force of frenzy, when performing his great deeds against dwarfs and Jötuns. But the Danish historian, Saxo Grammaticus, speaks of the whole as the result of witchcraft, and there can be little doubt that it was regarded in early Christian times with all the more suspicion, because of the deep veneration that it had called out among the pagans. As after the Iacchic festivals in Greece, so after a Berserksgång, the performers suddenly became exhausted and comatose, and presented the appearance of men barely alive after a crisis of fever. Something parallel is to be seen nowadays in the Asiatic dervishes, who are inspired with a kind of religious catalepsy, and, after a period of frenzy, fall down in the utmost exhaustion. The chief interest this physical phenomenon has for our inquiry, is the light its existence and encouragement throw on the temper of the race. To a people so essentially lovers of athletic exercise as the Norsemen, such a condition of superhuman power would present something of the glory of an apotheosis, and we find such to have been the case. The Berserker were regarded as men specially dowered with gracious gifts from the gods.

12. In their rules for battle, and for attack and defence, the Northmen appear to have been guided by a natural sense of what was upright and just. Shouts and the noise of arms, the whistling of arrows, the ringing of shields, manly deeds, courage and enterprise,—these combine to form the unvarying record of their battles. Fighting for its own sake was a virtue. But in the descriptions of incidental circumstances of warfare we find more that is characteristic. The rules of *hólmgångr*, or duel, in which the two contesting parties retired alone to a quiet place, generally an uninhabited island or holm, and there fought till one was dead, were elaborately framed with a view to exclude the possibility of foul play. This openness of proceeding was universal in the Northern warfare. Even in that very constant form of attack, always called in the Sagas *at nema hús á einn*, literally, to take the house from one, which consisted of gathering in a body as many men as the clan could afford, and, torch in hand, surrounding the settlement of the enemy—generally the little castle of the chief and the clustering dwellings of clients and slaves, circled by a wall, and setting fire to the woodwork,—even in this violent form of attack there were rules of honour which all true Norsemen strictly attended to. It was the extreme means when two clans had long remained in open strife, but it must not be attended by any kind of treachery. The onslaught must be made in open day, and

cowardly subterfuge of every kind was rigidly forbidden. Again, the Edda several times asserts that a refusal to give indemnity for the slain, or to pay the blood-fine, was an act of meanness that brought down the ire of Odin on the delinquents.

13. But the young warriors rarely were willing to remain at home to amuse themselves with merely local broils. Every year the fjords of Iceland and Norway sent forth some young Ulysses, bound for more perilous voyages than the Greek sailor dreamed of, and destined to scarcely less picturesque adventures. The passion of going a-viking, of being a vikingr, was inherent in the Scandinavian race. The Swedish writer, Professor Geijer, in his well-known poem *Vikingen*, gives a wonderfully dramatic study of this passion of the sea-rover. To a young Northman it became impossible to remain at home; he would wander along the shore, sick at heart with longing, till at last a chance came of sailing out into the wild open sea, and finding new lands and new men to rule and conquer. This universal custom of sea-roving was, doubtless, the cause of the extraordinary precocity of culture that surprises one so much in the history of Norway. The young vikingar penetrated through the Mediterranean to the Black Sea itself; harried the coasts of France and Britain, and carried home again not only wealth and experience, but some echo, at least, of the faded civilization of classic times. Not intimately enough connected with the inhabitants of Southern Europe to be deeply influenced by them, still less to be warped by the blindness and littleness of the forms of culture prevalent in the early Middle Ages, the vigorous and observant young Northmen would rather be excited into the expression of their own individuality, and into the formation of a moral and ethical code intimately expressive of their own pure though violent modes of life. The art of poetry flourished in Iceland when it was dumb elsewhere in Europe, and the luxurious products of the South, introduced by the vikingar, gradually led to the adoption of such a highly-cultivated life among the pagan Norsemen, that it was possible for Iceland to produce during the darkest midnight of the Middle Ages a brilliant school of poets, historians, and critics. The revival of learning and literature in Europe was almost cotemporaneous with the final decadence of those arts in Iceland. The death of Snorre Sturlesen preceded the birth of Dante by about twenty years, and in Snorre the literature of Iceland found its most splendid and almost its last exponent. The life of this truly wonderful writer, with all its magnificence,

luxury, and violent end, parallels with strange exactitude what is recorded of the poet-tyrants of the Greek colonies ; and in reading it we find it almost impossible to realize that one is being introduced to an inhabitant of that barren and desolate land that lies just under the Arctic Circle. The introduction of Christianity was the ruin of all this intellectual splendour. The light of Norse imagination refused to burn in the dingy lanterns in which the monks proposed to hide it, and no sooner was the pagan worship extinct than the decay of literary production came, and a merely critical epoch set in. It is, doubtless, an instructive question to ask ourselves,—why has the spread of Christian truth been in so many parts of the world a death-blow to the fine arts? Shall we call the results in Greece, in Rome, in Iceland, in Europe after the Reformation, a mere string of coincidences? or shall we confess that when God speaks to the nations with a special voice of awakening, it is needful that the beautiful, innocent arts that occupy them should for a while be put aside, and the whole attention of the earnest-minded be given to the things that are essential to His Kingdom? It would seem so; and as all of us in our graver moments would confess it is Luther and not Rafaele, Wickliffe and not Chaucer, for whom as men and as Christians we have to thank God most, it seems to me to show little wisdom to regret, as many writers have done, that the beautiful literary arts of the North were destroyed by the introduction of Christianity, since, though that Christianity was indeed a wretched twilight of monkish superstition, it paved the way for the brighter light of the Reformation, and made it possible for Norway, that had once seen Snorre Sturlesen's dragon, with its gilded mast and its silken sails, glide out of the Trondhjem Fjord, to watch from the same shores the humble bark of Hans Egede and his beautiful wife Gertrude sail out to carry the Gospel to the miserable savages of Greenland.

14. The position of women among the Scandinavian nations presents some very interesting peculiarities. It was one of the noblest sides of the Northern character that appeared when the fate of a woman was discussed. All through the Sagas we find foreshadowed the principles of that chivalry by which the Norman descendants of the Vikingar succeeded in infusing some degree of moral purity and poetic grace into the sordid life of the Middle Ages. It was the Norseman's creed that there existed something sacred and divine in woman; and in consequence he treated his wife and daughters with gentleness

and courtesy, and the rest of their countrywomen with respect. Admiration mingled largely with this feeling of veneration. The Icelandic language is singularly full of delicate and passionate phrases to express the beauty of woman, and must reflect, in this respect, the feeling of the nation at large. The Sagas abound with incidents of a character far more sentimental than one would be ready to expect, and throughout the old literature the passion of love is treated with a delicate reticence that reminds one of very modern romance, and contrasts most favourably with the rude and coarse love-tales of the Middle Ages. The universal testimony of the poets bears out the view that the same order and reticence regulated the conduct of the Norsemen towards their own free-women, and the laws of marriage that have come down to us testify to the solemnity and force of the rites that accompanied domestic ties. The education of the girls was tinged with the same athletic spirit that gave so strong a colouring to that of the boys. If she was not to be a hero, the daughter was at least to be trained to be the mother of heroes. Accordingly a certain manly force, a masculine temper, were the subjects of admiration and praise in a woman. Even some pale reflection of the berserk-fury seems to have reached the women. It is curious to read of heroines who shared the toils of warfare with the men; in doing so they imitated the Valkyriur, those warrior-maidens of the gods. One of the lays of the poetic Edda is occupied with the feats of Svava, the daughter of King Eylimi, who fell in love with Helgi, and protected him in battle. But no story is more curiously illustrative of the manners of the time than that one in the Völsunga Saga, which records the warlike achievements of the chaste and valorous Alfhilda, daughter of the King of the Ostrogoths, Sigurdr.

15. The laws of maidenly propriety and the customs of wooing and betrothal were quite modern in their exactitude of detail; by all but those roughest warriors and most lawless vikingar who lived altogether outside the pale of social life, these laws were strictly observed. The higher the rank of the individual the more was she bound by the bondage of etiquette. A maiden of the highest class was obliged, by custom, to refuse several suitors before she consented to change her condition. It was the fashion, too, among the daughters of kings and chieftains to send the accepted suitor on expeditions of great danger and difficulty, and to consent at last only on his return covered with the glory of renown in arms. Many high-born ladies would rather die than accept a man of ignoble lineage or un-

tried in warfare. It follows from all this that a girl was free to choose her suitor, and to accept whoever seemed most pleasing in her eyes. This freedom, however, which is positively asserted by Saxo Grammaticus, and of which many Sagas give proof, was in most cases restricted by the power of intervention possessed by the father of the maiden. The Egilssaga, which teaches us so very much of the social and ceremonial life of the Norsemen, gives us reason to believe that in most cases the male head of the family, or, in want of such head, the King himself, superintended the betrothal, and might forbid it. If the father refused his permission, the lover had still one remedy at hand; he might challenge the father or brother of the girl to fight, and might win her by his death. Nor would a Scandinavian maiden have shrunk from alliance with the man she loved, even though he came to her with his hands still wet with the blood of her nearest of kin, supposing, always, that this blood had been shed in fair and open fight, according to the strict laws of *hólmgánger*.

16. Whatever the measure of liberty in choice given to the damsel, one thing is certain, that the ceremony of marriage, besides being very protracted and formal, was accompanied with certain business relations between the families united. The bridegroom was said to buy his bride of her father; it was a kind of commercial exchange. The word for wedding, *brúðkaup*, which signifies bride-purchase, shows that, in form at least, this ancient and barbarous proceeding was continued down to the Christian times. No doubt, in the more polished ages, the purchase resolved itself into merely a sum paid, as a sort of reversed dowry, to the parents of the bride, when they became deprived of her services by her marriage; but such a gift was always essential if the marriage were to be a legitimate one at all.

17. The wedding, which was always celebrated in the house of the bride's father, was formulated by an appeal to the hammer of Thor. The bride and bridegroom exchanged rings, and in many respects the ceremonies were much the same as those of the same countries in Christian times. One little feature of the scene was not without its interest: the wife was invested with a bunch of keys, in token of her new position of mistress of household arrangements. The wedding was celebrated with much pomp and with a lavish display of hospitality, open house being held for eight days, or even a month, until the end of which time the bride and bridegroom remained in the father's house. The newly-married pair, arriving at last at home, were

met by their entire clan, into which the new wife was formally received, and she became at once the partner of her husband's honours, and manager of the household affairs. It is interesting in the light of recent efforts in legislation to know that the personal property of a Scandinavian woman was out of her husband's reach, unless special provision to the contrary had been made at the time of the marriage. For the rest, the man's power over his wife was almost unbounded; but against its misuse, she could always oppose her right to demand a divorce. This menace appears, however, to have been of little avail in the more barbarous settlements. Practically, the husband could chastise, sell, and even, if she were untrue to him or sought his life, kill his partner. The *Njálsaga* bears evidence that even very noble women took blows from their husbands without reproach. The man's right to sell his wife demands explanation; we have already said that he was understood to *buy* her, and it is to be hoped that the one custom was practised as little as the other. In passing, it is vastly amusing to note that Professor Petersen, with true continental complacency, points out the "still prevailing" parallel custom in England of men selling their wives at a market!

18. In spite, however, of all excesses that local barbarity may have fallen into, without question the position of a Scandinavian woman was more honourable than that of any of her sex in other parts of Europe in that age. She was in no wise a slave or a dependent: on the contrary, the history and the poetry of the North abound with examples of heroic women whose gravity and grace made their households admirable, while their judgment and sense rendered them the constant counsellors and companions of their husbands. Domestic love, of the sober, steady, reticent kind, that we are apt to think rather a modern growth of the races kindred to ourselves, evidently was an everyday matter among the early Norsemen, a quality that only needed the illumination of pure religion to make it the shining and beautiful thing it has now been for centuries. The Icelandic laws concerning separation and divorce were very elaborate and strangely consistent with the general views of modern thought on the same question. If the wife, accused of a crime deserving divorce, chose to defend her innocence, it was usual to appeal to one of those physical tests so constant in the early history of nations, such as running barefoot over burning coals, or plunging the naked arm into boiling water. These picturesque features are preserved in several of the oldest Sagas, as in the *Gudrunarkvida* in the Edda, where Gudrun answers

the accusations of Herkia by plunging her beautiful arm into the scalding caldron, and drawing it out unscathed, having seized the *iarknastein*, the milk-white opal of innocence, at the bottom. On the whole, we may say that marriage, though in the outset more a matter of expediency than of pure inclination, yet in practice brought with it a mutual fidelity that often ripened into strong affection. The wife died in ancient times on the bier of her husband, less, it would seem, from conventional obligation than from real sentiment, for widows were free to re-marry, and, in doing so, they retained their social status and the respect of their kindred.

19. Domestic rule seems to have been orderly. The Northern laws and practices show far more consideration for individual rights than those of Germany. A man was master of all in his house, but the rights of wife, children, and hired servants were accurately defined. He might strip his wife to her sark, and drive her from his door, keeping her dower and her wedding gifts, if she were proved to be faithless; but whatever he did must be done openly, and in the presence of her own kindred. The rest of the laws of the household partook of this rigid formality. Strict regulations guarded the interests of free servants, who could claim wages and compensation for unjust dismissal. Hired servants could leave the master's house if not well fed, or even in case they were not nursed when ill. But they could be beaten and forced to work, if they were *lazy*.

20. It was in the treatment of slaves, however, that the savagery of pagan life made itself most keenly felt. Redress was to be found for all freemen, but there was no redress for slaves. They formed an indispensable portion of every Norse family, for no race of free artisans existed, and all hand labour was intrusted to bondmen. This unhappy section of the community consisted of the descendants of earlier, conquered races, or of criminals who had been punished by loss of liberty. They were held in the deepest contempt; it was shameful to join in the same work with a slave; to die by the hands of one was held to be a terrible disgrace. They might be killed if they were mutinous or disobedient, and in some cases they were even offered in sacrifice to the gods, like cattle. They were bought and sold like chattels; their marriages were informal and unrecognized, and they were not counted as members of the household. They possessed nothing on earth, and after death were hurried out of sight like beasts. In spite of these social indignities, however, there is no reason to believe that any

special inhumanity was practised towards them; such a supposition, indeed, would be out of harmony with what we know of the genial serenity of the Scandinavian aristocrat, when he was not inflamed with the passion of war. The duties of the slave were simple and humble. He had to cultivate his master's land, to cut and gather in hay, to reap and prepare the grain, to look after the cattle, to grind salt, and perform the other menial duties of the household. The hired servants, of whom I lately made mention, were chiefly men who had been liberated by their masters, and whose position, though entailing civic rights, was not in everyday matters much more elevated than that of the slaves themselves. I cannot leave the discussion of the domestic life without calling attention to a beautiful trait in the Scandinavian character, which must temper somewhat our natural indignation at the treatment of the slaves. We find abundant proof that tame animals were valued and carefully tended as part of the family. The dog and the cat were provided for even in the laws of Iceland, and are spoken of repeatedly as honoured and cared-for guests. Surely we cannot believe that those who could show a sense of the responsibility of man towards his dumb dependents far higher, alas! than that shown at this day in several countries of Europe, could in practice have been very barbarous towards their human dependents, though the legal position of the latter may have been savage and degraded to the last.

21. There was no fear of death among the Northmen, who had no belief in punishment after death, nor any dread of annihilation. They anticipated a continuation of sensuous enjoyment in Odin's halls, and believed that after the solitary passage of the spirit into the other world, the cares and sorrows of earth would cease. One kind of death alone was horrible of them,—death in bed, or by natural causes. This kind of decease, to which they gave the contemptuous title of straw-death, was repugnant to their religious traditions, for Odin had promised to receive into Valhal only those who died in battle. The fate of straw-diers was doubtful, and hence those who were not fortunate enough to fall in battle, acquiesced when they grew old and weak in the expediency of putting an end to their own lives, or, like Stærkodder, of accepting death at the hands of others. No part of a heathen life is so dreary as its close; never do the consolations of revealed religion appeal so strongly to the natural reason of the student of history as when he is occupied with the dolorous expedients by which the cowardly heathen seeks to evade or the heroic one to hasten the inevitable close of life. Strange as it may seem, a not unusual mode

of suicide was hanging; several heroes and heroines in the Sagas chose this mode of death, which was considered to have nothing shameful in it, and which was performed in the presence of the people. One singularly impressive mode of self-destruction, the one, perhaps, of all which takes the imagination most by its solemnity and beauty, was that adopted by Sigurd Ring and others, who went alone on board a burning ship, and suffered themselves to be blown with full sails out into the open ocean. Captives would solicit death at the hand of their captors, the usual form chosen being the exquisitely horrible one of carving an eagle, as it was called, on the captive's back,—that is, cutting with a sword-stroke down the backbone and then across the ribs, so as to expose the lungs,—a mode of death truly worthy of an athletic savage.

22. There are still some points in the Northern character that I should be glad to discuss, such as the estimate of wealth and the fidelity of friends and foster-brothers, but time fails me before the subject approaches exhaustion. I have said enough, I trust, to demonstrate in what chief particulars Scandinavian pagan civilization forestalled the advantages of Christianity, and in what particulars it glaringly failed to approach them. In the consideration of the modes of life among, perhaps, the most elevated people of heathen antiquity, one is struck by the utter inability of the unilluminated conscience to perceive any nobility in those passive virtues which Christianity alone inculcates, and which the life of its Divine Founder so uniformly and so exquisitely illustrated. That social and domestic order are good, that it is well that women be guarded and honoured, that temperance, mercy, and uprightness are excellent qualities, are ideas which, it would seem, may spontaneously start in the mind of a thoughtful pagan, but those words of self-abnegation that struck the antique world with dismay,—“love your enemies,” “blessed are the poor in spirit,” “come unto me for I am meek and lowly,” for these there is no echo in the unawakened, unilluminated heart, and for the just understanding of these more knowledge of divine things is needed than the wisest skald or sophist can weave out of his own unaided intellect.

The CHAIRMAN.—It is now my duty to move a vote of thanks to Mr. Gosse for his interesting paper. For myself, I should have been glad if it had pointed out how far the matters with which it deals are purely mythical, and how far they distinctly rest upon an historical basis, and also if the dates of the events alluded to are historical.

Mr. SIMCOX.—I think there is very little authentication in history of all the marvellous things that we hear about the Berserkers.

The CHAIRMAN.—In his paper Mr. Gosse says :—

“Christianity alone takes no colour from the psychological conditions that surround it, but moulds to itself men of every shade of temperament.”

This is more than doubtful. Let us look at the aspect which Christianity assumed in the fourth, fifth, and sixth centuries. It was largely coloured by the intellectual tone of the Greeks, with whom it passed into a metaphysical discussion. On the other hand, the German form is one of the highest forms of Christianity that has ever existed. It is plain that the Christianity which has prevailed in different regions has been largely modified by the habits of thought and previous civilization which have prevailed in those regions ; in fact, it has followed the same common law which has affected other departments of human progress ; and, as I have said, it has been largely coloured in its conception by the intellectual and moral forces by which it has been surrounded. This, I think, will not be denied by any one who has studied the history of the Christian Church. In the fourth paragraph of the paper there is a remarkable assertion that the Northern races had a higher moral ideal than had the Greek and Latin races. If we look at the Greek and Latin races, their representation of the idea of holiness is a strange misconception. Take the whole range of their literature, and you will not arrive at what we call the idea of holiness in its treatment of morals. The idea of holiness seems to have been never comprehended by the ancient races, and the Christian idea of purity is wonderfully absent from all ancient ethics. The Greek and Latin ideas of holiness consisted almost exclusively in outward observances, and their purest moralists have indulged in images which we freely designate as impure. Our modern ideas on this subject have been largely developed in German Christianity, and I should have been glad if this paper had been a contrast, pointing out the distinctions between the grand idea of the German character and the grand idea of the Scandinavian character, and I should have been glad to have known the effects produced by the Scandinavian character, as distinguished from those produced by the German character. We know that the social position of woman has been vastly superior in the Christian ages to what it ever was in Greek and Roman society, where it was extremely degraded. I cannot doubt that the state in which females were placed in the ancient world exercised a necessary lowering influence upon the moral aspects of that world. I have recently been reading Renan's last work, and he states that the elevation of women and slaves first really began with the Neronian persecution. This is a remarkable admission for such an author. In his seventh paragraph, Mr. Gosse has referred to a very peculiar feature in these Icelandic people. It seems that they had an expectation of a renovation of society at some future period. If so, that is a most striking contrast to the ideas of the ancient world. The millennium of the Greek and Roman philosophy was always placed in the past, and the general despair with which the philosopher contemplated the prospect of man in the

future was of a most striking kind. The utmost a philosopher hoped was to keep things right, but a millennium in the future was never hoped for by him. And when modern unbelief appeals to the progressive advancement of modern life, I say this is an aspect of Christianity, because before Christianity the hopes of the future were of the most dismal character. I should like to know more of the actual historical character of the fact which is set down by Mr. Gosse, in his thirteenth paragraph, where he says,—

“It is, doubtless, an instructive question to ask ourselves, Why has the spread of Christian truth been in so many parts of the world a death-blow to the fine arts?”

This passage must be accepted with considerable qualification. I suppose that the author meant to refer to the effect of the Reformation. What is the actual position which Christianity has held with respect to the fine arts? The fine arts of Greece and Rome were unquestionably associated with the ancient idolatries, and, to a great extent, with the moral degradation of ancient society. Christianity has nothing to do with it, as a result. In Renan's “Life of St. Paul,” one which unbelievers are not very fond of, speaking of his speech at Athens, Renan says he lifted up his hammer and broke the elegant creations of Greek genius to pieces. He in his intense admiration of them calls them “their gods and goddesses.” Of course Christianity was hostile to the Pagan forms of art, which were all idolatrous; they ministered to the worst forms of moral corruption; but while this is the case, as a matter of fact, there is nothing in the New Testament which is opposed to the general progress of art, and there cannot be a doubt that Christianity has created an art of its own. (Cheers.) I do not use too strong a term in saying that the moral improvement of art has been more or less effected by Christianity. But there is a great danger in mixing art too largely with Christian worship, because we see that a certain aspect of it has a tendency to corrupt it. Although Christian art may not have produced that pure exhibition of the beauty of the human form which is seen in Greek and Roman statuary, it has created the magnificent Gothic cathedrals and other works, and Christian painters have been able to create productions of art, as great as were ever accomplished by the artists of Greece and Rome. In one paragraph, Mr. Gosse says, a Scandinavian woman might choose her own husband, while in another it is stated that the power of a man over a married woman was of the most terrific nature. I cannot understand how the two statements are capable of reconciliation. But this shows us that, taking Paganism in its best form, woman was degraded, and I cannot help thinking that the elevation of woman to the proper position which she now occupies in society is greatly due to the results of Christianity. Christianity has fallen upon very favourable ground in the German and Northern races of mankind, but I cannot see the portion of this paper which gives so extremely favourable a view of the position of woman in the Northern races, is quite borne out by the character given by Tacitus of the Germans. No doubt the highest teaching with regard to the position of woman is that given by St. Paul in the well-known passage which I need hardly quote. (Cheers.)

Rev. J. SINCLAIR.—As far as this paper is an exposition of Scandinavian mythology, I can say nothing except that I thank the author for the explanation he has given us. Every man who reads picks up something of every subject, but I am afraid that this is a subject of which many besides myself have but a very fragmentary knowledge. But there are many questions suggested by this exposition which are collateral to the exposition itself, and which we may be capable of forming an opinion upon; such as those which have just been indicated to us so ably in the speech of the Chairman. Now, I cannot help thinking that the author of the paper is more nearly right about the development of Christian art than is the Chairman. I think Mr. Ruskin, who is a high living authority on every question of art, has, in his *Seven Lamps of Architecture*, expressed his opinion of the incompatibility of high art, or of some developments of high art, with a high degree of religiousness or spirituality. I think that all experience justifies and confirms this opinion. It is true that some of the great painters, both Italian and English, and of one or two other nations, have been eminently Christian men; but I think you will not find any people who, as a whole, were equally distinguished for spirituality and for taste,—refined and artistic taste. I am not aware of any such example. On the other hand, we find that some of the nations most distinguished in this respect have been also no less distinguished for their sensuousness. A little consideration of human nature in its actual condition, as we know it, is quite enough to account for this fact. There is a kind of antagonism between sensuousness and spirituality,—at least, as realized and manifested by man in his actual condition. The very essence of religion is, that the emotional and affectionate nature goes out towards the Divine Spirit. I believe that in the heavenly spirit, when men's moral and spiritual natures have been fully developed, and all extraneous elements have been rejected, then art—the beautiful in form and colour, and other aspects of which we can now form no conception—will not only be compatible with this perfection, but associated with it as a result. But, in man's present imperfect state, I think there must be a certain degree of antagonism and counteracting influence between spirituality or high religiousness, and the high development of the artistic elements in human nature. There is just one other question on which the paper gives an opinion in which I cannot so thoroughly agree with the author. Mr. Gosse speaks of the humanity of those people as shown in their treatment of their dependents, slaves, and the lower orders of society. He adduces the fact that they were distinguished by their kindness to the lower animals—dogs and cats especially—as a presumptive proof that they were not so harsh in their treatment of their slaves as the laws and customs of their community would seem to infer. Now I am afraid the premisses scarcely warrant the conclusion. I have often observed that children who are very fond of petting their cats and dogs are very much addicted to quarrelling with one another; and I have often asked them how it was that, being so kind to cats and dogs, they were so different with their brothers and sisters. That is a very significant fact, which one has observed for one's self; and it may be accounted for in this way. Tame

animals are submissive; they never contradict one, if they did, they would receive a different kind of treatment. A great cause of conflict in society is opposition of interests, and the conflict of whims and notions. I think there is nothing which marks the real progress of a nation in true Christianity so much as this one thing; that is, the manner in which the wealthy and the powerful are wont to treat those who are dependent upon them, and beneath them in social circumstances. I think we can measure our own religious condition very well. If any one were to judge British society by the true Christian standard, it would be discovered that while we have made progress as compared with the Scandinavian community, there is yet very great progress to be made in the feelings with which men ought to regard one another, and the treatment they give to each other, especially when it is in their power.

Dr. E. HAUGHTON.—As regards art, if we want guides and rules for genuine refinement, worthy of mankind, we shall find them nowhere else than in Christianity: there we find all that is right in man and woman. We shall find the highest ideal embodied in Christianity, and we never need be afraid that that will interfere with culture, which in itself is good and desirable, it being evidently the Divine idea that all ranks and conditions and occupations of men should be equally penetrated with the same spirit of courtesy and self-denial.

Mr. R. W. DIBDIN.—In his eleventh paragraph Mr. Gosse speaks of Iceland as the fountain-head of all that was noblest and best in the Scandinavian race. I rather doubt the correctness of this. Iceland was colonized at the end of the ninth century by some of the Vikings driven out from Norway by the conquests of Harold Haarfager, and it is interesting to remember that the descendants of some of these Norsemen, at the close of the tenth century, were the first European discoverers of America, long before the time of Columbus. It is curious to notice what hold such legends as that of the death of Baldur, to which Mr. Gosse alludes in his third paragraph, still have in Scandinavia. On the eve of the longest day almost every town and village in Norway has its Bale fire lighted to commemorate his death. Whilst he lived, the days were said to have been getting longer and longer and brighter and brighter, but as soon as he died they commenced to darken and contract in length.

The CHAIRMAN.—You will find many of these things in this country. If you go into Cornwall you will find many Pagan customs there.

The HON. SECRETARY.—And in Ireland, on the Eve of St. John, which is the longest day, after the sun sets they light what they call Baal fires, in which wood and turf,—but never coal,—are used, at cross roads and on the tops of mountains. These fires are kept burning till next morning, and the peasants throw their children from one to another through them.

Mr. DIBDIN.—Possibly the name of Baal fires may be derived from Baldur, the good spirit. Mr. Gosse says in his first paragraph:—

“I propose to show this evening how totally distinct was the mission of Christianity to the peoples of the North; to sketch before you the habits

of thought peculiar to the heathen nations of Scandinavia ; and to show in what respect they had learned, spontaneously, as one may say, the axioms of moral wisdom, and in what respects their condition left them, with much of this quality to receive from the Gospel."

I have been much struck in noticing how the Scandinavian mythology and cosmogony corresponds in many points—some of which have been pointed out by Mr. Gosse, and some of which have not—with the truths of Revelation. "Learned spontaneously" was hardly, I think, the phrase to use in describing the means by which the Scandinavian people obtained those ideas. It seems to me more probable that these traditions had their source in the early knowledge, possessed by their ancestors, of matters revealed in Holy Scripture. It is doubtful where the present race of Norsemen came from, as there is no accurate history before the seventh century ; but if the common opinion be true,—and it is an opinion supported by the great authority of Munch, in his "Det Norske Folks-Historie," that the tribes who drove out the Laps and the aboriginal people of Norway, came from Asia, under Odin, it would tend to confirm my theory. Coming from Asia, they would be more likely to be acquainted with Revelation than if they had existed immemorally in the distant lands of Scandinavia.

A MEMBER.—I have listened with very much interest to this paper, having studied Scandinavian mythology to a great extent. There is one point in the paper, with regard to the temporary destruction of fine art in Scandinavia, upon which I should like to say a word or two. All I can say of European art generally, seems to my mind to apply to art in Scandinavia. The decadence of art, Scandinavian, Teutonic, or Latin, sets in when a cataclysm sets in in regard to the religious feelings of the people themselves. We have had a pre-Christian art in Rome, and a Christian art, and there is no disruption in the whole line, Pagan or Christian ; and indeed there is a continuity in art from the earliest times, which is carried out by those links which adapt themselves to the requirements of particular times and phases of civilization. Mr. Gosse says :—

"All of us in our graver moments would confess it is Luther and not Raffaele, Wickliffe and not Chaucer, for whom, as men and as Christians, we have to thank God most."

I must say I think we may thank God for art as well as for its appreciation. Coming back to the philosophic consideration, we find the Latin races imbued with the Roman Catholic form of Christianity. That was a Christian ideality and symbolism. In order to give a tangible idea to their religion, they appealed to the senses of the people. They attracted to religion by means of beautiful works of art, and pictures which have tended so much to the development of art and civilization. But as we know the ideality in time became so much impregnated with errors, that the people lost their hold upon the aesthetic portion of religion, and gave themselves up more to considerations of personal ambitions than to those considerations which religion placed before them. So we have decadence in art, and decadence to a great extent, but not decadence for ever. We find this true of the Puritanical reign in England,

when we had a revulsion of public sentiment, which was only a spring of resentment against the errors under which the people had been brought to labour, and that led to the demolition of pictures, and ornaments, and sculptures all over the country; and it was seen in the demolition of the figures which bedecked the front of Westminster Abbey. They broke down those works of art which were used to symbolize in the freest sense of the word. They broke down those works of art which added to religion the encumbrances of superstition; and instead of showing their resentment to its utmost against those people who by their acts brought about the Reformation, they imagined that the cathedrals and churches were the cause of all that they objected to, and that led to the decadence of English art. When the people came to a true sense of their position, and discovered that it was not the buildings that caused their discomfort, but that it was human error, they found that they had been acting upon the wrong side, and began to regard those cathedrals and churches as houses erected to the Lord, and thus we had a revival of British art, and a restoration of cathedrals all over the kingdom. If we look at the phenomenon of the apparent declension of art in Scandinavia, consequent on the destruction of paganism, we shall be able to apply that theory to explain the problem, just as I have endeavoured to explain it with regard to England.

Rev. J. MARTIN.—Would the author give us a little more information in reference to his fourth paragraph, as to the Scandinavian notion of holiness? I particularly desire to know what warranty the author has for saying that Heimdall is a holy god in the Christian sense of holiness. I do not mean beneficent, but pure in the Christian sense of purity.

Mr. H. CADMAN JONES.—I should like to touch, for a moment, upon one question which has been raised. It has been stated that Christianity is practically modified by the psychological conditions of the nations that adopt it. There is no doubt that Roman Catholicism is prevalent among the Latin races, and Protestantism among the Scandinavian and Teutonic races, and I should not be disposed to deny that there is something in the natural character of each of these races which rather predisposes it to that form of religion which prevails there. But we must take care not to carry this view too far. I have lately heard it put forward almost in this shape,—that Roman Catholicism is the form of Christianity which is naturally adapted to the Latin races, and Protestantism the form naturally adapted to the Scandinavian and Teutonic races, and that we, therefore, cannot expect either race to change its form of religion. I should be sorry to adopt a principle which, if carried out, might lead us to the conclusion that heathenism was the natural religion of some races, and that we must not expect them to change it. It is an interesting subject of inquiry, how far the difference of religion in different countries is owing to difference of national character, and how far to those controlling circumstances which influence the destiny of nations. At one time the Protestants were a majority in Poland, and it hung in the balance whether Protestantism should not become the established religion of the country. The balance turned against Protestantism, and by

the efforts of the Jesuits, with the help of a zealous Roman Catholic king, it was gradually rooted out without persecution. In France, though the Protestants were never a majority, they formed a large and influential minority, including some of the noblest spirits in the country, such as Coligny and Mornay du Plessis. It does not, therefore, seem that national character would have made France a purely Roman Catholic country: that it has nearly become so is owing to two centuries of rigorous repressive measures. I think it would be found that the difference in the forms of Christianity in different countries is to be accounted for, not so much by differences of national character, as by differences of controlling circumstances.

Mr. Gosse.—As to the first question put to me, it was, if I understand it, whether the excitement of the Berserkers was anything more than we find among some other peoples. I think that may be admitted, but that is in favour of my theory, that the Berserkers, like the Oriental dervishes, acted under a religious fervour. Then the Chairman has touched on a vast variety of subjects, but he may be said to be generally in my favour rather than an objector. Mr. Martin has raised an objection to the holiness of Heimdall. I have not laid down that point authoritatively, but have simply stated my belief that in the case of Heimdall there was a singular instance of the metaphysical idea of inherent holiness and purity of thought and action. Another present asks what more information I can bring forward on the subject; there is very little indeed: the same story is told with exceeding diffuseness in one of the poems of the Edda, and I can add very little more. Everybody must judge for himself whether the facts I have stated bear out my statement or not. One subject which has been discussed bears reference to the effect of Christianity on art, and on that point I feel that I differ extremely from all who have spoken. Perhaps my own mind is too much an artist's in feeling to conceive some of the views which have been expressed. I had no intention of discussing this point at all, but only of stating my opinion that when a great spiritual and, if you like, pietistic movement is stirring in the world, at that moment and place the fine arts do not flourish; I leave it to theologians to explain the cause. I merely say that at moments when pietistic feeling has been very strong, the arts have dwindled. Look at Florence; the decadence of Florentine art is marked by the rise and success of Savonarola, one of the most striking instances that occurs to me.* With regard to what I have said about Iceland, I may add that as any one writing upon ancient Greece would take Athens as illustrating what was best and noblest in art and literature, although the pre-eminence of Athens scarcely overlapped a couple of generations, and would take Athens as the head and centre of Greek art; so Iceland, in the same way, is the centre of all that was most intense and brilliant in Scandinavian art and literature.

* It is noteworthy that Michael Angelo first began to study painting, under the brothers Ghirlandajo, ten years before the death of Savonarola in 1498.—Ed.

Not only Norway, but Denmark and Sweden, and Finland and Pomerania, all enter into the description which I have attempted to give you here.

The CHAIRMAN.—What was the population of Iceland about that period?

Mr. Gosse.—It is very difficult to tell, in the absence of anything like a census. The present population is about 64,000, and there is no doubt whatever that then it had vegetation enough to keep at least double that population, and probably a great deal more, because they subsisted largely on stores from other countries,—stores of corn and meal, and various necessities of life, brought from Norway and England and the Teutonic countries generally. I should think 200,000 people might easily have been sustained on the island then, though there is nothing in the Sagas to suggest that so large a population actually existed.

The Meeting was then adjourned.

ORDINARY MEETING, JANUARY 5, 1874.

MR. CHARLES BROOKE, F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed ; and the following Elections were announced :—

HONORARY FOREIGN CORRESPONDENT :—Rev. E. Bersier, 216, Boulevard Perière, Paris.

MEMBER :—Rev. F. Burgess Goodacre, M.D., F.Z.S., Wilby Rectory, Attleborough, Norfolk.

ASSOCIATES :—Arthur W. Crickmay, Esq., President Church Guilds Union, Upper Tooting ; Major M. F. Downes, R.A., Nightingale Vale, Woolwich ; Rev. Joseph Angus, M.A., D.D., Principal Regent's Park College, North Gate, Regent's Park ; Rev. Franklin A. S. Bellamy, St. Mary's Vicarage, Devonport ; Rev. L. J. Bernays, M.A., Great Stanmore Rectory, Middlesex ; Rev. F. Elmer, Vicarage, Biddulph, Congleton ; Rev. C. Darby Reade, M.A., 83, Holland Road, Kensington ; Rev. Warden F. Stubbs, B.A., T.C.D., Incumbent of St. Columba's, 19, Prospect Vale, Fairfield, Liverpool ; Rev. F. Watkins, B.D., Marston Rectory, York.

Also, the following donations to the Library :—

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| "Proceedings of the Royal Society." Part 147. | <i>From the Society.</i> |
| "Proceedings of the Soc. of Bib. Archæology." Part 3. | <i>Ditto.</i> |
| "Report on Fossil Plants." By J. W. Dawson, LL.D., F.R.S. | <i>From the Author.</i> |
| "Protoplasm." By Lionel S. Beale, Esq., M.D. | <i>Ditto.</i> |
| "Cautions for Doubters." By the Rev. J. H. Titcomb. | <i>Ditto.</i> |

It was also announced, that the increase in the number of **New Members** and Associates in 1873 had been slightly in advance of what it had been in 1872.

The Rev. J. H. TITCOMB was unable to read his Paper, on account of a severe accident, but stated that a friend, the Rev. J. B. Heard, had kindly consented to do so for him.

The following Paper was then read :—

ON CERTAIN MAGNITUDES IN NATURE, AND THEIR BEARINGS UPON BIBLICAL INTERPRETATION. By the Rev. J. H. TITCOMB,* M.A.

THERE is a text in the 111th Psalm, which, though it stands in immediate connection with the doctrine of Divine Providence, is none the less applicable to the doctrine of Creation. "The Works of the Lord are great,"—says the Psalmist—"sought out of all them that have pleasure therein!" † What a golden link between science and revelation! It seems to sound like a voice from the realms of universal nature, bidding us search into the laws which govern them, take pleasure in the phenomena which they present to us, and measure the power of their Creator by the magnitude of the forces which regulate them. Thus science, when reverently pursued, becomes the handmaid of true religion; their spheres of thought being separate, yet equally culminating in the praise and glory of God.

2. Such, at all events, is the platform upon which we stand in the meetings of this Institute. Searching into the various mysteries of nature, we do so under a solemn conviction that we are therein studying the works of a Heavenly Father; and that, in all those works, whatever department we may investigate, we are beholding proofs of the Divine goodness and greatness. Whether our investigations lead us into researches among the animal or vegetable kingdoms, or whether into the physical and inorganic, they alike conduct us, as Christian philosophers, toward the contemplation of Infinite wisdom and truth. Whether we are tempted to inquiries respecting things that are minute and microscopic, or to inquiries about any of those forces in nature which bring us face to face with velocities and periods that are overwhelming in the character of their magnitude, the pleasure and the profit are the same. On the present occasion it will be our function to examine some of the latter class of phenomena. In doing which, we shall place the recorded facts of science in the light of holy Scripture; simply

* Now Canon Titcomb. † Ps. cxi. 2.

for the purpose of ascertaining, if we can, how far they affect the principles of Biblical interpretation.

3. It appears to me that it is impossible to overrate the importance of this inquiry. It is one of the greatest and most anxious questions of the day. For so long as Christian philosophers are unable to see how holy Scripture may be a true revelation of God's mind to man, and yet be altogether independent of the researches of science, it is certain that scientific men will have a tendency to regard revelation with distaste, and even look upon its authority with suspicion. If they find themselves unable to pursue their researches from a strictly scientific point of view, without having their opinions called in question as infidel, because they seem to be in conflict with Scripture, they will necessarily come to the conclusion that either one or other of these two bases of belief must be abandoned. It is perfectly clear that they will not abandon the first; and therefore nothing will remain for them but to give up the second. Thus the means we use to protect the authority of Divine revelation may become a latent source of unbelief, and spread the very evil we deplore. I am speaking to you plainly because the danger is imminent; indeed the mischief is already working widely. Nor is it possible for a member of this Institute, whose sole object it is to preserve a proper relationship between science and revelation, to do better service than by showing how each of these may be studied, and received independently, without any want of due allegiance to either.

4. In prosecuting this purpose perhaps I cannot do better than state, at the outset, the conviction which I have arrived at after long and anxious study; and which I now desire to put forth for discussion, with all the anxiety of one who seeks alone after truth. It is this: That while Scripture is indifferent to the duty of expressing itself with uniform exactness upon scientific questions, it is nevertheless so perfectly accurate in some particulars which have been only made known by recent scientific discoveries, as to justify us in believing that, wherever it fails to be properly scientific, it does not result from any inability to be so, but simply from the circumstance that its primary and fundamental object was of a different nature; the scientific propriety of its language having been deliberately set aside, in order that its teaching might be subordinated to those moral and spiritual purposes which were the great ends for which revelation was delivered.

5. It appears to me that this view of the subject is not only capable of proof, but that it is the only view by which we can be loyal to our Bibles, and yet loyal to Science also. To establish this proposition will be the object of the present paper.

6. The line of my argument must be threefold:—1. I shall concede that Scripture is indifferent about speaking upon scientific facts with philosophical accuracy; 2. I shall show that some of its expressions are, notwithstanding, so scientifically accurate, as to be consistent with the latest of our modern discoveries; 3. I shall then test the bearing of these facts upon Biblical interpretation, and ultimately come to the conclusion just announced.

I.—WE SHALL CONCEDE THAT SCRIPTURE DOES NOT INVARIABLY EXPRESS ITSELF WITH EXACTNESS ON SCIENTIFIC QUESTIONS.

7. Since, for all the purposes of controversy, one test is as good as twenty, let us confine ourselves to the Creation of the world; which in the fourth Commandment is said to have been effected in six days. "For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day; wherefore the Lord blessed the seventh day and hallowed it." (Ex. xx. 11.) Now, comparing this statement with the account given us in the first chapter of Genesis, it is perfectly clear that it speaks of the creation of the whole physical universe, including the sun, the moon, and the stars; for, in the course of the narrative of the six days' creation, it is said that "God made two great lights, the greater light to rule the day, and the lesser light to rule the night; the stars also" (v. 16).^{*} Reading all this, therefore, in the way of plain common sense, and taking the words in their simple and natural meaning, it is absolutely impossible to doubt that the Hebrews to whom they were revealed regarded them as teaching that the whole universe, from the stars above their heads to the waters at the bottom of the sea, were created in six days; and that, as God rested from His work on the seventh, that day was to be observed by them

* I am not going to enter into the question as to whether the first verse of this chapter describes an *original creation* of the universe at an indefinite point of remote time; while the rest of the chapter, in which the six days, work is recorded, refers only to the *present condition* of the earth's surface; because that theory is now held to be impossible by all scientific men. It was held by Buckland, but has been abandoned by Hugh Miller and all the later geologists.

as a weekly rest. It may be perfectly right for modern criticism to contend that the days here spoken of are capable of being interpreted as "extended epochs of untold duration." Yet we are bound to allow, in all honesty, that this was not its natural or primitive teaching. The very fact that the seventh day's rest was a day of natural duration could not but have carried with it a conviction that all the other days were of a like character, and that thus the whole work of Creation, from beginning to end, was the product of six days' wisdom and skill on the part of the Heavenly Architect. In other words, the language of Scripture in this particular makes no pretensions to be scientifically accurate.

8. The truth of this need scarcely be examined at any length in a Society like ours. We will, however, make a few brief remarks upon it in connection with some of those magnitudes of time and space, which are now disclosed to us by the researches of geology and astronomy. Let us begin with the former.

9. Of the enormous epochs which must have been necessary to produce the various phenomena of the earth's crust, no man who has seriously studied the subject can entertain a doubt. Easy-going indifference may toss the thought aside; but only ignorance can deny it. Ever since Mr. W. Smith first pointed out that there was a regular order in the deposition of sedimentary rocks, each of the divisions being marked by distinct organic remains representing many successive races of plants and animals which have been buried by the aqueous changes of our globe, and during which changes thousands of species and genera have become extinct, so that the flora and fauna now living are but a small part of those which once lived in the past; ever since that moment our conviction has become more and more clear that the time required for the gradual formation of such rocks must have been vast beyond all measurement. As observations have increased, and fresh records of fact have accumulated, showing the deposition of many rocks perfectly separate in composition, and varying from the Laurentian (which in Canada are 30,000 feet thick) to the Tertiary (which are, upon the whole, 9,000 feet in thickness), this conviction has become so strong as to be irresistible. Some of these rocks are entirely made up of the remains of zoophytes and testacea, the concretion of which cannot but have been gradual. How can we see millions of shells dispersed through a long series of strata without allowing time for the multiplication of successive generations? How can we contemplate certain deposits, such as those which are composed of *Diatomaceæ* (take the *Tripoli* rock in Bohemia, for example, where the microscope

shows that 41,000 millions of fossil specimens of the *Gaillonella distans* are contained in a single cubic inch), without recognizing in such strata a perpetuation of countless generations? Who, again, can take into review the vast superpositions of different strata on the same spot, indicating successive alternations of fresh-water deposits and deep-sea bottoms, subsidences and elevations, dislocations and denudations, arctic climates and tropical, with buried remains of the most divergent forms of flora and fauna, and not be convinced that all this must of necessity represent the gradual accretion of successive ages? To say nothing of the old Cambrian and Silurian strata, almost devoid of organic life, the Old Red Sandstone, with its marvellous fossils, occupying a thickness in some places of 10,000 feet, the Carboniferous Coal-measures, which in South Wales are to be found 12,000 feet thick; the Magnesian Limestones of the Permian period, the lower formation of which alone are 3,000 feet in some parts of the north-west of England; the New Red Sandstone, again; and then the Oolitic beds, which in the Isle of Portland underlie a fresh-water deposit, that, too, underlying a layer of old forest tree-stumps, and that once more underlying a bed of fresh-water calcareous slate;—to say nothing of all these revolutions of the earth's surface;—who can study the fresh-water Clays of the Wealden in Sussex, Kent, and Surrey, succeeded by those deep-sea deposits of gault, greensand, and chalk which surround, and in part overlie them; and these, again, followed by the Lower Eocene beds of the London Clay, containing tropical plants, shells, and animals; and these once more by further deposits distinctly evidencing a period of glacial action, and all ending in the tertiary crust above;—who, I say, can contemplate changes and revolutions like these, during which species of flora and fauna have lived and flourished in all sorts of varieties, each race displacing the other, without having an overwhelming sense both of the forces of nature, and of the enormous periods of time which must have been necessary to produce such accumulated results?

10. The same conviction that extended cycles of ages must have passed away since the heavens and the earth were first created, is no less forced upon our attention by the discoveries of astronomy. I particularly refer to those immense periods which the passage of light can be demonstrated to require before it can reach the eye of an observer on the earth when it comes from stars situated in the Milky Way, or from the still more distant nebulae.

11. So long, of course, as the distances of the fixed stars were unknown, it was utterly impossible to ascertain the length of time which their light would need in order to reach the

earth. This problem surpassed the loftiest efforts of the human mind for many centuries. It was, comparatively speaking, easy to measure the distance of the moon and the nearer planets, and even the sun; inasmuch as by simultaneous observation of any one of the bodies from two different points on the surface of the earth, and from the consequent diurnal parallax, its distance was easily ascertainable by a simple formula. But with the fixed stars this course was impracticable; inasmuch as the space between any two points on the surface of the globe is absolutely insignificant when compared with the tremendous depth of space which separates the earth from even the nearest of such stars. It was found, indeed, that when any fixed star was observed from one given spot, at intervals of six months, giving, as a base-line, the intermediate passage of the globe in its annual orbit round the sun (*i.e.* about 190,000,000 miles), the most powerful telescope could detect no parallax. This circumstance was formerly made use of by astronomers, in order to throw ridicule upon the discovery of Copernicus. They argued that it was impossible the earth could be making an annual circuit of nearly 400,000,000 miles round the sun; because, if so, the fixed stars must of course appear in different positions at different periods of the year. In vain did the advocates of the Copernican system reply, that this was caused by the prodigious distances of the fixed stars, which made the orbit of the earth itself, vast as it is, a mere speck in comparison. In their ignorance of that fact, many of the old philosophers still refused to believe. Since then, however, by means of improved telescopes, and the clever researches of such men as Henderson, Bessel, and others, the annual parallax of certain fixed stars has been discovered; and, as a consequence, their actual distance from the earth.

12. This discovery ranks among the most notable of those which belong to the domain of modern science, and has greatly added to the sublimity of our astronomical knowledge. It was between the years 1838-40 that Professor Bessel, of Königsberg obtained the most unequivocal results in this matter. I say unequivocal, because all astronomers concur in regarding his calculations as correct. The parallax which Bessel determined was that of the double star 61 Cygni, amounting only to $0.348''$, or to very little more than a third of a second of space; from which it was soon calculated that the distance of this star from our earth must be such that light (which is known to travel at the rate of 192,000 miles per second) must take $9\frac{1}{2}$ years to pass from it to us.

13. It may serve to give some idea of the immense distances of the main mass of the fixed stars when we say that only nine

of them can be said to have any distinct and ascertainable parallax; the rest being too remote for positive calculation by any such means. Of these nine, α Centauri is the nearest, being about 22 billions of miles distant; Sirius, a little under 90 billions of miles; and Arcturus, 160 billions, the light from which latter must therefore require twenty-six years to reach the earth. To Bessel, Henderson, and Peters belong the honour of these most important discoveries.

14. Such results, however, are as nothing when compared with the still more splendid discoveries of the two Herschels in relation to the Milky Way—that magnificent galaxy of stars which spreads across the heavens like a broad zone of light, and is familiar to the commonest observers. Submitting this mighty range of stars to his great reflecting telescope, which had an aperture of 18 inches with a focal length of 20 feet, and a magnifying power of 180, Sir W. Herschel found that the distances of many of these stars from the earth must be 750 times greater than the distance of an average star of the first magnitude such as α Centauri. As, therefore, this latter star requires $3\frac{1}{2}$ years to send us its light, it follows that the light from the Milky Way requires more than 2,656 years to reach us. Through the researches of the same great astronomer we learn also that the number of stars in this stupendous creation is from twenty to thirty millions; and that its entire length extends to about 60,000 billions of miles. This being so, the time which light takes to pass from one extremity to the other must be nearly 10,000 years.

15. But we have not done yet. For under the scrutiny of our most powerful telescopes a variety of nebulæ have been discovered, about 5,000 in number,—being systems of other stars still more remote than those in the Milky Way,—some of them being from 7,000 to 8,000 times the distance of our nearest fixed stars. Consequently, about 30,000 years must at least have elapsed since their creation, otherwise a sight of them would never have reached the eyes of our telescopic observers. Nor, is this all. For, to use the words of Professor Birks, “If the distance of these nebulous systems from each other, compared with their own magnitude, bears any resemblance to the distance which separates each planetary system from the nearest fixed stars, it is not unlikely that the intervals of many of the nebulæ are 1,000 times greater than the utmost extent of the Milky Way, or not less than 60 trillions of miles. Such a remoteness is really inconceivable,” he adds, “since light itself, in traversing it, would occupy almost 10 millions of years.”

16. From all this, then, it becomes very obvious that, by a

careful correlation of the science of Geology with that of Astronomy, their discoveries mutually confirm one another; leading us, by the magnitude of their results, to one inevitable conclusion, viz., that the creation of the physical universe was not the work of six natural days, which took place about 6,000 years ago, but of a period which is now lost in years, that must be reckoned by millions. Hence we are bound, as honest inquirers, to concede that Scripture, in its account of creation, although it may really be capable of an interpretation which is not inconsistent with scientific thought,—was nevertheless primarily couched in language which paid no respect to philosophical exactness.

II.—WE HAVE TO SHOW THAT, NOTWITHSTANDING THIS, SOME OF THE STATEMENTS OF SCRIPTURE ARE SO EXACTLY SCIENTIFIC, AS TO BE PERFECTLY CONSISTENT EVEN WITH THE LATEST MODERN DISCOVERIES.

17. Let me only call your attention to three things: the first in connection with Geology; the next with Physiology; and the third with Astronomy.

18. If there be one thing more clearly established by the modern science of Geology than another, it is this:—that the origination of animal life has been progressive. It matters not, for my present purpose, whether the student believes in the theory of evolution, or of separate creational constructions, everything goes to prove that there was a gradual course of development in this department of organic existence which, commencing with the simple forms, ended with man as the highest. All the fossiliferous rocks bear testimony to this. We begin with the *Foraminifera*, even as low as the earliest Laurentian. The Cambrian and Silurian introduce us to mollusks, corals, and starfish. As soon as we ascend to the Lower Ludlow rocks, we find ourselves, for the first time, in the presence of a *Vertebrated* order of fishes, which increase in number and perfection as we pass upwards through the Old Red Sandstone deposits. By-and-by we reach a new order, viz. the *Batrachian*, *Labyrinthodont*, and *Saurian reptiles*, amphibious air-breathing creatures, which are found in the coal-measures. In the Lower Trias of the United States we first meet with the footprints of *birds*. In the Triassic beds of North-western Germany we also find, for the first time, evidence of a small *Mammifer*, probably insectivorous. By the time, however, that

we have arrived at the Stonesfield slate of the Oolitic period, we come upon mammals belonging to four different species, and three distinct genera; while, in the Purbeck beds of the same period, mammalian life appears to have been much more general, for, in one place, the remains of as many as eight or nine genera, belonging to fourteen different species, have been discovered within an area of 500 yards square, all of the *Marsupial* order. We now reach the Tertiary and Post-Tertiary periods, where the order of mammals ranges through every form, until we come to elephants, tigers, stags, &c., which are only varieties of the corresponding species of our present times.

19. Now throughout this long course of progressive development in structural organization Geology discloses no appearance of Man until the last period which I have named. It is perfectly true that a higher antiquity is assigned to Man by many geologists than we have hitherto been in the habit of allowing, inasmuch as human remains have been found in gravel-beds and bone-caves alongside of extinct animals. But that much-mooted question bears in no way upon my present purpose. What I am now observing is, that Man stands out at the end of this long chain of progressive organization; and is therein proclaimed by Geology as its highest masterpiece. Whether he has been upon the earth 6,000 years or 60,000, the records of the rocks can produce no evidence of his existence until all other forms of mammalian life had been previously perfected; nor can it show any other typical form of organization which has succeeded him. This is one of the last revelations of natural science.

20. Such being the case, then, I ask you to notice how exactly Scripture agrees with this code of scientific belief. The narrative of the creation of the universe in six natural days may be as unscientific as you please. The lines of divergence by which their respective narratives travel may be as wide as you like to call them; but when we come to the close of each, you observe they meet at exactly the same point. Man is the great heading-up of the work of creation, the crown and masterpiece of the whole, beyond which no record can be found. In this respect, therefore, Divine revelation and the revelations of natural science are absolutely and precisely identical.

21. Let us now look at one or two facts in connection with Physiology. I refer to the correlation of birds and fishes, and to their marked separation in certain particulars from the organization of beasts. In the first place, birds and fishes are alike oviparous; while beasts are viviparous. In the next place, the methods of locomotion, both in birds and fishes, are analogous; the flight of the first being produced by the movement

of wings in the air, that of the second by a corresponding movement of fins in the water; whereas mammalia are completely destitute of either. We do not mean to say that it needed any discoveries of modern science to point out this amount of correlation and distinction between these orders of creation. I mention them only as introducing another fact which has recently been ascertained, and which throws much additional light upon the subject. The late Dr. Prevost, a celebrated anatomist of Geneva, some years ago startled the scientific world by the results of his experiments upon the blood of birds and fishes, as compared with the blood of mammals; by which he showed, beyond all doubt, that the globules of blood in the two former were identical, whereas the globules of blood in the latter were perfectly distinct. And again, Professor Huxley, in some of his communications to the Geological Society, has adduced certain curious evidences of affinity between birds and the Dinosaurian reptiles.

22. Now, putting these facts together, I call your attention to the very remarkable manner in which they coincide with the teaching of Scripture, in Gen. i. 20, compared with v. 24. In the first of these verses we have a picture drawn of the vivification of the waters, out of which there arises a twofold order of aquatic and aerial creations. "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." From which language, even if we had no science, we might reasonably infer that fishes and birds were correlated both as to origin and physiology. Afterwards, speaking of a separate and distinct department of creational construction, we have the following words:—"And God said, let the *earth* bring forth the living creature after his kind, cattle and creeping thing, and beast of the earth, after his kind." Thus the language of this passage is so far the language of natural philosophy; inasmuch as it traces a physiological distinction between the origin of mammals and those of birds and fishes. True, it is not couched in scientific phraseology, nevertheless its teaching is perfectly coincident with science, even when science is traced up to its latest discoveries.

23. Let us now pass to some of the last and most interesting revelations of modern astronomy. Here, however, instead of using my own words, I prefer quoting from a valuable little work which has lately been published by a Cambridge mathematician.* He is speaking of the question as to whether the

* *The Romance of Astronomy*, by R. K. Miller; to which the author of this paper is indebted for one or two thoughts on § 11.

stars are really fixed, as their popular name supposes; or whether they, like all the minor bodies, have their own special orbits and revolutions. He says:—

“The fact that some of these stars had a distinct and separate motion, indicating a permanent change of their position relatively to the sun, was first discovered by Edmund Halley. Some observations of the three brilliant stars, Sirius, Arcturus, and Aldebaran, made by the old Egyptian astronomers, had fortunately been handed down to his time; and, on looking over them, he perceived that those stars must have shifted their positions since that early time, by a small but well-marked amount. This indicated that either these stars, or the sun, or probably both, must have changed their places by many millions of miles since those old records had been penned by the philosophers of Alexandria. Other astronomers followed in Halley’s track; and, by the beginning of this century, the proper motion of more than a hundred stars had been determined, chiefly by comparing them with Tycho Brahe’s catalogue, made out two hundred years before. These proper motions showed great differences in amount and direction; and no attempt was made to reconcile and systematize them until the subject was taken up by the bold and speculative genius of Sir William Herschel, who revelled in difficulties, and whose daring and ambitious spirit always selected the loftiest and apparently most hopeless themes. He succeeded in evoking order out of apparent confusion and chaos; and announced his discovery of the fact that the sun, with all his gorgeous following, is sweeping majestically through space in the direction of the constellation Hercules. It was not till fifty years afterwards that another astronomer was found bold enough to grapple with this mighty theme. It was then taken up by some of the leading astronomers of Russia, with the advantage of half a century’s additional observations, and Herschel’s results were confirmed in the fullest manner possible.

“Of course the other suns of our great cluster have their own motions also; their varying position relatively to ourselves depending partly upon our motion, and partly on their own. Mathematical theory, proceeding upon Newton’s great law, tells us that the *centre of this universal motion* must be the centre of gravity of the whole stellar cluster; that any star situated there must be at rest, while all the others are circling in ceaseless revolution around it. Mädler, of Dorpat, is the only astronomer who has ventured to seek for this central sun. By studying Herschel’s diagram of the stellar system, and combining it with the known direction of our sun’s motion, this philosopher was led to believe that the centre of gravity of that system must be

situated in or near the constellation Taurus. A careful examination of all the stars in that quarter of the heavens made him finally fix upon Alcyone, *the central orb of the Pleiades*, as being the object of his search."

24. Now, while I must frankly admit that this final conclusion is at present somewhat uncertain, yet I bring it before you as one of the latest and grandest deductions of astronomical science, and as one which identifies itself with a hitherto obscure and unexplained passage of Scripture, in a manner that is eminently striking. If you turn to Job xxxviii. 31, you will find the following words:—"Canst thou bind the sweet influences of *Pleiades*?"* What are these sweet influences? For about three or four thousand years this question has remained in Scripture without any intelligible meaning. It has been supposed to have reference to some old belief in the influence of this constellation on the weather, or to certain old astrological beliefs of some sort. But now the ambiguity may be clearing; and the calm, quiet power of these magnificent influences may be beginning to be really understood. If so, is it not marvellous to find how it has awaited the successive discoveries of our most gifted astronomers thus unintentionally to interpret it? And is it not an evidence that while, beyond all contradiction, some parts of Divine revelation are unscientific in their phraseology, others are in the highest degree accurate and philosophical?

25. This brings me to my third point,—viz. :—

III.—TO TEST THE BEARING OF THESE VARIOUS FACTS UPON THE QUESTION OF BIBLICAL INTERPRETATION.

26. If the preceding portions of my paper be correct, we have seen :—

1st. *That the language of the Bible is sometimes utterly indifferent to the duty of expressing itself with exactness upon scientific themes.* The question which every theologian has to determine is, why was this so? It is sometimes argued that, if holy Scripture be a *bonâ fide* revelation from God, it must necessarily be as correct in its scientific phraseology as it is in its theological, because an Omniscient and Infallible Mind could never have allowed one word to go forth in His name which

* In the Hebrew *Chimah*. That it denotes the Pleiades is agreed; being the least doubtful of the determinations of the Septuagint. See article "Pleiades" in Smith's "Dictionary of the Bible."

was not absolutely true. This sounds very plausible. Yet may it not be one of those human preconceptions by which we may unnecessarily hamper our judgments? For what if God was pleased, in the early education of His church, to deal with it as a teacher does with children; stating facts immaturely and imperfectly, because the whole truth was at the time unsuited to its comprehension? Would there be anything in this unsuited to the infallibility of the Divine Mind? Nay, is it not obviously the case in reference to some points which cannot be controverted; such as the anthropomorphic representations of Deity? Can it be said that the picture of a living personal God, having human members, is *absolutely true*? What we contend for, therefore, is that this case should not be predetermined without investigation. Accepting, as we do, the inspiration of holy Scripture upon grounds which are totally distinct from any of those raised in this discussion, all we maintain is, that theologians should not come to it, having their minds occupied with self-willed preconceptions; but be ready rather, with the humility of little children, to adapt their preconceptions, when necessary, to the inexorable logic of facts. We begin, therefore, by facing this bold assertion that the Word of God must be as necessarily exact in all its scientific as in all its moral and religious language. I ask is this an intuitive preconception based upon some self-evidential truth; or is it a misconception founded upon the self-assumed authority of our own reason? Surely it must be the latter. For what antecedent obligation exists, previously to our making any inquiry into the case, by which we are compelled to regard the language of Scripture upon questions which have a scientific bearing as infallibly accurate? Do you say, because it was inspired by the infallible Spirit? That fact I hold to as tenaciously as any others. But it by no means settles the point. For, as I have said before, it seems perfectly consistent to suppose that the Spirit of God should have inspired the sacred writers with the utterance of infallible teaching upon all those purposes for which Revelation was designed—viz., moral and religious purposes,—and yet have allowed their inspiration to use terms of speech on points which formed no part of the designs of Revelation, such as scientific questions, according to the manner in which those persons to whom the Revelation was delivered could at the time best understand them. The very fact that this distinction presents itself to the minds of reverent believers in God's word as something which is both possible and probable, proves that, at any rate, the opposite conception cannot be necessarily intuitive and obligatory. When that view is forced upon us, therefore, previously to any examination of Scripture language, we

assign it to the self-assumed authority of reason which proudly prejudges the case ; and not, as its advocates suppose, to the exercise of a humble and reverential faith. If faith be really humble, it will take the Word of God as it finds it, and be ready to give up the preconceptions of reason ; it will interpret the writing of Scripture, not as it expects the writing to speak, but as it does speak ; it will use reason, not to prejudice its teaching, but to interpret it ; and on questions which are non-essential to its fundamental purpose, and where its phraseology is inconsistent with the unmistakable facts of science, it will not be shocked or shaken, but calmly conclude that God knew best what He was doing, and had some good reason for permitting the incongruity.

27. What, then, is the bearing of these remarks upon Biblical interpretation? Simply this: That as the Bible was not intended to teach science, the inspiration of its language upon questions involving science was subordinated to the single purpose of making moral and religious truth intelligible. Instead of complicating that teaching, by addressing itself to its readers in language which could not have been well understood, it adopted the phraseology which was best suited to the times, and which served in the most direct and forcible manner to enforce its spiritual lessons. Take the Mosaic account of the Creation, for example. The great purpose of this narrative (which Moses probably wrote as the *resumé* of a grand panoramic vision) was evidently to lay down a basis for the institution of the Sabbath. It pleased God, that is to say, to appoint for man the sanctification of one day's rest in seven, as a means by which his physical and moral welfare might be perpetually subserved. Hence He gave a sketch of His creative works in the form of six separated periods—periods described phenomenally just as they appeared in the vision to Moses as natural days, or as intervals between six evenings and mornings—periods which, whether they were prolonged ages or not, God allowed to be portrayed under the figure of ordinary days, in order that the moral significance of the seventh day's rest might be the more simple and obvious. In other words, the science of the divine cosmogony was subordinated to its great spiritual and religious purposes. Under these circumstances, that Moses should have described what he saw in his vision in the ordinary language of days, and that he should have restated it more decisively in the fourth commandment, constitutes no argument against his having received a *true* revelation. He expressed himself merely as the vision appeared to his own self-consciousness ; whereas, in reality, it may have properly represented six great eras of ages. As

it was not necessary, however, to make the message of God to man strictly scientific, he was permitted to speak popularly rather than philosophically, for a grand moral purpose. In the same way, when scientific men object to the statement of God's having rested from His work on the seventh day, because certain processes of creation are still going forward in the deposition of deep-sea chalk-beds, and in a variety of other methods (a fact, by the way, which is confirmed by our Blessed Lord in that remarkable passage, "My Father worketh hitherto, and I work"); it is enough for us to reply, that Moses made this statement only as a result of the vision which had been granted to him. Beholding a cessation of the various phenomenal changes which had been brought before his eye, he simply described what he had seen, and registered it accordingly; the strictly scientific truth of the case being thus subordinated to its merely phenomenal appearance for the sake of a moral and religious purpose. In like manner, when Joshua commanded the sun to stand still, whatever may have been the nature of the miracle, it was at any rate a mysterious prolongation of daylight; and therefore language was used to denote it which, though strictly speaking unscientific, was, nevertheless, best suited to serve the moral purpose which God had in view, viz., to impress upon the Hebrews His almighty power over nature, and its exercise in defence of His covenant people. In this way both the writing of Moses and the utterance of Joshua may justly be regarded as inspired; notwithstanding that the forms into which their language was thrown are now found to be at variance with scientific accuracy.* I venture to submit that there is neither irreverence nor unbelief of God's word in this form of Biblical interpretation. More than that, I am persuaded it is the only ground upon which the Bible can continue to be received by men of science, or stand against the attacks of scientific infidelity.

28. The man of pure science, however, upon hearing this view of Biblical interpretation, may very fairly turn round and ask us by what right we thus speak of the inspiration of the Bible as consciously subordinating science to higher moral purposes? He may say to us: "This is only your own invention, in order to get rid of a difficulty. The Bible is unscientific in its phraseology involuntarily. Any idea of yours that the Mind which inspired it knew better, and only held

* Other illustrations might be given from the second chapter of Genesis which is still less scientific in its narration, under the same line of argument but, for the sake of simplicity, I forbear to enter upon them; one sample being quite sufficient.

back the real facts of science by a premeditated purpose, is purely imaginary and unwarrantable." Such a rejoinder, I say, may reasonably be expected; and in the absence of any evidence to the contrary, might be perfectly legitimate.

29. We meet it, therefore, now by the second conclusion at which we have arrived in the preceding portion of this paper—viz., *That notwithstanding the unscientific language of some portions of Scripture, there are other parts so exactly scientific as to be consistent even with the latest discoveries of modern philosophy.* We have adduced, you will remark, three evidences of this, and had there been time, we might have adduced more; and we have proved that the Mind which inspired Scripture must have been cognisant of them. Hence we have perfectly logical and rational grounds for believing that the same source of inspiration might have expressed truth much more scientifically in other places if it had been pleased to do so. We see in this circumstance a deliberate reservation of scientific knowledge, which, if it had been the will of God to disclose to us in His revelation, He might easily have done. And, therefore, we lawfully conclude that He withheld it by some deliberate purpose. In other words, that Scripture *consciously* subordinated science to certain moral and religious purposes; which purposes it would have complicated and rendered less perspicuous, at the time when first delivered, if it had been propounded.

30. I consequently sum up the whole argument in the words with which I commenced. I say, if Scripture be unscientific in any part of its language it does not result from its inability to speak otherwise, but simply from the circumstance that its primary and fundamental object was moral and religious teaching. Hence the believer in Divine revelation need not be in the least degree perplexed or confounded; his position is impregnable and immovable. As he does not go to philosophy for his religion, so neither does he go to Scripture for his science. He does homage to both with true loyalty of feeling in their respective spheres, and uses each with thankfulness in the two great departments of truth which they are intended to illustrate. He does not say to the scientific philosopher, "You are an infidel because your views are not coincident with the Bible," neither does he say to his Bible, "Thou art false, O book, because thy voice is not always philosophical." He sees a reason on both sides for the divergence which at once satisfies his conscience and gratifies his intellect, and he pursues his studies accordingly.

31. This is, in my judgment, the true harmony between science and Scripture; and I am satisfied it is the only one which will stand the scrutiny of severe investigation. If

we go beyond this, by attempting to make every word in Scripture tally with scientific facts, we shall not only fail, but weaken the evidences of Revelation instead of strengthening them. In our vain attempt to uphold it by insecure props we shall bring it down with a crash. We shall alienate the scientific world from Christianity, and drive it more and more into antagonism with us. In which case the Victoria Institute, instead of being a foster-mother to religion, will become unconsciously one of its worst and deadliest foes. On the contrary, by treating this important question in the manner which I have ventured here to adopt, we shall sustain our character honourably, both as students of science, and as believers in the Word of God. For observe, I pray you, that while we have approached this Holy Word with an implicit conviction that all its teaching is divine, I have not attempted to force its teaching into any preconceived and self-determined lines of our own making, but have taken it just as it stands, and have interpreted it according to those necessary laws of sequence, which ever attend the discovery of actual facts. Now, I submit that this is at once reverential and philosophical, and alone worthy of an Institute like our own, which professes to reason without unbelief, and to believe without being unreasonable. It seems to me that this is the only method by which Philosophy and Theology can occupy the same chair. Philosophy can surely never cramp her researches into physical science by any antecedent desire to force her discoveries into harmony with the words of Scripture. She says, "I must patiently investigate, tabulate results, reason on them, generalize, and draw deductions accordingly." Theology must do the same thing. She must never cramp her researches into Scripture with any preconceived determination of forcing the sacred text into harmony with science. She, too, must say, "I will patiently investigate, reverently criticise, tabulate results, generalize, and draw deductions accordingly." If students on both sides would only be thus sincerely faithful to their respective functions, and, instead of rashly making war with one another, because they appear at first sight to disagree, would only do their best to get honestly at facts, and, out of those facts, the plain teaching which they present, we might then entertain some hope that, in the calm and quiet atmosphere of ascertained and admitted truths, a way would be found for reconciling their discrepancies, without compromise on either side, and with equal loyalty to both their spheres of thought. This alone can be the foundation of their mutual respect and toleration. As, therefore, it is the singular happiness of our Institute to occupy each of these platforms, I some time ago

determined upon writing and reading a paper before its members, based upon this great principle; and I trust the result may prove that I have not laboured in vain.

The CHAIRMAN.—I am sure we ought to express our best thanks to Mr. Titcomb for his able paper. I will now call upon the Honorary Secretary to read some communications which have been received from those unable to be present to-night.

Captain F. PETRIE.—The first point, taken up in the letters I have received, is referred to in the 23rd section of the paper. Mr. Christie, the chief assistant at Greenwich, writes :*—

“Royal Observatory, Greenwich, Jan. 2, 1874.

“Sir,—In the absence of the Astronomer Royal, I beg to inform you that the evidence of the Spectroscope, as far as it goes, seems to confirm the supposed motion of the Solar System towards Hercules, but the inquiry is altogether one of a most delicate nature. There is nothing whatever to show that Alcyone is actually ‘the centre of the Cosmos,’ all that can be stated is, that it appears probable that the centre of motion of the Solar System is *somewhere* in the *direction* of Alcyone.

“I am, Sir, your obedient Servant,
“Captain F. Petrie.” “W. H. M. CHRISTIE.”

I have also a letter from the Radcliffe Observer at Oxford, who says :—

“Dear Sir,—I think that the Astronomical facts in the paper are given accurately and clearly; but I think that the concession, in the first proposition, is dangerous without a good deal more definition and explanation.

“I am, &c.
“ROBERT MAIN.”

I may add that Professor Pritchard has sent a letter of similar import.†

* I have since received the following letter, dated 15th January, 1874, from the Astronomer Royal, Sir G. B. Airy :—“In regard to Mädler’s idea of the central function of the brightest star of the Pleiades, I do not think that there is any evidence for it: and that, I believe, is the opinion of astronomers in general. There is considerable (although not certain) evidence of the motion of our system in a definite direction, but I do not see any evidence of the revolving motion of it, or of any other stars distinctly round Alcyone or any other star.”—ED.

† The Rev. Canon Birks, Professor of Moral Philosophy at Cambridge, writes to say that he can neither go with the author of the paper in the concession he makes in the first proposition (referring to the scientific inaccuracy of the Bible), nor in his attempted compensation resting on special correspondence between certain texts in the Bible and some modern scientific hypotheses; he also adds :—“The remark borrowed from me in section 15 is taken, I believe, from ‘Modern Astronomy,’ written for the Tract Society about thirty years ago. I was led soon after to ex-

J. E. HOWARD, Esq., F.R.S.—I know that there are many here better able than myself to speak upon the paper just read, but I think we shall all feel that Mr. Titcomb has not at all over-estimated the magnitude of the subject which he has brought before us. For myself, I would suggest that we exercise the greatest possible caution in the way in which we handle the subject; we must all be well aware, that in connection with those last-mentioned six days of creation, there are a number of opinions which are strongly entertained by many. I presume that we are not all agreed upon the interpretation which we should give to this particular portion of Scripture, and the very eloquent, able, and interesting paper which we have heard must not be taken, I judge, as the collective opinion of the members of the Victoria Institute. I wish to say a few words upon the

amine closely that subject of which it speaks,—the distance of the nebulae, —and came to a clear conviction that both Herschel, in his earlier speculations, from whom the view is borrowed, and Struve, in his later and kindred theory, were guilty of a great and fundamental oversight, which rebutted all their conclusions. The phenomena of the Magellanic clouds seemed to me to point decisively in an opposite direction. And on general grounds of logic and sound reason, when less apparent size may result equally from two causes, real inferiority and greater distance, and we have no direct test to decide between them, the natural course is to refer it equally to both; so that a star, giving sixteen times less light, shall be naturally assumed to have half the radius, and twice the distance of another. Again, that days in Gen. i. mean days, and not long, indefinite periods, seems to me a hundred times clearer than that Gen. i. 20 implies any special likeness in the blood globules of birds and fishes, when compared with mammals, or that the ‘sweet influence of the Pleiades,’ in Job, has any secret reference to Mädler’s unproved, and I think improbable guess, that he has detected in Alcyone the true centre of gravity of the whole cosmic system. It seems to me quite plain that Orion, the Pleiades, and Arcturus, are there named in connection with the changes of the earth’s seasons, as indicated by the rising and setting of particular groups of stars, and can thus have no possible reference to such an abstract speculation in sidereal and physical astronomy. The view which I adopted with regard to the nebulae nearly thirty years ago, is the same in substance as that which Mr. Proctor has lately maintained with so much ability.”

The following letter has also been received from the Rev. A. I. McCaul, lecturer in Hebrew at King’s College:—

“Mr. Titcomb’s paper does not satisfy me. In § 26, he says of true faith, that ‘it will interpret the writing of Scripture, not as it expects the writing to speak, but as it does speak.’ A most excellent maxim, which has not been followed (I think) in the note to section 7. ‘I am not going to enter into the question whether the first verse of this chapter describes an original creation . . . because that theory is now held to be impossible by all scientific men.’ In other words, the theories of scientific men lead us to expect the opening verses of Genesis to have this particular meaning, and therefore we will not stop to enter into the question whether the Hebrew original admits of this meaning or not. The English version, by its italics, is sufficient, or ought to be sufficient, to warn the ordinary reader of the 2nd verse, that there is something peculiar in the wording of it. I need scarcely remind you that the logical copula is, as a rule, omitted in Hebrew,

“strictly scientific” aspect of the question. The expression which Mr. Titcomb gives us in the third paragraph of his paper is, “if they find themselves unable to pursue their researches from a strictly scientific point of view”; I should judge that “strictly scientific” means, taking all pains, by every possible means, to ascertain the truth on any definite subject. The questions of the Creation, and the six periods of the creation of the world, are, of course, questions of fact, to be investigated like all other facts, taking into account every possible means of arriving at the truth; and I should consider the person who altogether overlooked or rejected the testimony of Scripture, as not viewing the thing from a “strictly scientific” point of view at all. I consider that a person with a really scientific mind, not having that mind prejudiced and previously led away, would take into

as so often in Greek, *e.g.*, *καλὸς ὁ ἄνθρωπος*, the man *is*, or *was*. In lo, ‘darkness *was* upon the face of the waters’; ‘God saw the light that it *was* good’ (verse 4), the italics indicate the absence of the copula in Hebrew. But in the words, ‘And the earth *was* without form,’ the absence of italics shows that there is a word in the Hebrew in this case for ‘*was*’; and so there *is*, and it ought to have been translated ‘had become,’ *ἐγένετο*. ‘And the earth had become without form and void.’ In my own mind there is no doubt whatever that this is the meaning of the Hebrew words. But if so, surely it affects the preceding verse, and *necessitates* an interval of time being interposed between the action of the first and second verses. But if the Hebrew has this meaning, I do not feel disposed to relinquish it because Hugh Miller and later geologists have abandoned a theory which appears to be in harmony with it. It is not my business as a Biblical interpreter, or as a Hebrew scholar, to make the Hebrew say what it does not say, out of compliment to any scientific theory, however highly it may be thought of. Science does not appear to me to be sufficiently in harmony with itself to be in a position, or anything like in a position, to lift up its voice against the Scripture statements of facts. The position held formerly by geologists with reference to the period of time necessary for the formation of strata, has (I believe) been relinquished, and they now say that perhaps hundreds of years would be enough for what formerly they said required thousands of years. I am, therefore, undisturbed by what are called ‘scientific facts,’ for I retain a doubt whether they will, some few years hence, be any longer recognized as facts. Science is not in a position to dogmatize, or, at any rate, to assail the position of the Scriptures with its dogmata. The Samaritans had their Pentateuch more than six hundred years before Christ, and almost ever since they have been in antagonism with the Jews. We may be sure, therefore, that it was no newly invented volume, which they learned to venerate. It was a law, concerning the origin of which, and concerning the antiquity of which, there was no doubt. The statements of this venerable record are not lightly to be set aside for so-called scientific theories which grow up like the mushrooms. I have also to draw attention to the fact that again, in section 22, Mr. Titcomb falls into a snare from which the italics of the English version might have delivered him, ‘fowl *that* may fly.’ There is no relative pronoun in the original, but two *co-ordinate* clauses. ‘Let the waters bring forth abundantly,’ &c., and ‘let fowl fly,’ &c.”

account, even from a *neutral* standpoint, the testimony of so ancient, and in every sense, so remarkable a document as the first chapter of the Book of Genesis: he would then, I judge, confer with all those who have examined that document, to see exactly what it does say. That is one of the first things involved in a strictly scientific investigation. He would have to get at the basis and groundwork of everything, and the discussion as to what the document is, whence it proceeds, how it was given, and what exactly it does state, enters not only into a theological, but into what I should call a "strictly scientific" view of the subject. I do not think that we have in Mr. Titcomb's paper, able as it is, materials for this; for I consider that he has not gone to the foundation of a "strictly scientific" view of the whole matter. Mr. Titcomb gives us, for instance, the view that Moses received all this account of creation in visions, and represented those visions to us. Now, we do not anywhere in Scripture (that I am aware of) learn this. We do not, in the first place, know that this information was first given to Moses. There are certain indications in the style, and language, and manner of the Book of Genesis, as all those who have studied it very well know, which lead one to suppose that it might be the incorporation of the previous knowledge handed down from the very first beginning of the family of man, and in a certain line preserved, and then incorporated into the Book of Genesis. I have not the Scriptures with me, or I could easily point out that which probably is known to many here;—"These are the generations of the heavens and of the earth," as co-related with "these are the generations of Noah," and "these are generations of the sons of Noah," and so forth; also in one place, "this is the book of the generations of Adam." Then, of course, it is a very old observation that the first chapter and two or three verses of the second chapter are called by some critics the "Elohim" document, while the next portion is called the "Jehovah Elohim" document. There must surely be allowed to be a very great difference of opinion upon a subject which we admit is one of great difficulty, and which will probably so remain; for as yet the conclusions of science are fluctuating, and by no means certain. Our own views are undergoing changes, and, ten years hence, the subject may be looked upon in a very different light from what it is this evening. I have no doubt whatever in supposing that Mr. Titcomb is right in thinking that very extensive periods were occupied in the work of creation, but I desire that we should rather subordinate all these questions to that which I regard as the truly scientific way, of beginning at the beginning;—if we cannot tell how the Revelation was communicated to Moses, to admit that fact, and to let the document speak for itself. It seems to me that the Scriptures, as the first of Genesis, come before us very much as nature comes before us. We are brought into this world, and find that it is a world full of difficulties. If we have power to master those difficulties we attain good results, but no one can deeply think upon or contemplate the creation or nature, without seeing that it presents very great and in some cases insoluble difficulties. Any one who has studied the Scriptures will

see many great difficulties, of which this is only one specimen, and the way to benefit from these is, with a humble, reverential, and child-like mind, to study and prayerfully to seek for the explanation of these difficulties. With these observations, and hoping I have not detained you too long, I should like to conclude by urging upon you great caution in treating and handling the subject, because it is, as we all know, a favourite ground with sceptics. Looking at it in their own way—that is to say from the antagonistic point of view—the document is not to be lightly set aside. In whatever way they regard the record, if they suppose there is no revelation in it, still the difficulty arises that such extraordinary agreements do occur with the deepest researches of science. Mr. Titcomb has given us some intimation of them, but they might be very much extended. One remarkable work, which has appeared lately, referring to the creation of light, points out how wonderfully consistent it is with all we can know or imagine of the operations of the Divine Being and of the researches of science. Nothing can be more illustrative of what has been said than the work of M. Pouton on the “Beginning.” Looking at it from another direction, a person who says the days must mean periods of twenty-four hours, has to explain how it is that any person capable of writing such a wonderful chapter should begin by describing days before the sun is created—days consisting of evening and morning and daylight, before the sun exists. What is meant by the evening-morning if we are compelled to take it as an ordinary day? What is the commencement of the first day beginning in the *evening* or *sunset*? And then, again, when does the seventh day terminate? All these are questions which, in whatever way this portion of Scripture is looked at, present difficulties, and we cannot approach them with too reverential a spirit, nor can we extend too much toleration to those whose views are different from our own.

REV. G. CURREY, D.D.—Mr. Titcomb has evidently introduced the *days* of the creation by way of illustration, and I trust that we shall not lose sight of the main purpose of the paper, by entering into a discussion upon the creative days of Genesis, which would give us considerable trouble, and would scarcely help us to determine the question which Mr. Titcomb has raised. The nature of the days of creation, and the manner in which they have been regarded, give indeed an apt illustration of the first proposition which Mr. Titcomb lays down, namely, that a great part of Scripture contains descriptions of natural phenomena, which are not in accordance with modern scientific research. Professor Challis has said, in one of his works, that no language of Scripture is unscientific; I suppose what he means is, that it is not contrary to science. But it is certainly unscientific in another sense; that is to say, describes things as they appear to the outward senses, not as science shows them to be. When, therefore, we say that the language of Scripture is *unscientific*, we mean that it describes natural objects as they appear, and does not touch upon the reason of their appearances. Scripture does not, therefore, contradict Science, but simply describes that of which Science endeavours to give an account. The second point is the one which I should like to have discussed: whether we can dis-

cover in Scripture intimations, not understood at the time, but now seen to be intimations, of certain scientific truths which have been made known in modern days, but were not known at the time at which the Scriptures were written, and which could not have been known by mere human knowledge. Such intimations, if they exist, must prove the books to have been written under the guidance of one possessing more than mere human knowledge. This is, I believe, the substance of the second proposition.

Mr. TITCOMB.—Quite so.

Dr. CURREY.—This is a point of great interest. It struck me at first that Scripture was a little too much treated as one book. "It knows more than it expresses." Of course Mr. Titcomb is quite as well aware as I am, of the variety of the books of Scripture. I suppose he meant, that throughout the books of Scripture, though written by a variety of authors, the unity of the Divine mind is made manifest by indications of superior knowledge—knowledge of results which have since been obtained by scientific research. It would by no means follow that the writer himself understood the full significance of the language which he employed, but being guided by One possessing perfect knowledge, he used expressions which, as discoveries have gone on in the ordinary way, are seen to be specially suitable and appropriate. Thus truth which science has reached by laborious and continued research, may have been implied in scriptural words, the fitness of which could only be thoroughly apprehended after the discoveries were made. Such a view is naturally very attractive, and I wish that I could be more thoroughly convinced of its correctness than I am at present. I cannot but think many of these supposed anticipations of scientific discovery are owing to the ingenuity of reasoners who, having the facts before them, are able to find in a few words of Scripture a kind of fore-shadowing of some scientific truth, which may after all be due simply to this, that the *appearance* necessarily gives some indications of the *cause* of the appearance. On the other hand more recondite truths, such as the motion of the whole planetary system round one point, are at best, so faintly indicated that we may well doubt whether the supposed indication is not a mere fancy of him who has produced it. I must confess that the instance often given, and brought forward by Mr. Titcomb, of the "sweet influence of the Pleiades," and "the bands of Orion," presents itself to my mind as one of such fanciful interpretation. I know that ingenious men have often discovered in human compositions, allusions which were not in the mind of the writer. There is a well-known instance of this in a paper of the *Spectator*, in which two lovers are represented as communicating with each other at a distance, by a process which has been likened to the electric telegraph, of which some have called it an anticipation. But there is no trace of the method or principle of the electric telegraph in this paper of the *Spectator*; so that when in after-days a person compares the two, he simply applies knowledge now acquired to the realization of a common idea, that of rapid intercommunication between persons at a distance, and calls the one an *anticipation* of the other. There have been many instances of this kind

of analogy,—I mention this case by way of illustration. One must therefore be cautious in reference to this second proposition ; to establish it will require more investigation, and more facts to be brought together, than we have now before us. Mr. Titcomb will at once reply, and very justly, that in a short paper like this, he rather intended to suggest, than to establish the truth. But though I have frequently seen such suggestions, I have not yet seen the assertion supported with sufficient force to bring conviction to my mind, and I do not myself see why we should, *à priori*, expect to find in Scripture traces of scientific accuracy. We know for what purpose God has been pleased to reveal His will to man ; how He has employed certain writers, to whom He gave power to make known the great principles of moral and spiritual truth ; to show beforehand, as far as He was pleased to reveal, those things which were to come to pass. All these ends were certainly quite independent of any accurate scientific investigation or statements of scientific law. Therefore I must fairly say that I should not have, *à priori*, expected that God, for the purposes which His revelation was intended to serve, would have thrown into the revelation such hints of definite scientific laws ; and if, after grave consideration and inquiry, it were to be found necessary to admit, that the suggestion of these hints was due to the ingenuity of human conjecture, and was not borne out by more exhaustive investigations, it need not shake in the slightest degree our belief in the Divine authority of the Scriptures. We should be very careful, in statements of this kind, to guard against making the truth of Scripture seem to *depend* upon the establishment of an hypothesis. If there be in Scripture real hints of scientific discovery it is an interesting fact, but it is by no means necessary to make them out. Revelation would be no less Divine, as regards its authority and origin, if this second proposition of Mr. Titcomb were incapable of being maintained. We must all be much obliged to Mr. Titcomb for the paper which has just been read. A great deal of what is stated in it is especially valuable at this time, in order to guard us against that unscientific mode of treating Scripture, according to which men sometimes endeavour to force it to speak a language which it never pretends to speak. For it must never be forgotten, that the purpose of Scripture is not to teach science, nor to lay down scientific laws, and that when it treats and describes phenomena in the form in which they appear to the senses, it does all that can be intended in relation to the great ends of creation. All this is well expressed in the present paper. There cannot be too much put forward in the present day to prevent misapprehension on the part of persons who, after studying the Bible without Science, are shocked when Science throws a new light upon some object which they have been accustomed to regard from a different point of view ; and, also to correct the misapprehensions of scientific men, who fancy that those who are maintaining the authority of the Scriptures are maintaining and insisting upon adherence to exploded errors which no thoughtful student of Scripture ought to or need maintain. The paper of Mr. Titcomb is in this way very valuable, but his

second proposition seems to me to require more proof before it can be considered to have been established.

Rev. S. WAINWRIGHT, D.D.—I quite agree with Dr. Currey's opening observation in reference to avoiding mere side issues, and concentrating our remarks upon the obvious drift of the paper. With respect to the point, one of great importance raised by him, Mr. Titcomb, in his paper, shows us what his mind is in regard to it, and he makes quite as much of the second point as of the other; his second point is, "we have to show that, notwithstanding this, some of the statements of Scripture are so exactly scientific, as to be perfectly consistent even with the latest modern discoveries." Mr. Howard said with perfect justice that this second head should have been very largely elaborated. No person, I take it, is more conscious of that than Mr. Titcomb himself, but he could not elaborate every point, and give the necessary measure to each. With respect to this particular subject Dr. Currey says he should like to see more, but he added, and rightly, that it was impossible for Mr. Titcomb to say everything within the compass of a single paper. Perhaps Dr. Currey will allow me to say in reference to that remark of his, that the difficulty I am painfully labouring under in making these remarks is, that I cannot compress all I wish to say in the compass of a five or ten minutes' address. Dr. Currey says he is of opinion that rather too much has been made of some matters, and he went on to notice, justly enough, that the Bible is treated as one book, although it is written by different men. Unless I am much in error, Mr. Titcomb himself, in a work he has recently written, draws attention to this very head. Now the point I wish to arrive at through these preliminary remarks is this. There is a more or less real or seeming correspondence between Scripture and science, and this Dr. Currey suggests, whatever its measure or extent, may be the result of the reasoner or the student placing a meaning upon words which was not in the mind of the writer when they were written. Dr. Currey does not charge anybody with *malice prepense*, nor does he say what amount of inspiring spirit would be necessary to enable a student or reasoner to find out this correspondence. Now I think it is demonstrable, by evidence of the most satisfactory kind, that, on the contrary, the inspiring spirit did intend that the student of the Bible, ready to look at these matters from a scientific point of view, and taking the character and construction of the book as one of the facts that have to be accounted for, should find that there is a science in the Bible, which is not to be got rid of except by a determination to ignore it. Is it simply that there are such hints as Dr. Currey spoke of? Is it not true that, in addition to such hints, you have express assertions upon scientific topics, uttered and actually recorded in an age when it would have been as great a miracle as any the biblical writers now claim credit for, if man, in the age in which these statements were recorded, had of himself suggested that there were such things. I do not propose now to give instances, but reference has been made so expressly to the first of Genesis, that perhaps I may be allowed to turn to that. How can you

put aside the divine inspiration which intends to tell you something which, I venture to say, on the face of it, obviously does not convey a moral or religious truth, when you are told that there was light before the sun? How could you prepare yourself to expect of a writer who knew nothing more than appeared on the surface, that he would have told you that he was putting into his narrative something that would discredit it in the estimation of the persons for whom he wrote it? I do not know whether they understood the full significance of it, but if I am to accept the facts of inspiration, I answer that these holy men spoke not of their own will, but as impelled by a divine afflatus. Then I think that covers the whole ground. I should like to state in a few words what was written by Dr. Candlish ten years ago, in the preface to a new edition of his "Reason and Revelation"; he says, "The truth I take to be this—the inspiring mind had to convey to man a revelation of moral and religious truth; He had in this connection to give a certain amount of scientific knowledge. The problem to be solved was, how the language in which the revelation to be conveyed should be so constructed and so adjusted, as to convey to the men of each successive age no higher scientific knowledge than they were in possession of, and yet should be found, in the long run, to be abreast of the highest scientific results." Dr. Candlish goes on to say that in his belief and judgment that problem had been solved. After a close and minute study of this subject, I believe this is substantially a true statement of what has been done. If a man says, it would have been more satisfactory had the scientific knowledge of the Bible been more evidently in advance of the age; I ask, in advance of what age? If in advance of every age but the coming and final age, it would have been hopelessly unintelligible to all that preceded that age. If in advance of any particular age, it would have been similarly a hopeless enigma to all who lived before it, and would have been discarded as contemptible by all who came after it. The problem was simply this,—as Professor Challis and Dr. Candlish have stated it,—to convey the truth in language which, while popular in its mode of expression, should not utter any one statement, as a matter of fact, that was not strictly true. Some persons say the Bible was not given us to teach science, but they are hardly warranted in saying what the Bible was intended to teach, unless they are in possession of the views of the inspiring spirit. We, on the other hand, are warranted in saying that the Bible was intended to teach moral and religious truths, even when embodied in statements affecting scientific knowledge. "As in Adam all die; even so in Christ shall all be made alive." Again, "God hath made of one blood all nations." In these as in many other instances the moral and spiritual truth is absolutely dependent on the scientific truth: showing that what God has joined together, you will have great difficulty in putting asunder. With respect to the language of the Scriptures and its popular character, if it is asked of us, why it is that the Bible is not strictly accurate in scientific terms? we have a right to answer, that the first scientific men of our age, before they cast a stone at Biblical language, should see that that which they themselves use is correct. In such a book as the Bible, it

was imperative that the language should be that of popular phraseology. Professor Birks says with justice that it is not Newton who complains of the statement that the sun was risen upon the earth when Lot entered into Zoar. What would you have? You must accept such a statement in popular phraseology, and I maintain that it is not unscientific because it is given in popular language. There is, however, one remark in this paper, which, notwithstanding my great reluctance to differ from Mr. Titcomb, I am obliged to dissent from. I find that I have put no less than three notes of interrogation to a single section of his paper. It is § 27, and the notes refer to what Mr. Titcomb says in regard to the "vision" of Moses, which, to say the least of it, seems to me somewhat visionary. I certainly do not see my way out of the difficulty in that direction, and as far as the general argument is concerned, I agree with Dr. McCaul and Professor Birks in rejecting the visionary idea. Mr. Titcomb says, "In the same way when scientific men object to the statement of God's having rested from His work on the seventh day, because certain processes of creation are still going forward in the deposition of deep chalk-beds, and in a variety of other methods; it is enough for us to reply, that Moses made this statement only as a result of the vision which had been granted to him. Beholding a cessation of the various phenomenal changes which had been brought before his eye, he simply described what he had seen, and registered it accordingly; the strictly scientific truth of the case being thus subordinated to its merely phenomenal appearance, for the sake of a moral and religious purpose." Now after what I have said, the meeting may not be prepared to hear me add, that I dissent from this statement, because I have told you that I justify the language of phenomena; but I must say that instead of writing the passage as it appears here, I should have written just the contrary. Without taking up any other points in the paper, I may state generally that I find that the language of the Bible exhibits a marvellous instance of scientific accuracy; for instance: the Hebrew writer says that God, as God, "hath the earth upon nothing." Again, we read, "Only be sure that thou eat not the blood; for the blood is the life; and thou mayest not eat the life with the flesh." In these passages the writer could not have come nearer to the fact, if he had been acquainted with all the minuteness of modern science. In uninspired cosmogonies you find the writers talking of God having balanced the earth with mountains on each side in order to keep it steady. Suppose that the Bible, in any single line, had done this, or had subscribed to the astrological doctrines of the Jews, the Greeks, and the Latins, its scientific accuracy might with justice be disputed; but now we have a right to point out how marvellously the finger of God has kept the inspired writers of the Scriptures to statements which have commanded the adhesion of such minds as those of Chalmers, Sedgwick, and Whewell. These are men who knew all the discoveries of modern science, and yet they accepted the Bible as we have it. Then, I contend, these are more than hints; they are direct affirmations of the scientific truth of the Bible. Surely the existence of these scientific allusions in records so old, when the

truth could not possibly have been ascertained, does warrant us in saying that this is the finger of God. And in connection with the existence of these positive affirmations of truth there are remarkable evidences of error on the part of students of science. Scientific men are, in these days, constantly abandoning their own theories, and until you get finality in science, you have no right to question the scientific accuracy of the Bible.

Captain F. PETRIE.—As science has made such rapid strides even since the days of Chalmers, Sedgwick, and Whewell, perhaps it may be well to supplement Dr. Wainwright's remark in reference to their acceptance of the Bible, by quoting the opinions of two among the leading men of the present day in the scientific world, namely, the Rev. Robert Main (*Radcliffe Observer*), and Professor Phillips* (Professor of Geology at Oxford). The former, alluding to the Creation as given in Gen. i. 2, 3, says, "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."†

The CHAIRMAN.—There is only one observation I should like to make before Mr. Titcomb replies, and it has reference to Alcyone being the centre of the entire *Cosmos*. As a scientific society, I am glad we are not allowing it to go forth that we implicitly accept Mädler's hypothesis, when we know it to be altogether ignored by many astronomers of eminence. Mädler has assumed from certain observations, that the star Alcyone is the centre of the *Cosmos*—the centre around which the whole universe revolves. Mr. Titcomb speaks of its being somewhat uncertain, but that phrase is not sufficiently strong, seeing that it is altogether disputed by many astronomers of eminence. As to the meaning of the passage in Job, "Canst thou bind the sweet influences of Pleiades or loose the bands of Orion?" it is suggested that that refers to the heliacal rising of the constellation, at the time of the year when it took place, and would be within the comprehension of the people for whom it was written. But as to its being the *omphalos* of the *Cosmos*—the centre of the whole universe,—that must have been beyond their knowledge, and the fact itself is very questionable.

* Professor Phillips died after the date of this meeting.—ED.

† "Replies to Essays and Reviews" (Parker, 1862).

Dr. IRONS.—Mr. Titcomb has given two chief illustrations of anticipations of the concurrence of Science with Scripture. Now I think we should be careful before we assume this, because however interesting the speculation may appear, I think the two points are hardly clear enough for us to rely upon.

The CHAIRMAN.—I do not wish to impugn the other point, for which there appears to be much more reason—that is, the intimate relation that exists between the tribe of birds and that of fishes, and their simultaneous creation as mentioned in Holy Scripture. Some time ago Professor Huxley at the Royal Institution, gave a lecture in which he descanted with much unction on the assumed palæontological fact of a feathered reptile: he brought forward these fossil remains as the “missing link” between the tribes of *aves* and *pisces*—birds and fishes,—and some weight appeared to be attached to it in reference to the Darwinian theory of development.

Rev. J. H. TITCOMB.—In reference to what has fallen from the last two speakers, I gather that out of the three illustrations which I brought forward in confirmation of my second point, it is only the last which is disputed. I was prepared for this. Dr. Currey, to whom I am indebted for the manner in which he brought the discussion into its proper bearings, remarked that he would have liked to have had the second division in my paper greatly strengthened; and Dr. Wainwright and Mr. Howard said that it might be: I am fully conscious that this is the case; and that the absence of other illustrations seems to give a weakness to the argument which it does not properly possess. Indeed, I had jotted down some points originally for that purpose; but, as they did not seem to me to bear especially upon the Magnitudes of Creation, I forbore to introduce them. As to many of the observations of those who have taken this paper to pieces, I can only say that they justify rather than confute me; and satisfy me more than ever of the extreme unwisdom of forming any kind of preconceived opinions as to what Scripture ought to say upon scientific questions. I believe this unphilosophical method of treating the words of Inspiration is at the root any conflict between Religion and Science. I can never yield to any man in my love and veneration for God's Holy Word; but that is a totally different question as to whether, in that blessed book, we are bound to expect invariable scientific accuracy in all its revelations to man. I will only reiterate my conviction that, if this Society is to be of any real service in defending Divine Revelation, and if it is to have any influence upon those men of science who are now disposed to criticise and laugh at Scripture, we must be prepared to stand upon the ground which I have here ventured to lay down—viz., that Science and Revelation occupy two distinct and separate spheres; that each may be regarded as different departments of one great empire of Truth; and that any attempt to make one interfere with the other will only bring them into open and ruinous conflict. The purposes of God in Revelation, being moral and spiritual, and not scientific, I read them in the former light, and not the latter. They teach me that I am saved by the Redemption of Christ, and that Heaven at last shall be my home; this is

the message of the Bible to my soul, and it is enough. As for questions of modern science, I have endeavoured to show in this paper, that He who inspired the Bible, while conscious of all future discoveries, held very much in reserve ; first because it was no part of His Divine purpose to reveal them ; and, secondly, because, had they been revealed, the language would have been unintelligible. This seems to be the firmest basis upon which all can rest their belief on the Bible, when it is brought front to front with the phenomena of modern scientific facts. And holding fast to it, I feel sure that we need be none the less reverent on one side in our Christian faith ; while we shall be all the more wise and successful on the other side, in our treatment of scientific unbelievers.

The Meeting was then adjourned.

REMARKS

By the Rev. J. CHALLIS M.A., F.R.S., F.R.A.S.,

Plumian Professor of Astronomy, Cambridge.

AFTER carefully reading Mr. Titcomb's paper "On Certain Magnitudes in Nature, and their bearing on Biblical Interpretation," I have been induced to comply with a request for some MS. remarks upon it, partly from the interest I feel in the subject, and partly from having written an Essay on the First Chapter of Genesis, which I produced soon after the appearance of "Essays and Reviews." This work, which is entitled "Creation in Plan and in Progress," was printed at the Press of the University of Cambridge, and published by Macmillan & Co., in 1861. As I am of opinion that if Mr. Titcomb had been acquainted with the contents of this publication (which I fear is now out of print), he might possibly have modified certain views expressed in his paper, I beg permission to offer for the consideration of the Institute a reproduction, as brief as may be, of such of the arguments therein contained as appear to bear immediately on subjects likely to be discussed when the paper is read.

In the first place, I have to state that reasons are given in that work for concluding that the language of Scripture neither is, nor can be, *unscientific*; that is, it cannot be *contradictory* to the language of Science. The arguments on this head are for the most part contained in the Introduction (pp. 4—13). It will suffice for the present purpose to adduce the argument (in pp. 6—9) relative to the distinction to be made between *physical operations* and their consequences in *personal sensations*, and to justify, in particular, on the ground of this distinction, the language of Scripture as to *the fixity of the earth*.

By experiment and mathematics it has been ascertained that *sound* is produced by *vibrations* of the air, that *loudness* depends on the *extent of the vibrations*, the *pitch* of a musical note on the *number of vibrations* in a given time, and that the *harmony* of two musical notes depends on the *ratio* of the number of vibrations corresponding to one, to the number of vibrations in the same time corresponding to the other. Thus, in one rank we have such names as *sound, loudness, pitch, harmony*; and in another rank *vibrations, extent of vibrations, number of vibrations in a given time, and ratio of numbers of vibrations*. Similarly, according to the undulatory theory of

light, we have what all the world calls *light, brightness, colour*; and corresponding thereto in the language of Science, *vibrations of the æther, extent of the vibrations, and number of vibrations in a given time*. Now in both these instances one set of names express *facts* (things made or caused to be) just as really as the other, but the two classes of facts are utterly diverse, and in essentially different categories. One kind (the former) may be called *personal sensations*, being proper to the individual, although universally experienced; while the other is a class of facts external to the individual, and understood only by the intervention of modern physical research.

Researches of that kind are made in departments of science which may be included under the general term *Dynamics*, and the facts and laws elicited, as involving the agency of physical force, may be called *physical operations*. The relation between the two classes of facts is such that the physical operation has its analogue and consequent in a sensational fact; but because the operations and the consequences are of totally different qualities, there exists no human knowledge or means of inquiry by which it could be anticipated that *such* consequences would follow *such* operations. For instance, it is out of the limits of human understanding to comprehend why the *sensation of sound* results from vibrations of the air, or the *sensation of colour*, as a *red colour*, from vibrations of the æther. The relation being one of *mere antecedence and consequence*, and not such a relation between cause and effect as those we have means of reasoning about, we can only say of it that it exists by the *immediate volition* of the Author of our being and of our sensations.

Exactly the same considerations are applicable to the fact that to *sense* the earth is motionless. Physical science has taught us that the earth turns round its axis in a day, and revolves round the sun in a year, and that the former motion is maintained by the *vis inertie* of the matter of the earth, and the latter by the same quality combined with the gravitating attraction of the sun. But nothing in physics can give a reason for the sensational fact that we are incapable of perceiving motion only so far as it is *relative* to our own motion, and, in consequence, are incapable of perceiving our own motion. Of the reality of the fact any one may convince himself each time he travels on a railway.

Supposing, now, we should be speaking of *sound*, or *colour*, and a man of science should turn round upon us and say that we are under a mistake, there being no such things as sound and colour, but only vibrations of certain media, we should judge him, and rightly, to be a very foolish person. Of exactly the same folly they are guilty who attribute fault or imperfection to Scripture because it speaks of the fixity of the earth, which is a sensational fact in the same category, and in the same manner real, as sound and colour.

From these considerations it would appear that Physical Science and the Science of Scripture stand apart from each other in respect to the qualities of the facts they are concerned with. In the former the Book of Nature is studied by means of observation and experiment, combined with mathe-

matical reasoning, the purpose being to ascertain the elements and laws on which Nature's operations depend, and to find out what may be called the unseen *machinery* of the Universe. The effect of knowledge so acquired is to augment our comprehension of the *power* and *wisdom* of the great Architect of Heaven and Earth, but goes no farther.

For the solution of social, moral, and religious questions, whether as between man and man, or between man and his Maker, Scripture alone supplies in perfection the necessary elements and principles. For this purpose it has no need to refer to the class of facts which are known only by means of physical research, but only to those that are commonly understood from information given by the senses. Accordingly, it is found that the former kind are entirely excluded from the Scriptures, being left to be gathered from indications and data derivable from God's Book of Nature.

Still, there are parts of Scripture which have a direct relation to physical science, as, especially, the account of the Creation in the first chapter of Genesis, and that of the Deluge in chapters vii. and viii. These accounts, however, consist exclusively of statements of such facts as might have presented themselves to the senses of an unscientific observer on the earth's surface at the time of their occurrence. This character of the account of the Creation given in Genesis i. being taken for granted, it will follow that the facts stated are to be put under the class of facts of observation; and, excepting that they are peculiar in having taken place antecedently to all human experience, they are susceptible of philosophic inquiry as to their causation just as the geological facts observed in the present day. I have, in fact, entered upon such inquiries in the before-mentioned work, and, in particular, I have argued that, according to the Scripture narrative, there was a *progression* as regards the elaboration of the earth for its inhabitants, and the order of the creations of plants, fishes, fowl, beasts, and man, of the very same kind as that which has been scientifically inferred from the facts of geology. This very noteworthy agreement is well insisted on, so far as relates to the progressive origination of structural organisms, in sections 18-20 of Mr. Titcomb's Paper.

(Respecting the Deluge, I shall limit myself to expressing the opinion that the operating causes described in the Scriptural account, when interpreted by the aid of modern physical science, were adequate to the production of the phenomena ascribed to them.)

But there are, it must be admitted, parts of the accounts in Gen. i. which appear to be self-contradictory; as where it is said that the divisions of time into day and night and seasons were effected by the luminaries of heaven on the *fourth* day, although the term "day" had already been used relative to three antecedent intervals. As far as regards the use of the term, the discrepancy would be got rid of by showing (as I have endeavoured to do in the work on Gen. i.), that the days of Creation are not intervals of twenty-four hours marked out by the sun's visible course, but ages of long duration, the limits of which were determined by definite steps in the process of the creation, and by alternations of darkness and light produced inde-

pendently of the sun's influence. On the duration of the Creation-days more will be said presently.

With respect to the *creation* of "the greater light" and "lesser light" on the *fourth* day, it is to be observed that the principle of the narrative demanded that their existence should date from the beginning of their *visible* existence, which could only be from the time when they began to determine days, and months, and seasons, and years. It would have been contradictory to the principle uniformly maintained in this record, that of stating only what is perceived by the senses, to have indicated that the luminaries had actual existence before they performed offices recognizable by human sense, for that would have been trenching on the ground of *physical science*. Still, it is to be said that *scientific* reasons might be given for dating the visible existence of the luminaries from the fourth day, if physical science, inclusive of the science of geology, were in such an advanced state as to allow of determining the forces and the operations whereby successive changes in the earth, the sea, and the atmosphere were produced in the geological epochs. (I have made some attempts in this direction in pp. 40-43 of my work.) In any case, however, an argument for the truth of the Scripture cosmogony may be drawn from the creation of the sun being assigned to the fourth day after it had been said that day and night had been generated on the *first* day; for this is just such a contradiction as a fabricator would have avoided.

I propose now to state briefly the argument from which I have concluded, *exclusively on Scriptural grounds*, that the six days of Gen. i. are periods of long duration. (See the chapter on the Seventh Day, in pp. 101-111.) In what I am about to say I shall take for granted, as the only rational view that can be entertained respecting God's Word, that the whole of it has virtually but *One Author*, the Divine Spirit, notwithstanding the number of human writers that have taken part in its composition, and the diversities of times, places, and circumstances under which the several books were written. The same Mind, for instance, dictated "the tree of life" in Gen. iii. 24, as in Rev. xxii. 2. There is so much of intimation in Scripture as to where, when, and by whom some parts were written, as serves to show that human agency has been employed in the composition of it, and so much silence on these points with respect to other parts (as the four Gospels), as to indicate that knowledge of this kind is not essential, so long as "all Scripture" is regarded as having been written either under the control, or by direct inspiration, of the Holy Spirit. Also, assuming that the Scriptures were written for the purpose of preparing souls for an immortal existence, it may be admitted that in the form in which we possess them at the present day, with all the imperfections and variety of readings due to the negligence or ignorance of scribes, they are still adequate to that purpose. In short, I do not hesitate to express my belief that, on its own principles and data, the words of Scripture as much admit of philosophical inquiry as do the facts of Nature on the principles of physical science, and are just as capable of giving trustworthy and exact answers to interrogatories rightly conducted.

This being premised, I beg to say that I am unable to accept the view advocated by Mr. Titcomb, that the cosmogony of Gen. i. was revealed to Moses by "vision," and that he made it known to the Hebrews in a form suitable to their powers of comprehension. If revealed by *vision*, in what respect does this mode of communication differ from *inspiration*, and why not admit at once that this portion of Scripture gives the *ipsissima verba* which Moses, or whoever was the writer of it, was inspired by the Spirit to write? If it be anything short of this—if any human element was concerned in framing its language—it is of no value whatever. Since, as is admitted, future events can be predicted only by inspiration of the Holy Spirit, a revelation of what took place long anterior to all human experience equally required the inspiration of the same Spirit. Accordingly, it may be asserted that the real author of Gen. i. was perfectly acquainted with the process of the creation from beginning to end, and the purposes for which it was planned and executed.

Next, I remark that of itself it seems wholly unreasonable to suppose that the Holy Spirit meant to tell us that the Creator of the universe, after completing His work, rested twenty-four hours, or that the seventh day was a natural day. But besides the intrinsic unreasonableness of this idea, the sacred narrative itself, if viewed without preconception, would, I think, be seen to contain a refutation of it. For it asserts that three of the creation-days had already elapsed when the light of the sun began to define the natural day, evidently thus making a distinction between the two kinds of days.

Further, the interpretation put upon Gen. ii. 2, in Heb. iv. 3-10, forbids taking the duration of the seventh day to be that of a natural day, inasmuch as the author of that epistle places in juxtaposition (verses 4, 5) the statement in Genesis that God rested on the seventh day, and a passage in the Psalms (xcv. 11), containing, as spoken by God, the words, "If they shall enter into my rest"; and it is clear that he intends thereby to indicate that the *same* rest is spoken of in both passages, for he argues that the rest remains for the people of God, "although the works were finished from the foundation of the world." This last sentence refers to the ending of the works spoken of in Gen. ii. 2, and implies (by the word "although") that in that passage the Holy Spirit declares *proleptically* the completion of a plan designed from the beginning; so that this declaration is not inconsistent with a seventh day of rest to come. In the mind of the Eternal Spirit the design and the execution are one and the same.

But if this be so, *the sixth day is not yet ended*. Now, it is particularly to be observed that the terms which narrate the creation of man on the sixth day, and his dominion over the whole of the earth and all living things, are in accordance with this inference, inasmuch as the creation and sovereignty of the *race* (*ἄνθρωπος*) are there spoken of, the creation of Adam and Eve, the first individuals of the race, being recorded in Gen. ii. So long as the succession of generations goes on, the creation of man is not finished, and the seventh day *not* come.

I fully expect that these views will be objected to as weakening the Scriptural authority for the observance of the Sabbath. I think, however, that the reasons I am about to urge will show that this inference is altogether without foundation. There is not in Scripture a tittle of evidence that the Sabbath was commanded to be observed, or was observed, before the passage of the Israelites through the Red Sea. Soon after that miracle the Sabbath is first mentioned (Exod. xvi.) in connection with another miracle, the gathering of manna in six days, and the double supply on the sixth day to serve for that and the seventh. Then follows its institution from Mount Sinai as one of the commandments of the Decalogue; and lastly, when Moses rehearsed the Ten Commandments before the people, as recorded in Deut. v., he concluded the Fourth Commandment in these words: "Remember that thou wast a servant in the land of Egypt, and that the Lord thy God brought thee out thence through a mighty hand and a stretched out arm; therefore the Lord thy God commanded thee to keep the Sabbath day." It is to be noticed that in the reason here given for keeping the Sabbath no mention whatever is made of the six days of creation.

Putting all these statements together, any one, I think, only a little versed in Scriptural symbolism might see that the institution of the Sabbath is in no respect *commemorative*, but *typical*, having the character of a *covenant* whereby God undertakes to deliver His believing people from the bondage of the present evil world, "spiritually called Sodom and Egypt, where also our Lord was crucified" (Rev. xi. 8), and to give them rest and eternal life (signified by the manna) in the seventh day yet to come. Thus, the reason for the observance of the Sabbath, as given in Deut. v., is in perfect accordance with that given in Exod. xx., always supposing that the *antitype* of the seventh day of observance is that day of eternal rest which supervenes at the end of this world, and which all the faithful of all times have looked forward to. Hence it may be concluded that there is just the same reason in the Christian dispensation that there was in the Jewish for observing a seventh day.

From this argument, it would appear that the institution of the Sabbath was delayed till, by God's miraculous dealings with the Israelites, it could receive a spiritual signification, and be observed acceptably with *faith*. To observe it with the accompaniment of faith, is to regard it as a symbol of the covenant of everlasting rest and life which God has made, through Christ His Son, with all the faithful, and to wait in hope for the fulfilment of that covenant. By a formal observance without such faith, in the strict manner of the Pharisees which our Lord condemned, it is not possible to please God.

I have now only one more remark to make relative to the views contained in Mr. Titcomb's paper. If it has been rightly argued that the period during which the race of man has existed on the earth (which, to take the lowest computation, is very nearly 6,000 years) is but a portion—possibly a *very small portion*—of the sixth day of creation, it will follow that that day, and, consequently, all the days, are periods of long duration. And whereas

neither the duration of the sixth day, nor that of any of the other days, is definitely limited by any statements in Gen. i., the vast periods of time which, as Mr. Titcomb shows, are demanded by astronomical and geological facts, may be conceded without contradicting the truth of the sacred narrative, insomuch that we may conclude that on this point Scripture and Science are at one.

ORDINARY MEETING, MAY 4TH, 1874.

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

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

ASSOCIATE :—Rev. G. Lawless, A.M., Chaplain to Her Majesty's Forces, Curate of St. Bride's, 18, New Bridge-street.

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

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| "Proceedings of the Royal Society." Part 151. | <i>From the Society.</i> |
| "The Mosaic Deluge." By Rev. S. Lucas. | <i>From the Author.</i> |
| "The Biblical Antiquity of Man." By Rev. S. Lucas. | <i>From the Author.</i> |
| "On the Works of Dr. F. A. Treudenburg." By
Professor G. S. Morris. | <i>From the Author.</i> |

The following Paper was then read by the Author :—

**BIBLICAL INTERPRETATION IN CONNECTION WITH
SCIENCE.** By the Rev. A. I. McCaul, M.A., Lecturer
in Divinity at King's College, London.

TO the Biblical Student, in these days, it is a source of no small consolation to remember that there is no necessary connection between Science and Infidelity. There have been men, in past ages, of high scientific reputation, who have not only believed in a Supreme Governor of the world, but also received, with devout and simple faith, the Scripture teaching of Redemption. There have been men, in the various countries of the civilized world, of acknowledged learning and ability, of true philosophic mind, who have accepted the Scriptures as the Revelation of God, and who have confessed that Jesus Christ, the Founder of Christianity, was God manifest in the flesh.

So also in the present day, there are men as well known for their earnest Christian faith as for their scientific attainments, or for their grasp of the profound subjects of Philosophy. There are men, whose opinion is justly respected in questions of science and philosophy, to whom the Bible is precious, as the

teaching of Him in whom there is no deceit and no possibility of mistake, as the Revelation of Him from whom all wisdom and all knowledge proceed.

It does not seem fair, therefore, to assert that the study of philosophy, or the increased attention devoted to physical science, can be the explanation of the apparent increase of infidelity. Take the case of young men who go up to the Universities. Suppose the very possible case of their going up with a scanty knowledge of the Scriptures. Suppose that they are strangers to the coincidences and extraordinary harmonies which the various books of the Bible present. While studying in their colleges, they hear much of the difficulties which have to be reconciled, they hear much of the miraculous interventions which have to be accounted for, they hear much of the doubts with which unbelievers of every age have regarded everything that claims to be supernatural.

If they had any sufficient acquaintance with the other side of the question, if they had any adequate knowledge of the way in which the Scripture speaks for itself, they would be able to balance the difficulties. They would be in a position to retain their faith in spite of the skill and of the persistence with which apparent inconsistencies are presented to them. They would be competent to form some independent judgment for themselves.

But, as it is, infidelity has increased because, generally speaking, men are ignorant of the contents of the Scripture. As luxury and riches have increased, so also has carelessness with respect to religious matters. Parents, by their example, encourage their children to neglect the Bible. They do not study the Scriptures, and therefore, naturally and necessarily, they are ignorant of them. They have no weapons, therefore, wherewith to ward off the attacks of infidelity. They are beset with doubts, and they yield to them only too readily. They are not sorry to be persuaded that those writings, which they regard with indifference, if not with aversion, are really not worthy of the esteem in which they have so long been held.

The Scriptures appear to me to prepare us for the increase of infidelity, and to assign the explanation of this "falling away" from the ancient belief, which we already behold. It is to be attributed not to the increasing love of science or of philosophy, but to the fact that men are more and more haters of God and lovers of their own selves. The difficulty is, after all, far more moral than intellectual. It is due to the increased carelessness which prosperity and peace have gradually engendered. Science, if unprejudiced, will feel an interest; a strong and irresistible interest, in the teaching of that Book for which there is so

much overwhelming evidence. It will be glad to compare *its* teaching with the discoveries and progressive theories of modern research. It will be willing to suspend its judgment rather than, lightly, repudiate the conclusions of so venerable, and so sacred, a record.

The students of Science and the students of Scripture will thus have common ground. They will be glad to meet and to discuss their apparent differences. They will be anxious to hear what can be advanced in the way of defence of what is old or of accommodation of what is new. But there is one condition which, it is obvious, must be observed by both parties. There must be a fair statement of facts on both sides. There must be no partiality, there must be no concealment, there must be no distortion, out of deference to already-received opinion.

The student of Science has a right to demand that the biblical student shall present to him the simple and true meaning of the original records. And it is only on this understanding that healthy intercourse between them can continue. If there is any suspicion that the translation is tampered with in order to favour any special theory, all confidence is at an end. The duty of the biblical student, as such, is to give the meaning of the original narrative in its plainest terms, quite irrespective of what scientific consequences may ensue. Let him do this earnestly and diligently, and men of science will not be indifferent to his labours, however unpretentious they may be. But, if they cannot read the Scriptures for themselves, in the original languages, and have no guarantee that others, whose business it is to understand them, are dealing fairly with them; then it is, surely, no wonder if they altogether abandon the Scriptures as worthless for scientific purposes, or at any rate, as unintelligible.

Let us take for example the Mosaic record of Creation in the first chapter of Genesis. It is not for the biblical student to commence by asking whether modern science will allow of the first verse being introductory to the rest. It is immaterial to him, in his capacity of biblical interpreter, whether modern science allows of it or not. The question for him is, how far the Hebrew original necessitates it. If the matter is decided by the original, then let him honestly say so, and let him leave the scientific consequences to take care of themselves. There will be no lack of scientific men to discuss those consequences. And, in this case, it appears to me that there can be no reasonable doubt on the subject. It appears to me that the language of the second verse necessitates an interval of delay between the action of the first verse and that of the verses which follow. The earth had become without form and void (*ἐγένετο*)

or as Dathe renders it, "Terra facta erat,"—It had become waste and desolate. It had become, as the LXX. have it, invisible and unfurnished; *invisible* by reason of the water and darkness, and *unfurnished* by absence of the productions which formerly existed upon it; for this seems to be the intention of the Greek translators. But, of whatever character the change may have been, that there was a change is, I think, clearly indicated by the word in the second verse.* And not only

* The word occurs again in the first verse of the third chapter, where, I think, it ought to be translated in a similar manner. "Now the serpent *had become* more subtil."—והנחש היה ערום.

To illustrate this meaning, let me quote the way in which the verb היה is rendered, in the versions, in a few passages taken from *Genesis* and elsewhere.

- i. 3. 1. Let there be light—יהי אור—γενηθήτω φῶς—Fiat lux—Es werde Licht.
- i. 6. 2. Let there be a firmament—יהי רקיע—γενηθήτω στερέωμα—Fiat firmamentum—Es werde eine Feste.
- i. 6. 3. And it *was* so—ויהי כן—καὶ ἐγένετο οὕτως—Et factum est ita—Und es geschah also.
- i. 14. 4. And God said, Let there *be* lights—יהי מארת—γενηθήτωσαν φωστῆρες—Fiant luminaria—Es werden Lichter.
- ii. 5. 5. And every plant of the field before it *was* in the earth—מִרֵבֶרֶץ יהיה בארץ—πρὸ τοῦ γενέσθαι ἐπὶ τῆς γῆς—Antequam oriretur in terrâ.
- ii. 7. 6. And man *became* a living soul—ויהי האדם לנפש חיה—καὶ ἐγένετο ὁ ἄνθρωπος εἰς ψυχὴν ζῶσαν—Et factus est homo in animam viventem—Und also ward der Mensch eine lebendige Seele.
- iii. 22. 7. And the Lord God said, Behold the man *is become* as one of us—הֲזֵן האדם היה כאחד ממנו—Ἴδού Ἀδὰμ γέγονεν ὡς εἷς ἐξ ἡμῶν—Ecce Adam quasi unus ex nobis factus est—Siehe Adam ist worden als unser einer—Voici, l'homme est devenu comme un de nous.
- v. 4. 8. And the days of Adam after he had begotten Seth, *were* eight hundred years—ויהיו ימי אדם—ἐγένοντο δὲ αἱ ἡμέραι Ἀδὰμ—Et facti sunt dies Adam.
- vi. 1. 9. And it *came to pass*, when men began to multiply—ויהי כי החל האדם לרבו—καὶ ἐγένετο ἥνικα ἤρξαντο οἱ ἄνθρωποι.
- xvii. 16. 10. And I will bless her, and give thee a son also of her; yea, I will bless her, and she shall *be* a mother of nations: kings of people shall be of her.
והיתה לגוים מלכי עמים ממנה יהיו.
ἔσται εἰς ἔθνη, καὶ βασιλεῖς ἐθνῶν ἐξ αὐτοῦ ἔσονται.
Eritque in nationes, et reges populorum orientur ex eo.
Völker sollen aus Ihr werden, und Könige über viel Völker.
Je la bénirai, et elle deviendra des nations. Des rois chefs de peuple sortiront d'elle.

so, but there is a further change of language in the third verse, and the verses which follow, as compared with the first verse, which has been noticed by Amyraldus, in Wagenseil, and which is worthy of attention. In the bringing the earth into order, we have again and again the curious formula, "And God said."

Amongst men, it is more significant of power to effect one's purpose without the intervention of words. To produce results, visible to others, by a simple nod, or by an exercise of will, unaccompanied by outward signs, is more imposing and impressive than to do so by an exercise of intermediate gestures or commands. And yet, in the case of God Almighty, although it would be difficult to say to whom the words were addressed, or for whose sake they were uttered, we are told that the commands were expressed, as we should say, aloud.

In the Gospels, we are told expressly that certain words, which Jesus Christ our Lord spoke, were uttered aloud for the benefit of those who heard. "I knew that Thou hearest Me always; but because of the people which stand by I said it, that they may believe that Thou hast sent Me." But, in the case

Eccles. iii. 20.—All go unto one place; all *are* of the dust, and all turn to dust again.

הכל הלך אר מקום אחד הכל היה מן העפר והכל שב אל העפר.

τὰ πάντα εἰς τόπον ἕνα, τὰ πάντα ἐγένετο ἀπὸ τοῦ χυοῦ, καὶ τὰ πάντα ἐπιστρέφει εἰς τὸν χυόν.

Omnia pergunt ad unum locum; de terrâ facta sunt, et in terram pariter revertuntur.

Es fähret alles an einem Ort; es ist alles von Staub gemacht, und wird wieder zu Staub.

Tout va en un même lieu: tout a été tiré de la poudre, et tou retourne dans la poudre.

Jonah iv. 10.—Thou hast had pity on the gourd, for the which thou hast not laboured, neither madest it grow; which *came up* in a night, and perished in a night.

שבן לילה היה ובן לילה אבד.

ἢ ἐγενήθη ὑπὸ νύκτα καὶ ὑπὸ νύκτα ἀπώλετο.

Quæ sub unâ nocte nata est, et sub unâ nocte perit.

Welcher in einer Nacht ward, und in einer Nacht verdarb.

Car il est venu en une nuit, et en une nuit il est péri.

Compare also Dathe's note (*Gen.* i. 2).

"Vau ante הארץ non potest verti per *et*, nam refertur ad *v.* 1. ubi narratum fuit, terram æquè ac cœlum a Deo esse creatam. Jam pergit *v.* 2. de terrâ, eam, incertum quo tempore, insignem subiisse mutationem. Igitur Vau per *postea* et explicandum, uti sæpe, e.g. Numb. v. 23, Deut. i. 19."

now before us, there is no such explanation (so far as we can see) possible. We have to understand that the re-constitution of the earth was effected "by the word," and we are compelled to notice the difference, which is so marked, in the wording of the first verse. "In the beginning ($\epsilon\nu \acute{\alpha}\rho\chi\eta$) God created the heavens, and the earth."

I might have drawn attention to the Hebrew for "in the beginning" ($\epsilon\nu \acute{\alpha}\rho\chi\eta$), but that has been done elsewhere. It is however worthy of special attention that both in the Hebrew and in the Greek—both at the beginning of Genesis and at the beginning of St. John—the word is without the article. It is not $\epsilon\nu \tau\eta \acute{\alpha}\rho\chi\eta$, but $\epsilon\nu \acute{\alpha}\rho\chi\eta$; and so in the Hebrew it is not a definite time but an indefinite time.

We conclude therefore (I think, necessarily) that the description which follows is a re-constitution, and not the original constitution of the earth upon which we dwell. There was an interval, it may be, of very long duration, before the action, which is represented in the third and following verses, commenced. There may for what we know, have been flora and fauna upon the earth, even in this pre-historic period; for, as St. Augustine points out (*Ench. ad Laur.*), the text "Death entered into the world through sin," may be understood of the human race, and may be taken to mean, simply, that death obtained its power over mankind through sin. This explanation certainly appears possible, and that is all that it concerns the Biblical interpreter to know. It is not his province to attribute any greater degree of certainty to scientific theories than is justified by the terms of the Scripture record.

With reference to the early inauguration of light, we remark that it is not said to be created, and that it is not dependent upon the sun, or any other heavenly body. With reference to the first point, the language, we are sure, is what already must approve itself to science, and with respect to the second, it has been shown (in "Aids to Faith") that the idea of light existing independently of the sun is not repugnant to scientific minds. So far from this being the case, Delitzsch ("Comm. on Gen.," p. 97) quotes an American writer, to the effect that the Mosaic idea of light existing before the sun is "the corner-stone of creation." With reference to the separation of the waters, we remark again that the firmament or expanse is not said to be created. The words are "And God said, Let there be a firmament in the midst of the waters." And again, in the next verse, "And God made [or arranged] the firmament." The word in the original is not the one specially applied to creation.

The same remark applies to what follows with reference to the formation of the dry land, and the further centralization of

the waters, and especially the appearance of the flora. "And God said, Let the earth bring forth abundantly," &c. "And the earth caused to go forth," &c. If the earth already teemed with the germs of vegetable life, and only awaited the necessary conditions and the due proportions of light and dryness or warmth, in order to send forth its treasures, the wording of the Scripture narrative is fitted to represent such a consummation. By the word of the Almighty the necessary conditions were fulfilled and the due proportions secured, and by the same word the vegetable creation sprang at one united burst into existence.

With reference to the fourth day of creation, it is again remarkable that the narrative implies the further arrangement of existing material rather than the creation of new matter. "And God said, Let there be luminaries." "And God made [or arranged] the two great luminaries," &c. It is scarcely necessary to remind you that the Hebrew word for *lights* or luminaries is not here quite the same as that in the third verse. It is a derivative from it, indicating of itself the *localization* of light.

So far the narrative (commencing at the 3rd verse) has dealt, as it appears, simply with the organization of what already existed, or what was ready to become visible to the eye. It does not appear to me that, as the matter is here represented, the time would be any considerable difficulty. The action is represented as gradual, and culminating in increased heat through the operation of the sun. After the wet and extreme moisture, this would have an immediate tendency to hasten the growth of those vegetable existences which were already in the earth. The earth would appear covered, as in a moment, not only with grass, but with plants and trees, which by the sixth day would have attained a magnitude giving promise, at least, of their ultimate proportions. We now come to the special act of creation. And here again the consideration of time is immaterial. We are told that God *created* the inhabitants of the waters. At His word they sprang into existence. And so also with respect to the fowls. The original command stands thus—"And God said, Let the waters bring forth abundantly the moving creature that hath life, and let fowl fly upon the earth," &c. These are two *co-ordinate* clauses in the original, which the English version has unfortunately amalgamated, making one *subordinate* to the other. In the Hebrew it is not stated, it is not implied, that the fowl was produced from the waters. They were created at one and the same time, and that is all that the narrative records. On the sixth day we first have the formation of the cattle and various beasts of the earth: we then have the creation of man. And there is this distinc-

tion between the two. The proper word for creation is not applied to the lower animals. The words are—"And God said, Let the earth bring forth," &c. "And God made [or arranged] the beasts of the earth after his kind," &c. Whereas in the case of man, the words are—"And God said, Let us make man," &c. "And God *created* man in His own image."

Whether the days spoken of, in this record, are periods of twenty-four hours, or of still greater duration, it is impossible to determine. There are many who think that they may be understood as indefinite periods. But the language of the Fourth Commandment seems to others to be unfavourable to such an interpretation. Nor do they see any reason for its necessity. We have to deal, they argue, with the Scripture narrative, not with modern scientific theories. The narrative specifies certain distinct operations, and they do not see that the time specified is in any one case incommensurate with those operations. The subsidence of the waters is represented as God's act. The production of the verdure and the vegetable creation, is the result of God's command, after the necessary preparation. The localization of light is attributed immediately to the divine operation. And so with what follows. The wording of the fourteenth verse, and the verses which follow, is consistent with the idea that the *creation* of the heavenly bodies is included in the first verse. The work of creation, subsequently, is connected simply with man and his residence upon earth. The organization, the *redecorating*, of the earth is the subject of the narrative, and the author confines himself to that one topic. We have his plain testimony that God himself undertook this re-constitution. He, who was to be the Saviour of a fallen race, was the Being by whom all these effects were produced, and the time, which He would assign to such operations, was according to His own wise purpose. He tells us that in six days He completed the formation of the things which we see, and rested the seventh day and hallowed it. Be this as it may, we can in this case only wait for further information. The Biblical students watch, with intense interest, the progress of scientific inquiry. They listen, gladly, for the conclusions to which Science conducts her disciples. They join, heartily, in the congratulations with which each new stage, in her triumphant march, is hailed. But they cannot forget that the voice of Science has not always been the same. They cannot forget that, at different periods, different theories have been maintained (especially, for instance, with respect to the formation of geological strata), and that, at all these periods, the theories have been employed, by men who were so disposed,

in order to assail the Scripture records. They are not, therefore, in a hurry to receive the conclusions of scientific investigation as final; they are not disposed, at the will of the science of the day, to convict the sacred authors of inaccuracy, or of ignorance. They remember that the evidence in favour of the Scriptures is great and varied, and has survived the hostile criticism of a vast number of centuries. They remember that this evidence is altogether independent of modern science.

Not only were there various versions at an early period of the Church's history; not only was the Old Testament translated into Greek three hundred years before Christ; not only was the Pentateuch existing in the Samaritan language and character three or four hundred years earlier: but also men of learning and intellectual ability, in each successive age, have admitted that He, whose words are preserved for us in the New Testament, proved Himself indeed to be the Son of God. Christians believe that Jesus Christ, by Whom the truth of the Old Testament was ratified and confirmed, was God as well as man, and that His authority is final.

It appears to me very uncandid to ignore this feature when treating of the common subservience to *authority*, and of the mischievous tendency which it has to retard progress. If it be true that Jesus Christ is our God, the Creator of the universe, then we are not only bound to pay respect to His authority, but those who repudiate and reject it will certainly have to bear their guilt.

Nor is it more reasonable on similar scientific grounds to quarrel with the details of Christ's commands. If He tells His disciples that they are to pray, and that their prayers will be heard and answered by God, it appears captious and unreasonable (not to say blasphemous) to propose means of testing publicly the utility of prayer. To the biblical student, such tests will appear arbitrary and presumptuous. They will be counted like the signs which the Jews required from their Lord, while they rejected the evidence which was already within their reach. There is no sufficient evidence that unbelievers would be convinced by such additional proof, supposing it were vouchsafed to them, and to believers it is superfluous. For the spirit of Christianity, it is never to be forgotten, is docility and readiness to receive Christ's teaching. Doubt may be the proper attitude for philosophy as well as science, but it is not so in the case of those who wish to attain to the knowledge of God. Jesus Christ came into the world, we are told, in order to declare Him, and He assures us that, unless we become as little children, we shall not enter into the kingdom of God. The natural characteristic of children is a readiness to believe,

and not to doubt, the information which they receive from those in whom they have confidence.

We may remark, in conclusion, that St. Augustine has long ago drawn attention to this difference between the spirit of philosophy and the spirit of Christianity. In the "Ench. ad Laurentium," he notices how the Academics withheld their assent from things which other men believed, on the ground that truth and error were mixed up beyond the possibility of discrimination. But with us, he says (*apud nos*), faith is the essential condition. Nor is faith misplaced if it be reposed in the Lord of the Universe. When we say "*ipse dixit*," we do not mean Pythagoras, or men of like reputation in the present day: we mean Him in whom are hid all the treasures of wisdom and knowledge.

I have drawn attention, afresh, to the argument from authority, not because the statements of the Old Testament appear to me in themselves incredible, but because, "of late years infidelity has assumed an unprecedented tone of defiance to all authority, human and divine." It is not that there is any real opposition between Science and Revelation; but men at the present day sometimes speak and write as if, in the matter of religion, we could get rid, or ought to get rid, of authority. But this is not the case even with science. Scientific men may test the facts of science, and have their own experience for the corroboration of those facts. But the great bulk of mankind cannot do this. They have neither the leisure nor the training which might enable them to accomplish this confirmatory process. The consequence is, that they have to rest upon the authority of scientific men. If physical science is to be our guide, the exponents of its meaning will be those who have given most attention to that study. Those, therefore, who decry authority are re-asserting its validity. There may be a change of masters, but there must always be a reliance, more or less unquestioning, upon the word and authority of others. It is not the province of the biblical interpreter to deny or to suppress this truth out of compliment to unbelievers. It is not the duty of the Christian inquirer to leave the vantage-ground of authority, or to depreciate its value, because it is offensive to certain men by whom the Scripture is little valued. Undue concession is a thing for which we get no thanks, even from those whom we would conciliate, and is accepted only as a sign of weakness. I cannot forbear adding a few remarks which appeared on this subject some little while ago in a public print. They refer to the tone of a book assailing Christianity, and point out how, even by unbelievers, one authority is substituted for another, and how what is condemned in our case is

approved and practised by themselves. The reviewer says—“It is a curious return to the argument of *authority* after a long denunciation of that old and venerable mode of conducting controversy. We do not reason with you, say the new schools of disputants; we dislike interminable arguments. We only direct your attention to what is the actual case, that a large intellectual class has made up its mind on the question. The master has spoken; the intellectual class has judged; it is now decided that Christianity must be given up.” At the same time, between Scripture rightly understood and Science accurately interpreted, there is, and there can be, no real opposition, because they are the gifts of one and the same Creator. By a false, or erroneous, interpretation, the Old Testament may be misrepresented, and both poetry and painting have, unfortunately, done much to foster and increase this misapprehension. By the poetical license, which they claim for their respective votaries, they have done much to obscure the scriptural subjects of which they have volunteered to treat.* But it is sad to think that science should offend in the same way. It is, to say the least, unfair to adopt an erroneous interpretation of certain passages, and then, because those erroneous interpretations are inconsistent with facts, to infer or to assert the falsity and the worthlessness of the whole record. But it is not only unfair, it is conduct utterly unworthy of professed lovers of truth. It must, in time, recoil upon the heads of those who so offend. The credit which has attached to their exposition of other subjects will be undermined. They will be looked upon, generally, as men whom party spirit has blinded, whose word is no longer reliable, whose judgment is affected by prejudice, whose real object is victory instead of truth.

The CHAIRMAN.—I am sure we shall all join in a vote of thanks to Mr. McCaul for his interesting paper.

The HONORARY SECRETARY.—I have received the following letters in regard to the paper just read.

The first is from one of our Vice-Presidents, the Rev. ROBINSON THORNTON, D.D. :—

“EPSOM, April 21, 1874.

“I HAVE read Mr. McCaul's paper with interest. It brings before the Institute a point which must carefully be maintained, and which too many

* Cf. *Erwin*; or, *Miscellaneous Essays*, p. 60. Nisbet, 1831. Cf. also *Cic. de Leg. i. 1* (5).

of the orthodox are prone to forget; viz., that in discussing the Scriptures and comparing their statements with the conclusions of science, we must be extremely cautious lest we make the Scriptures say more than they were intended to say. The sceptical school sometimes try to saddle us with erroneous traditional interpretations of the Sacred Record. This is unfair enough, but it is trebly so when our own friends damage our cause by forcing upon the unwilling some exegesis which cannot be maintained. I believe that much harm has been done in this way.

"I think Mr. M'Caul has scarcely made the most of his materials. He has exemplified his principles by a reference to Genesis i. I wish he would go further, and give some more instances where a traditional exegesis (in some instances taken from Milton) has been substituted for the simple meaning of the original text. If he would also give the sceptics a few words on the practice I have already alluded to, of *forcing* on us some interpretation of Scripture, and rejecting the whole, because that one interpretation seems inconsistent with facts, he would improve the paper. Also, I should like him to wind up with a tirade against the expression, 'Opposition of Scripture and science.' The grand rational orthodox principle of the Institute is that there can be no possible opposition between Revelation, rightly understood, and scientific conclusions correctly drawn. If there is an opposition, it is between Scripture wrongly understood and science drawing wrong conclusions from misunderstood premises. Lastly, I think several of his allusions to our Lord *unnecessary*. Devout and admirable as they are in themselves, they seem to me a little out of keeping with the rest of the paper. We are, as Christians, defenders of revealed religion; and if we begin to touch upon the *special* doctrines of Christianity, we shall get into the Creeds, and then to Theology, which is exactly what I (as a Theologian by profession) want to keep the Institute out of."

The other is from the Rev. J. McCANN, D.D. :—

"GLASGOW, April 10, 1874.

"By reason of the hasty glance I have been enabled to take at Mr. M'Caul's paper, I am not sure as to the chief point he wishes to establish, but hope he will forgive me if I make a remark or two in detail.

"He attributes the apparent increase in infidelity to a superficial knowledge of the Scriptures, caused by the increasing luxury, and consequent idleness and selfishness of the age. This is, doubtless, true; but I cannot help thinking that he has not stated the most efficient cause of that superficiality. Are not those preachers most to blame whose teachings never compel research, or stimulate earnest examination of the whole Word of God,—who by continually supplying only milk, make their churches into nurseries, and keep their congregations as babes? How can we expect dwarfs to grow into giants, on a diet that would starve giants into dwarfs? Let the clergy lead the way in going on unto perfection of doctrine,—other people will soon follow out of their present most deplorable superficiality. Mr. M'Caul deserves our thanks not only for calling attention to the evil, but also for doing so much to provide a remedy.

"But I would go further than he, and say that many of the teachers of theology are profoundly ignorant of philosophy. But as philosophy is the science of that human nature which the Bible was given to rectify and ennoble, how can the man treat the latter adequately, or even consistently, who does not know the former? What is the result? That many teachings called Scriptural are in direct antagonism to the facts of consciousness, and so *cannot* be intelligently believed by thoughtful men. Formerly, when education was more generally elementary, and men did not read much science,

these passed muster with only an occasional challenge ; but now a more thorough mental training is exposing the error, and students are consequently becoming more sceptical, as it is called, than they were before. But is it really scepticism?—that is, is it really doubt about the truth of the Bible itself? In many cases,—far too many,—no doubt it is ; but in the great majority, I have found it to be unbelief in the teachings of men, far more than in the Revelation from God. While, therefore, we meet infidelity by showing that the interpretation of the Bible and of physical science are in unison, we must go further, and show that the interpretation of the Bible and mental science are also in unison ; or that between a true theology and a true humanity there is no discord. Again, Mr. McCaul says,—‘The duty of the Biblical student, as such, is to give the meaning of the original narrative in its plainest terms, quite irrespective of what scientific consequences may ensue.’ This is wise advice when possible to be followed. When the text of the original is determined, and the meaning is so clear that there can be no reasonable doubt on the subject, then assuredly it is the duty of the student to state the meaning, be the consequences what they may. But when there are possible two or more different interpretations, I think it is our duty to obtain assistance from every available source, scientific or otherwise ; so that, while at one time we might interpret the first verse of the Bible in one way, we might, if science showed us to be mistaken, interpret the same verse in another way, more in harmony with the discoveries of the period ; always distinguishing, however, between the truth of the text in itself, and the possible error of our ideas regarding it. I think Mr. McCaul will not deny that science has aided him greatly in his interpretation of the first chapter of Genesis. The Word and the world being brethren, should, whenever possible, give each other a helping hand.

“The able writer of the paper has also done well in calling our attention to the abuse of ‘Authority.’ Scientific men are continually speaking as though Christians rested altogether on the authority of churches, creeds, or dogmas, while they rejected authority of every kind, as such. Now what is the fact? That the number of those who *verify* experiments in science for themselves are very few comparatively, and consequently all the remainder rest solely on ‘*authority*’ for their scientific creed ; indeed, are often compelled to do so because they have not the opportunity of experimenting for themselves. The overwhelming majority of scientific believers *end* in authority. But what of Christians? They indeed *begin* with it in church and creed, but only as a means to an end. The end of Christianity is Christliness of character; this, however, is a matter of personal consciousness, called the *knowledge* of Christ. It is, in a word, the Christian theory experimentally confirmed. Consequently, every Christian must, to be such, verify for himself, and so leave behind the region of mere authority.

“The case therefore stands thus,—the believer in science may rest in authority only, never passing beyond it ; but the believer in Christ, while starting in authority, must in every case pass beyond it, into the higher ground of personal verification.”

MR. C. R. MACCLYMONT.—At the commencement of Mr. McCaul’s paper, reference is made to the case of young men affected by the current scepticism of the day. Perhaps I may be permitted to suggest some thoughts which a perusal of the paper have brought up in my mind. I trust the learned author will excuse me if I venture to say that the chief thought which

occurred to me in reading the paper was one of disappointment, when I considered that so much critical and literary ability should have been directed to what I think, in a meeting of this sort, is not particularly required,—I mean the establishment among ourselves, who are the members of an avowed Christian Association, of the objections to the doctrines of those who challenge or attack the Scriptures.* It seems to me that less than justice is often done to the interpretation of that with which the science of modern times has undertaken to deal. The learned author himself could scarcely have framed his criticism of Genesis i., if he had not had before him most of the results of advanced modern science. It is true we find that the account of creation given in Genesis is not necessarily inconsistent with the proved results of modern science; but those who have been brought up in what I may call the old-fashioned method of Christian dogma, or those who are acquainted with the literature of the Church of a few years back, know that the conclusions which Mr. McCaul puts before us now, would, twenty or thirty years ago, have excited surprise, to say the least of it, in the minds of most of the professed Christian apologists. If it be true that science has done something to widen our own ideas—I mean the ideas of those whose faith is fixed in orthodox dogma, and who, therefore, can deal both with philosophy and with science, without fear of having their faith disturbed, or their belief in religion endangered,—should it not, I ask, be the object of those who now try to reconcile science with religion, not to content themselves with merely showing that they are not in antagonism, but that they should also show how they can be changed by the Gospel, and made themselves the greatest instruments and the best means of spreading religion to those who have no religion, and of making the doubts engendered by science the best conditions of proving the truth of the Gospel? Take one example. Mr. McCaul has been very severe upon those who endeavoured, by what he calls high art, to set forth the nobility and grandeur of sacred themes. But is it not true that he has himself transgressed the bounds he imposes, and that he has been compelled to do so by the limitations of the language which he is forced to employ? Take the first illustration we have, where he talks of God speaking the word. Surely this is true only as a metaphor, to give it form to the sense of man. It is not meant to say that we should venture to conceive to our own mind that the actual using of words by God was among the physical conditions necessary for the expression of His command before the heavens and the earth took form? Is it not the necessary condition of all progress of human thought that we are required to grope to things unseen by things that are seen, and in the effort to approach a higher truth we have often to be content with a narrower expression? Mr. McCaul speaks of light being

* Mr. MacClymont appears to have momentarily forgotten that the Institute's organization exists in a great measure for the purpose of restoring, and, perhaps, in some cases, even creating, a sound public opinion as to the true relations of religion and science.—ED.

existent before creation. Let me ask him respectfully what it is he means by that? What do we mean by "light" before an eye was created? What do we mean by "light," apart from the communication between the seeing eye and the sun? The Deity does not see in the sense in which we see, and does not speak in the sense in which we speak, limited as we are by space and time. These limitations are necessary and proper for us; but if Mr. M'Caul admits, in these days, when science has laid bare the sources of language, and all her resources are spread before us, that he is forced to express himself within such narrow limits, we cannot blame a doctor of the sixteenth century because sometimes he fell short of the dignity of the materials he was using, and in endeavouring to put his opinions strongly, sometimes put them in a way which make them rub roughly against our wider notions now. Then, again, about prayer. No doubt it is a blasphemous thing for anybody to propose a test of prayer; but is it not true that the supporters of the Christian doctrine of prayer, in these modern times,—and I say it in the presence of authorities in theology, who will correct me if I am wrong,—adopt an argument in reference to prayer which is something quite new in the history of theology? Is their doctrine of prayer the same as that which was accepted by the older Puritans and divines? I think I am right in saying that the warning against dictatorial prayer is probably one of the most frequent subjects of warning among the older divines, and I do not know that there is any authority among any of the orthodox theologians of our Church, or of any other Reformed Church, for holding that the mere expression of a wish, by the creature, is sufficient to change the supreme will of the Creator. If we once admitted that, we see plenty of opportunities for philosophical and scientific infidels to scoff, for the assertion that the expression of such a wish would necessarily change the plan of the Creator is full of difficulties, both metaphysical and physical, which are too numerous and obvious to need pointing out. Let us take one case; suppose a young man who is an object of deep regard to a whole nation is lying at the point of death, prayer is publicly offered up, and that young man recovers; and we say that but for these prayers the Almighty would have struck him with death, and bereaved the people. Do we mean that? Suppose it were cruel to take him: do we mean to say that but for the accidental upraising of the people's voice the Deity would have been cruel? Suppose it were kind and wise to take him, because the people were impatient and rebelled, the Lord repented! What is the orthodox notion of prayer? Is it not that a blessing is given to those who humble themselves before the Throne? Not that their human desires and imperfect conceptions are realized; but that they are enabled to trust where they cannot trace, and grace is given to them, in the mean time, to bear the dispensation in resignation, with the hope that by-and-by they will perchance have light given to them to see how even this was love,—not an evil, but a good in disguise. Yet I have never seen this view stated in any of the recent controversies that have arisen on this subject, though it is the most obvious teaching of Calvinism. I said I was disappointed in this

paper. May I suggest to the author that it is not enough to defend young men from scepticism? The scepticism current now in the universities is not the priggish insolent thing it was years ago; but there are men who are seeking earnestly and anxiously for the light, and, if they could see their way, anxious to do good work, and to help each other. There is no one to tell them the way, for wisdom is no longer crying in the streets to them. The results that we see around us, then, are not so much the fault of the ignorant young men or of the infidels; for these so-called infidels have done a great good and exercised a mighty power for truth. If it had not been for Darwin and Herbert Spencer, how could theology cope with that heavy dark materialism which has been settling down upon us ever since the day of Locke, and which takes us back to the metaphysical difficulties concerning the nature of matter? It is something to recognize in the Darwinism and utilitarianism of the age a power by which we can take to task the materialism which now clogs the general mind of England, and which can prepare us for a broader theology and for a fuller expression of the truth which we learn from the Bible. If there is one thing needed, it is, perhaps, that which the learned author of the letter which has been read to us refers to. It is not fair and right that a man should not be allowed to change a dogma which he cannot reconcile with reason, without being compelled to take up his abode in the camp of those whom he dislikes as infidels. It seems to me that the Church ought to go out and find what there is in science that is true; and not only what is true, but what is applicable to the solution of the difficulties in the Bible. There is another thing, also, that ought to be done. We ought to have a more clear, distinct, and precise formulary of faith, fully expressed and more strongly insisted on, so that if a young man did meet with dear friends not like himself, having had the opportunity of an early and careful Christian education, he might have in that precise education a sure refuge from difficulty, and a wider opportunity of putting himself into a position of sympathizing with his unenlightened friends. It is a poor thing when the Church confines herself to her own battlements and her own friends, and does not adopt the missionary spirit and the higher duties of the missionary life—going out to seek and save. (Cheers.)

Mr. CHARLES DIBDIN.—I should like to draw the author of the paper's attention to a point, a minor one, perhaps, contained in the 12th paragraph, where I find the following sentences:—

“There may, for what we know, have been flora and fauna upon the earth, even in this pre-historic period; for, as St. Augustine points out (*Ench. ad Laur.*), the text ‘Death entered into the world through sin,’ may be understood of the human race, and may be taken to mean, simply, that death obtained its power over mankind through sin. This explanation certainly appears possible.”

To me this “possible” explanation appears impossible. It is based on the passage in the 5th chapter of the Epistle to the Romans (where it says, “For as by one man sin entered into the world, and death by sin,

so death passed upon all men, for that all have sinned." Now, it seems to me that the passage alluded to, and the context in which it stands, are directed to this: that the consequence of Adam's fall was the death, in *trespasses and sins*, of himself and all his descendants, and not *natural* death. I may justifiably claim, in support of this interpretation, the words, "in the *day* thou eatest thereof, thou shalt surely *die*." Adam *did* eat, and he is said to have *died* that very day. I ask Mr. McCaul, did Adam when he fell die naturally or spiritually? I say spiritually. The words, "Thou shalt surely *die*," &c., thus understood are plain, and in my opinion will hardly admit of any other interpretation. In addition to this, will natural "death pass on all men, for that (*i.e.* because) all have sinned"? It has not, for Enoch and Elijah did not die; and it will not, for millions will be alive at our Lord's second advent, who will not *die*, when the words of St. Paul will be fulfilled, "we shall *not* all sleep." I would be glad if Mr. McCaul would enter somewhat more fully into this point in his reply.

A MEMBER OF THE INSTITUTE.—I sincerely thank Mr. McCaul for his paper; but in taking the line of argument which he has adopted, he is endeavouring to establish the accounts of the Book of Genesis: and I think he must either take his stand firmly on that and abide by it, or else he must abandon it. He says in his sixteenth paragraph, in speaking of the various changes that came about with the creation:—

"The earth would appear covered, as in a moment, not only with grass, but with plants and trees, which by the sixth day would have attained a magnitude giving promise, at least, of their ultimate proportions. We now come, again, to the special act of creation. And here again the consideration of time is immaterial."

I cannot understand, if the account is literally true, how it is that time is immaterial. Either time is time, or it is not time; it appears to me that in endeavouring to fix an absolutely simple and literal interpretation of these matters, we are endeavouring to fix in the words a character which they will not bear. The Bible was not written as a scientific book, and the theologians who endeavour to prove that it was, in my opinion force an antagonism between science and religion.

Rev. T. M. GORMAN.—I have listened with interest to the observations of the first speaker. It is refreshing to hear so clear and bold a statement of old-fashioned doctrine, in combination with such breadth of view, in relation to science: but I am unable to agree entirely with the opinion that the school to which Mr. Darwin and his disciples belong has done good service to the cause of truth: such may be the case; but if so, the service has been of a negative rather than of a positive character. Much of what passes in these days for science and philosophy is such as to warn us of dangers ahead, which it is our duty to employ every means in our power to avoid or avert. I wish to speak of principles, and not of persons. Take, for example, the verbose speculations of Mr. Herbert Spencer. To those who look upon the created universe as the work of an Infinite Being, who

has personally revealed Himself to His creatures, the chimerical hypotheses put forward by that ingenious writer necessitate the conclusion that the world is an inexplicable riddle; that everything great and noble in human life is a dream; and that, for man, there is but one creed, with one fundamental article,—*nil certum* here or hereafter. Such a state of mind as this seems to me to be the precursor of intellectual suicide. Possibly some good may arise from such dreary speculations, for Divine Providence is ever educating from evil the good that is hidden in it. It may be necessary thus to arouse from their indolence and sleep the mere routine teachers of hereditary opinions. As remarked by Dr. McCann, religious teachers in these days of free thought too often minister to their hearers as if they were addressing boys instead of men. The way to a solution of the main difficulties which cluster around the first chapters of Genesis, lies in obtaining a true idea of the peculiar style in which they are written. Into this subject it is impossible to enter. To indicate the difficulties which beset attempts to explain these portions of Scripture, let us take, for example, the apparently simple words, "God said." Now this is an historical fact, but the problem is to grasp the true meaning of the phrase, and to conceive how speech can be really, and not figuratively, attributed to Deity. On this point St. Augustine has written profoundly and beautifully in his *Genesis ad litteram*; but his sublime speculations are not satisfactory. Before I sit down, permit me to refer to an article which appeared a few years ago in *Fraser's Magazine*, from the pen of Professor Owen. It deserves the special attention of the clergy who are members of this Society. The design of the article is to show that physiological science is in direct antagonism to certain statements made in the Book of Genesis, as commonly understood. Here is an instance, if ever there was one, in which this Society ought to feel itself bound to come forward with a "reconciliation." The Professor, writing in refutation of an assertion made by a living Anglican bishop, demonstrates that no human being ever did or could live on this earth 969 years, the age assigned in Genesis to Methuselah. An utterly futile attempt at reply was made in a succeeding number of the same *Magazine*. Swedenborg, to my mind, has given a good explanation; but here is an alleged incompatibility between the definite conclusions of science and a clear statement of Holy Scripture. An unmistakable issue is raised on a matter of fact, the consideration of which falls fairly within the range of those objects which this Society was instituted to promote.

Dr. E. HAUGHTON.—I should be very sorry to prevent any educated man from studying any work which was written with a good purpose, however erroneously,—not even excepting those from which I most emphatically dissent,—as I do from the writings of Swedenborg. They will find much to interest them in the writings of that philosopher; but at the same time (as Mr. McCaul has said), with regard to authority, we have to choose who is to be our authority. Some scientific men, holding a high position in the world of science, wish to diminish the weight of the Word of God, as being a thing of no authority; and some of them desire to substitute in its place their own authority. In the

minds of such people it seems to be considered sufficient to compel our assent to a proposition, that a certain number of leading scientific men have agreed to adopt a certain view ; and therefore that we are to receive it as though it were Gospel. I demur to that kind of authority ; because, whatever weight it may bear when a judgment is formed, those of us who have been accustomed to the meetings of this Society know how many of these notions have been exploded within the short period of time within which we have existed as an Institute. I will recall a remark which was made by Lord Shaftesbury at one of our meetings,—“ he remembered no less than eighty different theories, all current, in science—all opposed to the Word of God, and all set up as reasons for doubting the Word of God,—yet that those eighty theories had all vanished and clean gone out of sight ; while the Word of God, which they were supposed to upset, still remained in all its stability.” I hope that, as regards any other writings but the word of God, we shall read them as Lord Bacon advised us to read,—“ not to take for granted, or to confute, but to weigh and consider.”

Rev. Professor McALL.—Shall I be travelling out of the record if I suggest a few considerations that seem to deserve attention in connection with this subject ? Without presuming for a moment to put aside what Mr. McCaul has given us, or pretending a competition with his views, there are some thoughts which have occurred to me which go very near the ground taken by some of the gentlemen who have spoken. In the first place, without undermining the authority of the Pentateuch, may we not regard the earlier part of Genesis as a compilation from pre-Mosaic records ? Such records must, of course, be sacred in themselves, and they are sufficiently authenticated for us by the use which is here made of them. Then, when God is said to have created the heavens and the earth, may we not understand an act differing in its very nature, and widely distant in point of time, from that series of acts afterwards described,—the first act being the origination, and the others the mere arrangement and disposal of things already existing ? My third point is,—may not the first act of creation refer to a period which would leave scope for many alterations and developments, through which the world has passed,—a period possibly comprising myriads and even millions of years ? Fourthly, I would ask, is it difficult to believe that in the earlier conditions of the globe death existed not merely by natural decay, but because the different orders of creatures preyed upon each other ? Fifthly, does a proper faith in Revelation forbid the notion that among the various pre-Adamite tenants of the earth in the unrecorded past, there may have been creatures nearly resembling man in form, and endowed with intelligence ? The question need not be viewed with any alarm, as a doctrine of natural religion. Revelation being silent on the subject, it might perhaps be inferred that some such connecting link always existed between the Creator and the various irrational tribes. These inquiries point to a consideration of great importance, viz., that the Mosaic account is largely poetic, rhetorical, and figurative. The key to that account seems to be found in the fact that the writer describes things not as they were, but as

they would have appeared to a human spectator ; or, as has been otherwise stated, it narrates only those things which are necessary to the development of a religious system. Consistently with this idea, the moon, though absolutely the smallest light in the planetary system, is described as second only to the very greatest, the sun.* It is not then the planet as it is, but the planet as man would see it, that is described. There must always have been a danger lest erroneous physical ideas should intrude into the domain of theology, and it was probably to prevent this that the doctrine of the true God—His omnipotence and beneficence—was put before the world, not in abstract propositions, but embodied and illustrated in the attractive form in which the sacred historian presents it. So long as the general object and tendency of the account are not misapprehended, it is of little importance how far that account is taken literally. Some persons are indeed impatient of any, even the least, divergence from the strict letter of the narrative, as if it must undermine revelation itself ; but the great majority of Christians are content with a less rigid theory of interpretation. Humble-minded and devout readers of the Bible yield very willingly to the impression made on the mind by the account *primâ facie* and as it stands, and yet, deep in their hearts is the conviction that the narrative is largely figurative and poetic.† They believe in Divine purposes and acts, but in their calm judgment they would question whether in literal fact the Almighty gave express names to the light and the darkness ; and whether in articulate words God commanded the separation of earth and water. It produces in the minds of such persons the effect of poetry rather than of unadorned narration, when it is said that the Almighty breathed into the nostrils of man the breath of life, and he became a living soul. Lastly, when we are told that God said, as if in soliloquy,—“ It is not good for man to be alone ; I will make a help meet for him,” we have a representation not of the speech, but of the will of God, and that in a manner fitted to produce a just and natural impression upon the mind. It has been the object of the author of the sacred account, in dealing with the facts on which that account is based, to treat them as if he were giving an exact and literal description of the process of creation. It is customary for a man to frame a deliberate purpose in words, and in

* I think not. The original narrative says that God made the two great—not planets—not heavenly bodies—but lights or *luminaries*. They are called *great*, not in reference to their size, real or apparent, but in reference to the amount of light which the earth receives from them. The literal translation of the Hebrew (Gen. i. 16) is, “ And God made the two great luminaries : the great luminary to rule the day, and the little luminary to rule the night, and the stars.” And so we find it in the German translation which was made by eminent Jewish scholars (Amheim, Fürst, Sachs), and edited by the late Dr. Zung (Berlin, 1873). “ Und Gott machte die beiden grossen Lichter ; das grosse Licht zur Herrschaft des Tages, und das kleine Licht zur Herrschaft der Nacht, und die Sterne.—A. I. M'C.”

† I think not ; although occasionally figurative, there are no data for saying that the narrative is poetic.—A. I. M'C.

important cases to announce his attention beforehand. Hence the general effect of the Mosaic account is to represent God as being as truly the originator and framer of all things, as if He had conceived and expressed His purposes after this human fashion. A correct philosophical account of these things would have been in the early ages of the world unintelligible, if not incongruous and contradictory, and therefore it would not have conveyed a true picture. Let us imagine a patriarch of the olden time, told that this earth, instead of being, as it seemed, one vast immovable plane, is a globular body of comparatively insignificant size, whirling through space round the sun, and completing that revolution in the course of a year, while it goes daily round on its own axis. Before the discoveries had been made which enabled men to understand, in some degree, the solar system, such a description would only have created confusion; it would have conveyed no useful information, and would not have been believed; but when science is sufficiently advanced to comprehend the facts, men are able to appreciate the motive which dictated the earlier and simpler account. It was wise, therefore, to accommodate the teaching given to the imperfect knowledge of the infancy of our race. In future ages the Mosaic account may come to be taken less and less literally as physical science advances; * but had revelation anticipated modern discoveries, it would only have unsettled man's belief in higher things. The sphere of our duties and our hopes lies beyond all this. Still, as we imagine, we have in this account facts, not myths; a central mass of reality, although invested with poetic drapery,—reality such as God only could have made known. This account guided thought and imagination, when knowledge was in its infancy, and it is not surprising if, in regard to its physical aspects, modern science compels some change in the interpretation of its terms. That a cosmogony, dating some 3,300 years ago, should be deemed in this day worthy of any attention might seem sufficiently wonderful, but that in its substance it should have successfully borne every class of scrutiny is more surprising still, and we may safely allow it to make its natural impression on the mind as conveying moral and spiritual lessons which will never be obsolete.

A MEMBER OF THE INSTITUTE.—May I ask one question of the speaker who has just addressed us in so interesting a manner. Does he consider that there was a pre-Adamite man, or some one before Adam in human shape? I do not ask this question for the purpose of carping; but only to ascertain what is his ground for the suggestion.

Mr. McALL.—I simply say that if it were proved that there were 10,000 such men, I should not give up the Bible.

A MEMBER OF THE INSTITUTE.—I understand you to say that there may have been such a thing?

Mr. McALL.—I think it is possible.

Mr. T. W. MASTERMAN.—I think that all the speakers hitherto

* So far from any necessity existing for such anticipation, my own belief is, that the more physical science advances, the more will the literal sense and accuracy of the Mosaic account be indicated.—A. I. M^C.

have omitted to notice what is to my mind one of the most important features of the paper, namely, that Mr. McCaul makes so strong a point of the world being created in six days, and assumes that the first verse of the book of Genesis is descriptive of an earlier creation. At one time of geological research it was thought that there had been immense convulsions which shook the earth, and that after each convulsion there was a fresh creation of plants and animals; but now it is believed and proved, so far as we can prove anything in the ancient history of our planet, that there was a succession of animals and plants from the very earliest discoveries in the very deepest deposits of the Silurian strata to the superficial gravel-beds of the Tertiary. This being so, I think the idea that the first verse of the first chapter of Genesis describes an earlier creation, and that the six following verses described the creation of the animal and vegetable world which is now existing, can scarcely be maintained. Then Mr. McCaul, speaking of the fourth commandment, says:—

“Whether the days spoken of, in this record, are periods of twenty-four hours, or of still greater duration, it is impossible to determine. There are many who think that they may be understood as indefinite periods. But the language of the Fourth Commandment seems to others to be unfavourable to such an interpretation.”

Now, it seems to me very favourable to it. The Fourth Commandment tells us that God rested on the seventh day, and is not this just the seventh day on which God is still resting from the six periods of work and creation? I cannot certainly see that we should gain anything in the eyes of the scientific world by cutting off that first verse, and saying, “there are certain other theories about creation in that first verse: here, in the following verses lies our belief.” By taking up the idea that the six days represent six periods of time, one after another, in which the world was created and brought forth everything, and that the seventh day was a period of rest which has not yet come to a close, we have a better solution of the difficulties, which I admit are very great, and a solution which I think ought to be satisfactory to the Christian. There is one other thing I will mention about prayer. I was sorry to hear the remarks made upon that subject, to the effect that it is not to be expected that we should receive an answer to our prayers. It seems to me that every one who prays truly and earnestly in the true spirit of a Christian may expect to receive an answer to his prayers.

Rev. Sir T. M. LUSHINGTON-TILSON, Bart.—The speaker to whom you refer did not say that, I think: you are going beyond what he really did say.

Mr. McClymont.—I would draw a distinction between the *τὸ κατ' ἀλήθειαν ἀγαθὸν*, and *τὸ φαινόμενον ἀγαθὸν*, the real wish of a good man which may be answered, and the wish which was not really good and which would not be answered. (*Vide* Aristotle, Ethics, Bk. 3, cap. iv. sec. 1-4.)

Mr. MASTERMAN.—Perhaps there may not be so much difference between us as I anticipated.

Sir T. M. LUSHINGTON-TILSON.—Mr. McCaul has touched on a great variety of points, and there may be a difference of opinion as to the minor ones, but on the major, all who are old-fashioned orthodox believers will agree with

him. We are not ashamed of the conclusions to which we come when we find ourselves in company with such men as Lord Bacon, Locke, Sir Isaac Newton, and others. They felt as we feel, that it is the first axiom either in nature or in written revelation, that there is a moral Governor of the universe—an Almighty Being; and that, therefore, it is utterly impossible that there can be any real contradiction between the two books—the book of Nature and the book of Revelation. The book of Nature is not yet perfectly understood, nor the book of Revelation; and we must wait until the former has been made much more plain to us by the vast induction of facts, not yet gathered by scientific men, who are too hasty in leaping to their conclusions; for it is impossible for them to say that the theories they form to-day may not, like others previously, be found untrue to-morrow. Hence, in regard to nature, we must wait; and so also in regard to written revelation. The Church, perhaps, has not arrived at the amount of knowledge she might have arrived at in the last 1,860 years or more. She has not thoroughly understood the Bible as a whole. We see great divergencies of opinion even in our own age among theologians. Let us look, for instance, at many of the words of prophecy, which could not have been made plain before, but which are being interpreted by the events of our own day. Yet the Bible cannot be thoroughly understood until the whole prophetic period comes to an end. Hence, as Christians, we must not dogmatize too much, but must wait and see: events will unravel the wisdom of God; and when these events have occurred, we shall see that the book of Nature speaks exactly the same language as the book of Revelation. As to Genesis i., I fully agree with Mr. McCaul, that we must take up the account after the first verse; and it seems to me also that in all probability the first verse includes many changes in the eternity of the past. “In the beginning God created the heaven and the earth,” and then there is a pause. It is said the earth was without form and void; and we do not know how long the interval may have been. The world may have passed through many changes, and the first verse is open to this interpretation, that it includes the whole period of these changes up to the time of chaos, and after that followed the period referred to in the subsequent parts of that first chapter of Genesis, during which there was a fresh creation. Then came the fall; and with it entered anguish and sorrow into the world of man; for man, as we know, is not now in a perfect state; he fell; and his redemption can only be provided for through the God-man who came down and took our nature.

Mr. W. N. WEST.—I agree more with Sir Lushington-Tilson than with Mr. McCaul. In Genesis, it is said, that “In the beginning God created the heaven and the earth”; but, though commonly understood so, it is not stated that He *created* the earth without form and void, but it *was* without form and void; in other words (and I believe this is the force of the original), it *became* without form and void.* I cannot conceive that God could have

* This point is also taken up in the “Transactions,” Vol. IV. p. 237.

created the universe in a chaotic state ; on the contrary, like all His other works, it must have been perfect : doubtless, it afterwards became, through some catastrophe, without form and void ; in fact, the description is that of a superinduced state of ruin. And this view is strikingly confirmed by a remarkable passage in Isaiah xlv., where, in reference to the creation of the earth, it is expressly said, "He created it *not* in vain," words which, in the original, are the same as those in Genesis i. 2, rendered, "without form and void." Out of this state of ruin, then, I submit, the world was created as it is at present. Between the "beginning," and the period when the earth lay in this chaotic state, infinite ages, for anything I know, may have intervened, sufficient to account for all geological discoveries.* I do very much complain of our scientific men jumping at conclusions, and putting aside the good old Bible, for theories which have to be given up almost as fast as they are formed. Speaking for myself, I would say that all the arguments in the world, philosophical or scientific, will not convince me that there can, by any possibility, be divergence between the revealed Word and works of God, coming, as they do, from the same hand. (Cheers.)†

Mr. McCaul.—I beg to tender my best thanks to those gentlemen who have discussed my paper, and to assure them that my principal wish in

* The fifth essay in "Aids to Faith" (Murray) deals very fully with this question.—Ed.

† The President of the British Association, at its Bristol meeting in 1869 (Professor G. E. Stokes, Cambridge, secretary to the Royal Society), concluded his address upon that occasion with the following words :—

"Truth we know must be self-consistent, nor can one truth contradict another, even though the two may have been arrived at by totally different processes ; in the one case, suppose, obtained by sound scientific investigation, in the other case taken on trust from duly authenticated witnesses. Misinterpretations of course there may be on the one side or on the other, causing *apparent* contradictions. Every mathematician knows that in his private work he will occasionally by two different trains of reasoning arrive at discordant conclusions. He is at once aware that there must be a slip somewhere, and sets himself to detect and correct it. When conclusions rest on probable evidence, the reconciling of apparent contradictions is not so simple and certain. It requires the exercise of a calm, unbiassed judgment, capable of looking at both sides of the question ; and oftentimes we have long to suspend our decision, and seek for further evidence. None need fear the effect of scientific inquiry carried on in an honest, truth-loving, humble spirit, which makes us no less ready frankly to avow our ignorance of what we cannot explain than to accept conclusions based on sound evidence. The slow but sure path of induction is open to us. Let us frame hypotheses if we will : most useful are they when kept in their proper place, as stimulating inquiry. Let us seek to confront them with observation and experiment, thereby confirming or upsetting them as the result may prove ; but let us beware of placing them prematurely in the rank of *ascertained truths*, and building further conclusions on them as if they were."

The importance of the foregoing remarks by one who is justly called "a true scientific man," and, "one of the intellectual parents of the present splendid School of Natural Philosophers" (see "Scientific Worthies in Nature," 15th July, 1875), warrants their insertion here.—Ed.

reading it was to promote discussion and in no way to dogmatize. I wished to point out that the original seems to indicate certain conclusions, and where this is the case it is not the part of a Biblical interpreter to suppress or deny them out of compliment to science. There are one or two points which I should wish to notice very briefly; and first as to the letter read from Dr. McCann, which seemed to say that the fault of the present state of things in reference to the increase of infidelity was to be attributed to the clergy. I am ready to admit, that there is probably in the present day, as there has been at all times, ignorance among the clergy, not merely of philosophy and of science generally, but of the meaning of the original records of Scripture. But I would remind you that the clergy are still the children of the laity, and I do not think it is fair to say it is the fault of the clergy. The course of a man's reading and the bent of his mind will depend almost entirely on his early education. If a young man has a reverence for the Scriptures, if he has been taught to regard the Bible as a sacred volume, and to consider himself bound to study it while young, he will be likely to carry on that study afterwards; but if you bring up children with very little regard for the Scriptures, you have no right to be displeased at the result; and I maintain that that result is the fault not so much of the children as of the parents. If it is different now to what it has been in the past I am thankful for it, but I have my doubts as to whether there is much improvement in this respect. I should be sorry to be misunderstood as to the benefits of science; I do not wish to disparage science at all, and I admit most cheerfully the enormous debt of gratitude which we owe to it. With respect to painting and poetry, I do not depreciate them, but I say it is a thousand pities if they venture to "idealize" on Scriptural subjects: this is what I complain of. When subjects are treated of, that are taken from the Scriptures, great care I think ought to be taken to deal with them *correctly*. As to light existing before men, I thought I could not have heard correctly what Mr. McClymont said: I was greatly interested in his speech, but he said light could not exist without a seeing eye. But surely a seeing eye does not make light. Light existed before the speaker was born and will do so after he is dead. Light is a very material fact in reference to vegetation. If you put plants into a cellar they will force their way through the interstices in the flags in order to get to the light. With respect to prayer, I would advert for a moment to one instance which Mr. McClymont gave us: although I should be most ready, as we all *were*, heartily and earnestly to thank God for the recovery of the Prince of Wales, I should not consider that I had a right to say positively, that his recovery was *ipso facto* due to the prayers which were offered up in his behalf, for we have no absolute data to go upon.

Mr. McClymont.—I rather tried to help out the theory of the paper that some prayers were unanswered.

Mr. McCaul.—Yes, I know, but you put an opinion into our mouths which I for one did not at all relish. There are two other points to which I should like to draw special attention, and the first is in reference to spiritual death. I admit that there is spiritual death, and that the Scripture

records it as a very terrible thing; but I maintain that we have no data for saying that Adam was overtaken by spiritual death. The death in his case is physical death, not spiritual. If you draw an inference from the passage, "in the day that thou eatest thereof thou shalt surely die," I say that that only means, "thou shalt enter into a new condition of life, the end of which is and will be death." As to time being "immaterial," in the same page you will find that I put it rather differently. I meant to say that if we believe a certain operation proceeds from God, it does not rest upon time,—it exists in time, but it does not matter to me whether it took twenty-four hours, or years, or centuries; if it is His immediate creation, and His work, the question of time does not so much matter: this is all that I meant when I said it was immaterial. With respect to the age of the patriarchs, a gentleman made some interesting remarks with reference to the age of Methuselah. Some years ago there was a little notice copied into the *Times* from the *Lancet*. I, at the time, read a copy of it, and have it still. It gives an account of certain great ages, and the medical writer argues that after a man has attained a certain age, and has passed certain epochs, the wonder is not that he should go on living, but that he should ever die. I never felt any difficulty about the matter, but I was very much struck with that medical confirmation of the Mosaic writings. As to pre-Mosaic documents, I should concede that there probably were documents before the time of Moses. As to pre-historic man, it is not necessary now to enter upon that subject. Is the Mosaic account poetic? I think not; it is perhaps figurative, but not poetical. Lastly, with respect to the seventh day, I still adhere to my opinion. The difficulty to my mind is that there is a practical command to men to keep holy the seventh day, because God rested on the seventh day; and it appeared to me, *primâ facie*, unlikely therefore, that that should represent a period and not a day. But I am quite aware that it is often held to be a period, and I am aware that Bacon, in his essays, takes it in that sense, speaking of the ages that exist now as the *day* on which the Lord rested. I thank you again for the very kind way in which you have received my paper. (Cheers.)

The meeting was then adjourned.

REMARKS UPON THE PAPERS BY THE REV. J. H. TITCOMB
AND THE REV. A. I. McCAUL.

BY J. W. DAWSON, Esq., LL.D., F.R.S., *Principal of McGill College,
Montreal.**

I HAVE received the proof copies of the papers recently read before the Institute by the Rev. J. H. Titcomb and Rev. A. I. McCaul; and having been invited to do so, I shall frankly give my opinions upon the subjects discussed, limiting myself, however, to a few principal points.

It would, I think, have been well had the writers more carefully considered two of the elements which enter into the discussion of the relations of the Bible to Science. I refer, first, to the essential distinction in character between the history of creation in Genesis, and other references to Nature in the Hebrew Scriptures; and, secondly, to the internal evidence with reference to the length of the days of creation.

First. 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. In these points of view, the Bible stands pre-eminent, even in its poetical books, over all other literature, ancient and modern. One can scarcely read a page of any modern poem, or literary work, without finding incorrect statements of natural facts and false hypothetical views. The Bible is wonderfully free from such blemishes. But we do not need to consider this as an evidence of inspiration. The accurate observation of men highly gifted in this respect, and living in the midst of natural objects, and the religious reverence for Nature as the work of God, sufficiently account for it,—at least, in most instances.

But with reference to the work of creation, as detailed in Genesis i., the case is far different. Here we have an attempt to reveal facts and processes anterior to the advent of man upon the earth. In dealing with such a record, we have to consider that, like Prophecy, it is either a product of Inspiration or it is of no authority; and, on the other hand, that we can compare it not so much with facts open to our senses, as with the deductions of science from these facts, and which are to be received with due caution and discrimination. In making such a comparison, it will serve no useful purpose to take low views as to the value either of Scripture or Science; nor will it serve any useful purpose to say that the Bible was not intended to teach science, because it need not in that case have committed itself to any state-

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ments on the subject ; neither can it satisfy any doubt to assert, that the days of creation were intended to justify the weekly Sabbath, since that merely gives them the character of a pious fraud. Fortunately, there is no necessity to have recourse to such explanations, since it is obvious that some account of creation was required as an introduction to the monotheistic theology of the Bible. It was necessary, for example, to affirm that nothing is fortuitous or eternal, but all the work of God ; also to include in this statement all the materials of ancient idolatry, whether in the heavens or the earth, and to show that the universe is a work of order and design. It was also important that any such statements should be so accurate and guarded as not to commit themselves to any existing hypothetical views, or to be contradicted by subsequent discoveries which might be made by scientific investigation. These are the conditions which should be fulfilled by the first chapter of Genesis, and which all fair investigation of the subject tends to show have actually been fulfilled, as I endeavoured many years ago to show in my work on this subject.*

Secondly. The question whether the days of creation are intended to designate long periods of time is one which, independently of the testimony of Augustine and other writers before the rise of geology, seems to be settled by the internal evidence of the book as investigated by modern scholars. On this point I would merely mention the following considerations :—

(1.) The Hebrew *yom* does not necessarily mean a natural day. In Genesis i. the word is obviously used in two senses, designating the creative days and the alternations of light and darkness within such days. The earlier creative days could not, in consistency with the terms of the narrative, have been natural days. In Genesis ii. 4, the whole creative week is called a day.

(2.) The expression “one day,” used for the first creative day, has been held, on the analogy of other Scriptural expressions, to imply a peculiar kind of day.

(3.) Many internal difficulties occur in the natural day theory ; one of these arises from the interval between the creation of the man and the woman as stated in chapter ii.

(4.) In Psalm xc., attributed to Moses, and which in its style resembles his poetry as reported in Deuteronomy, one day of God relatively to human history is said to be a thousand years, and relatively to creation it may be still longer ; and in this Psalm these days of God appear to be designated by the term “Olam,” age (rendered “everlasting” in our translation). “From Olam to Olam thou art, O mighty EL.”

(5.) The seventh day is not stated, like the others, to have had a beginning and an end ; nor is God said to have recommenced His work on any eighth day. It is fair, therefore, to infer that the seventh day at least is a long period, and still continues. Our Saviour himself seems to have referred to this when He said, “My Father worketh hitherto, and I work.”

* “Archaia.” Sampson Low & Co., London.

(6.) The reason given for the Fourth Commandment requires the supposition of long creative days. It cannot be meant that God works six natural days, and rests on the seventh, as we do; but it may mean that on God's seventh day we should have entered on His rest, and that our weekly Sabbath is a memorial of this rest, lost by the Fall, but to be restored in the future.

(7.) This explanation has the support of the author of the Epistle to the Hebrews, whose argument in his fourth chapter has no force unless on the supposition that God entered into a rest, or Sabbath, of indefinite duration, which man failed to enter into owing to the Fall, retaining only the weekly Sabbath as a shadow of it; but which is to be restored in Christ, who has already entered into His rest, of which the Lord's Day is in like manner a foreshadowing to us. There is also good reason to believe that the term *αἰῶνες* used with reference to the creation, in Hebrews i. 2, and in Ephesians iii. 11, refers to the creative days as long periods; and these passages, so obscure otherwise, become plain when this is taken into consideration.

Further discussion of these points will be found in the work to which I have already referred, and in Macdonald's admirable treatise on "Creation and the Fall,"* probably the best book on this subject accessible to the English reader; and it may be considered as established by an overwhelming amount of evidence that Moses himself, our Lord, and the Apostle Paul, have recognized the days of creation as long periods. If so, there can surely be no advantage in adhering any longer to a mediæval literalism, which besides depriving us of the advantage of explaining the origin and true religious significance of the Sabbath and the Lord's Day, and the relation of both to God's rest and to the rest which remains for His people, places the Bible in unnecessary conflict with truths which the stones themselves have, in these days, opened their mouths to declare.

It is high time that clear and Scriptural views of these subjects were given in all our schools and pulpits, by all grades of religious teachers. If this were properly done, there would be less reason to complain that young people, when they go out into the world, find what they have been taught in the name of religion to be in conflict with what all intelligent people believe on the evidence of their senses and their reason. The blame of the resulting infidelity may not lie at the door of even infidel men of science so much as of those who should have known the Word of God more perfectly before attempting to instruct others. There are enough of errors promulgated in our day in the name of science and philosophy, to engage the attention of theologians, without placing the Bible in apparent hostility to truths which are in harmony with its own teachings.

* Hamilton, Adams, & Co., London. See also Lewis's Introduction to Lange's "Genesis" (pp. 131 et seq.): Clark, Edinburgh.

ORDINARY MEETING, MAY 18, 1874.

J. ELIOT HOWARD, Esq., F.R.S., IN THE CHAIR.

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

MEMBER :—Rev. F. M. Oxenham, M.A., Oxon, 95, St. George's Road.

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

- "Journal of the Royal United Service Institution." Last part, vol. xviii. *From the Institute.*
- "Alleged Difficulties in the Teaching of the New Testament." By Rev. Prebendary Row. *From the Author.*
- "Commentary on the Bible," 6 vols. By Rev. C. Girdlestone. *Ditto.*
- "Flint Implements." By J. Parker, Esq. *Ditto.*
- "Hyena Cave of Wookey Hole." By the same. *Ditto.*
- "History of Oxford in the Ninth and Eleventh Centuries." By the same. *Ditto.*
- "Hollingsworth" (volume and pamphlet). By Dr. Sexton. *Ditto.*

The following paper was then read for the author, who is resident in America, by the Rev. Prebendary Row, M.A.

THE FINAL CAUSE AS PRINCIPLE OF COGNITION AND PRINCIPLE IN NATURE. By Professor G. S. MORRIS, M.A., Michigan University, United States.

IN more than one of the papers presented at the meetings of this Institute, the notion of final cause, or of design in nature, has been dwelt upon and defended. There can be no excuse for returning to the subject, except the desire to have included in the records of the Institute a paper, which shall attempt still more specifically, and, perhaps, from a point of view not previously chosen, to establish the definite presence of the idea in the world of reality, and its necessity as a principle of our thought about nature.

The late Professor Trendelenburg, of Berlin, in an essay on the *Ultimate Ground of Distinction among Philosophical Systems*, discriminates as follows:—"In all systems of philosophy, either force is conceived as superior to thought, so that thought is not primary, but rather the result, product, and accident of blind forces; or thought is made superior to force, so that blind force alone is not primary, but is the outcome of thought; or, finally, thought and force are represented as at bottom the same, and only distinguished in human opinion." (*Historische Beiträge zur Philosophie*, vol. ii. 1855, p. 10.) The disjunction seems exhaustive, and there can be no doubt under which member of it we are to range ourselves. Not the first alternative, which is espoused by materialism, nor the third, which corresponds to Spinozism, but the second covers the ground of our Christian idealism. We hold that primacy in rank and in power belongs in this universe to thought, or intelligence. This is our philosophical attitude, which becomes further differentiated and illuminated by the addition to it of Christian faith.

The scientific defence of this position is accomplished partly by metaphysical argumentation, and partly by analysis of the results of physical and psychological observation. What is true in thought, we claim, can not be false in nature, but must find in the world of natural reality its confirmation and realization. If the ideal controls the real, if intelligence governs force, there must exist in the world of real forces indications of this control and government.

In the acquisition of knowledge we proceed from the known to the unknown, from the sign to the thing signified, and (quite generally) from the part to the whole. Moreover, if knowledge is for us possible, it is, of course, so only under the conditions inherent in our nature and in the nature of real things. It is because man is a part of nature, that he may *à priori* assume a fundamental likeness or other relation between what is essential in his own nature and what is essential in the world around him. The physical (phenomenal) identity of the human frame with the natural elements is admitted and established. Analogy would lead us to suppose that what is specially characteristic of man—the developed reason and moral nature—is not a wholly incommensurable, isolated quality in him, but that it has its analogue or correlate in nature—or, that there exists in the latter something so akin to man (as Plato would say) that only the reason of man, and not the senses, can apprehend it. Analogy leads us to look for the ideal in nature.

And, as matter of fact, we do find, or think we find, in

nature, in abundance, that which can only be ideally apprehended. Of this description, above all, is apparently space itself, which is a specimen, on the largest scale and in a most significant way, of a realized abstraction. In the same category we are disposed also to class all concrete relations, as of order in succession and co-existence, symmetry, and the like. These, we assume, can not be said to be introduced into nature by the intelligence of the observer, for they would exist—such is our necessary conviction—even though no rational being, such as man, were in existence to observe them. What was *à priori* anticipated seems thus to be *à posteriori* confirmed, in so far at least as it regards what may be termed the passive existence of the ideal in the real. Our present, immediate concern is to see whether the ideal—thought—is also actively present in the real, as a principle underlying and controlling it—more especially in the form of final cause.

The question is a metaphysical one, in so far as it relates to our judgment of the real constitutive nature of the so-called “real” objects in the world, or of the world in general; and it is a logical one, or a question belonging to the theory of cognition, in so far as it is connected with the complex of propositions which we are compelled to hold as true regarding the conditions and forms of human knowledge. The answer to the metaphysical question will depend upon the answer to the logical one, to which latter, therefore, we may at once address ourselves, by way of introduction to the former.

Human knowledge is, conceivably, either of the real or of the phenomenal. It is also direct or indirect. These two divisions are not coincident, and each covers an important distinction.

As to the first: the distinction between real and phenomenal needs to be carefully stated, by definition of the terms employed, since it is by no means an obviously fundamental one. All that *is, appears*; strictly speaking, we know only how the object known appears to us, and in this sense it may be said that all our knowledge is of the phenomenal. (And this suggests the still more profound sense in which it may be said that all our knowledge rests in the last analysis on faith. *Credo, ut intelligam.*) But the (conscious or unconscious) employment of the appropriate logical processes leads us nevertheless to distinguish between the real and the phenomenal, and to recognize in the distinction the expression of a fundamental verity. By knowledge of the real I mean knowledge of the essential, constitutive nature of the object of knowledge, of the true, noumenal cause, or metaphysical

knowledge. All other knowledge relates to what I understand by the phenomenal, hence to what is non-essential, not constitutive, and to effects or phenomenal causes, rather than true causes.

By direct knowledge, I mean such as is furnished immediately in consciousness; the knowledge of our own being and of its attributes, and of all our conscious states; by indirect, all other.

I omit, for the present, the query whether or to what extent all knowledge of the real is direct; a part of it, at least, evidently is such. But not all direct knowledge is of the real; for the definite, changing contents of consciousness, which we know directly, are for the most part purely phenomenal.

The reflection confronts us at the outset, that, in assuming the possession by man of knowledge of the real, we run counter to the dicta and arguments of noted philosophers in ancient and modern times. This fact of itself need not, however, deter us from making the assumption, since, for that matter, philosophers equally distinguished have upheld our doctrine. Nor will the conditions of this discussion permit more than a passing reference to the especial positions of opponents. Kant's attempt to establish a strict limitation of knowledge to the phenomenal was, fundamentally speaking, a failure. For his attempted demonstration of the exclusively subjective nature of the "forms" of sensibility and of the understanding, and of the ideas of the reason, has been shown to be defective, and hence inconclusive;* he himself, in practice, did not observe the limitation for which he contended (he regarded "things-in-themselves" as *causing* in us impressions whence we could infer at least the existence of the former, and thus contradicted himself by applying to the transcendental realm of true being the category of causality, which he affirmed to belong merely to subjective, relative, human thought); and his doctrine may be said to have been disproved by a decree of history, since his immediate successors, professing (notably in the case of Fichte) to carry out to its legitimate consequences his own teaching, landed at the opposite extreme of pretended absolute knowledge. As for English philosophers of the empirical school, who have denied of man that he is equal to the cognition of anything that is real (in the sense of this term indicated above), the fundamental principle, upon which they proceed in their arguments, it is competent for us to pronounce an imperfect generalization and a principle which,

* See, for example, Trendelenburg's *Logische Untersuchungen*, vol. i. chap. 7, and *Histor. Beiträge zur Philosophie*, vol. iii. art. vii.

carried out to its logical consequences, leads to the absurd. Consider, for example, the words of John Stuart Mill, in book i. ch. 3, of his *Logic*, "Everything is a feeling of which the mind is conscious." What is true in this assertion is what is above admitted, namely, that all being, so far as known by us, *appears* to us, *i.e.*, is known in the forms, under the conditions, by the means, which are peculiar to human cognition (truismatic as this may sound). I do not inquire whether it be a correct use of terms to identify consciousness with feeling—virtually to define the one by the other. But the whole and only truth of the expression cited (as far as it concerns the point immediately under consideration) is, that all our knowledge of the real must, to be possessed by us, be a part of our individual consciousness. But to affirm that this is the whole truth of the case, is to identify the part with the whole, the aspect with that of which we perceive the aspect, or (better) the form with the content, and the appearance with that which appears. It is true that our metaphysical knowledge (knowledge of the "real") does not come to us through the medium of demonstration. Like all that is ultimate, it is simply apprehended, is acquired and recognized directly, and can be confirmed by indirect demonstration alone. But the testimony of consciousness to its reality is ever present, and furnishes the one conclusive answer and corrective to statements like that now under criticism. Hume showed that the logical issue of such a principle is philosophical scepticism; and it is substantially this to which Mr. Mill himself is led. (See his *Examination of the Philosophy of Sir William Hamilton*, chs. xi. and xii.) But the considerations, by which philosophical scepticism is shown to be absurd, are too familiar to need to be re-stated.

All knowledge consisting in ideas, it is a work of both psychological and metaphysical analysis to answer (in the second place) the metaphysical question as to the ideas which represent or are the medium of knowledge of the real, on the one hand, and of the phenomenal, on the other; as also to show what knowledge is direct, and what indirect. In the case of indirect knowledge, we are obliged to resort for confirmation to logical criteria of truth, or to processes (observation and experiment) guided by logical rules.

Pre-eminently, and in the first place, our knowledge of reality is knowledge of ourselves, furnished in direct consciousness. A long line of thinkers, among whose names are included the illustrious ones of St. Augustine and Descartes, have called attention to our direct consciousness of our own existence, as providing the immovable starting-point and foundation for all true (ontological) knowledge. Differences

have existed and been expressed among philosophers as to the interpretation of consciousness, but none have been able to call in doubt its reality, or the truth of the witness which it bears to the existence of something which is called *I*. What the *I* is must be learned from consciousness, which teaches us to consider it as a self-conscious, feeling, thinking, willing force.

It is to be admitted that the representatives of positive science tend, with increasing unanimity, to reject the conception of force, as an hypostatized abstraction, to which no physical reality corresponds; and it is true that able philosophical analysts (Trendelenburg, for one) are unable to find in it anything but motion. The truth of these conclusions, from the stand-point of physics, will at a later stage in this discussion, be formally admitted; and if, in here using the term force, I employ a term, burdened with what might be falsely suggestive of physical associations, it is for the want of a better one to express what I read in consciousness, namely, the efficient agency of the will.

So much direct knowledge of the real, then, is to be claimed, viz. the knowledge of our own ideal existence and efficient agency. The former is perforce universally admitted, in some form; the latter has been questioned. But the testimony of consciousness on this point is apparently so explicit, and the interpretation placed upon it by the general consent of mankind has been so nearly uniform (not to speak of the accordant opinions of noted thinkers), that the burden of proof seems clearly to lie with those who deny free efficient agency to man. Their arguments are directed, generally, against what is termed the freedom of the will. It is enough to remark here that these arguments are mostly of the kind, of which men of science disapprove: they are deductive inferences from apparent or real generalizations, by which it is attempted to decide what must be true in the particular. By an *inductive* appeal to our own consciousness and to that of others—*i.e.* by direct personal observation and experience—we arrive at the assertion of freedom. The denier of freedom, on the contrary, proceeds from some such general truth as that of *law* in human actions, whence he *deduces* a conclusion in conflict with our induction. But all questions of fact must be settled, when this is possible, inductively; such is the dictum of scientific practice and of correct logical theory. Hence we need not longer concern ourselves with a theory contrary to inductively established fact.

All other knowledge of the real than that which pertains to ourselves is indirect and analogical. The basis of analogy is that direct and most certain knowledge which we have of our-

selves as ideal existences. We can advance in our attempts to cognize the real which is not ourselves, only by the way of analogy, because of the unknown we can frame no conception, except in terms of the known. The results of our attempts, being inferential, will command an assent less absolute than that which is due to truths of which consciousness is the immediate voucher.

By analogy we form for ourselves most easily conceptions of the ideal nature of organized, living beings, other than ourselves. Thus, without difficulty, we represent to ourselves in imagination the inward life of our fellow-men, and then, by a process of de-idealization, that of inferior animals. By a reverse process of idealization we conceive of intelligent existence superior to ourselves. (Cf., in Ueberweg's *History of Philosophy*, vol. ii., the section on Beneke, more especially pp. 284, 285, and Ueberweg's *Logic*, § 42.) So, then, we know our own ideal being directly, and we infer that of other beings, more or less like ourselves, from signs, the meaning of which no one calls in question. And this is the only kind of being of which we can truly be said to have intrinsic knowledge.

Besides, ideal, conscious existence, as above set forth, science has been in the habit of treating of the universe as containing "matter" and physical "force." To these materialism reduces the world, and it treats the two as inseparable. They belong for us primarily to the province of the phenomenal. They are, in the first place, ideas; and whatever reality or being corresponds to them can be known only through a transference to them (positively or negatively) of the analogy of our own ideal being.

First, as to matter. In the definition of this conception we are compelled to use terms which imply force, such as impenetrability, power of resistance. It is only these terms which throw the least semblance of light into our idea of matter; extension, form, and the like, are expressions which say nothing on the subject of intrinsic, constitutive nature. Accordingly, philosophers and scientists have sought to identify matter with force or motion, but without success. Professor Trendelenburg, notably, who made of motion the hypothetical principle of nature and of cognition for the physical realm, had to confess his inability to reduce matter to motion. Nor will inductive science admit the theory that matter (atoms) consists simply of forces concentrated in a mathematical point. Says Professor F. Schneider, in Meyer's *Jahrbuch* for 1873, p. 583: "The theory that the atoms have no extension in space and are merely centres of force . . . is, in view of the

results of investigation in various provinces of molecular physics, no longer tenable," &c. This view, I take it, is tacitly assumed in all expositions of molecular physics, as, for example, in Professor Clerk-Maxwell's paper on the *Theory of Molecules*, read before the British Association at Bradford, in 1873. Matter, we are then apparently obliged to admit, is really existing (if there exists an external world—which we may assume to be the case), but of its real, substantive nature we have no knowledge. For Plato, it was irrational and, in itself, unreal; for Aristotle merely potential; for Descartes it was extension; for Kant (at the age of twenty years) "working force," or (at a later period) simply a "necessary formula of thought"; while Hegel treated it as the "produce of place and motion," and the "means for the self-realization of spirit"; Helmholtz declares it an abstraction, and Huxley a "form of consciousness." Evidently none of these men knew or knows what matter intrinsically is; and Du Bois-Reymond says that we never can know it (*Ueber die Grenzen des Naturerkenntens*, Leipzig, 1872, p. 34). And this is true, because matter cannot be conceived by us in sufficiently positive terms; we can only think of it (*except in so far as we attribute to it "forces," our idea of which is formed after the analogy of what we know in our own conscious experience*) as not possessing this, that, and the other attribute of the only kind of existence of which we have direct knowledge, namely, of ideal existence. As to force, in the second place, it too is merely an abstraction (Helmholtz, Ueberweg, and others), or a "form of consciousness" (Huxley), the formation of the idea being "a sort of rhetorical artifice of the human brain which resorts to figure when its ideas are too vague for clear expression" (Du Bois-Reymond), unless it be in an important measure identical with that of which we believe ourselves conscious in our voluntary actions.

Matter and "physical" force are so little known, or rather are so absolutely unknown (apart from the analogy of ideal force), that, without claiming or seeking to arrive at the *what* (the substantive nature) of things, physical science seeks only to ascertain the laws and order of phenomena, which latter it regards with reason as phenomena ("modes") of motion. ("Under the influence of this idea [the idea of the conservation of energy], we see in our time physics transformed and established as, in the strictest sense of the term, doctrine of motion"; see Dr. H. Böhm, *Geschichte der Entwicklung der naturwissenschaftlichen Weltanschauung in Deutschland*, Gotha, 1872; cf. also Emil du Bois-Reymond, *Ueber die Grenzen des Naturerkenntens*, pp. 2 et seq., Leipzig, 1872.) The

question, then, as to the real, substantial nature and laws of action of the substrate underlying phenomena, is left open to metaphysical speculation, which alone can determine what views may with greatest probability be held upon the subject.

If, now, true (physical) science deals only with phenomena, and neither can nor will declare aught as to the real nature and (metaphysical) modes of operation of their causes, he who would form an opinion on the latter point has but to take the results of positive science and reason freely backwards from them, as from signs, to that which they signify. Science, obviously, can neither interpose obstacle nor objection so long as the results of reasoning (speculation) are not given out as results of so-called "exact" (*i.e.* mechanical) science. And if, in prosecuting our reasoning, we proceed by the way of analogy, arguing, as far as there seems ground for it, from the known to the unknown, we shall obviously be simply following the usual method of scientific inference.

The fact is worthy of attention at this point, that, if any representatives of science lend their countenance to philosophical materialism, they favour, in so doing, a *metaphysical* theory. Clearly, the doctrine that nature is a complex of unconscious forces is a metaphysical doctrine—a theory as to the intrinsic, ontological nature of things, a theory of causation, or of that which science asserts its own inability to cognize.

Before using the full liberty which science leaves us, of speculating as to the nature and principle of operation of the causes of physical phenomena, let us revert for a moment more particularly to the specified topic of this essay. The title chosen requires us to set forth the final cause as a principle of cognition and of nature. To show that it is a natural principle, we must show that it is a constitutive principle (or element) in cognition. The opposite of *constitutive*, as here employed, is *regulative*. To illustrate: the critical philosophy of Germany (Kant) affirms that the ideas of a soul, of human freedom, and of God, are simply "regulative" ideas, suggesting what are subjectively necessary points of view from which to judge of things, but to which no reality or objective truth can be known to correspond. If it could be shown to the satisfaction of an adherent of that philosophy that these ideas have an objective worth or significance, he would admit that they are constitutive elements of human knowledge, or, in simpler phraseology, that, in having these ideas, man has through them true knowledge of reality. This latter is what is claimed for the notion of final cause, as applied in the cognition of nature.

What "final causation" is, is familiarly known to us all through our consciousness of our own modes of intelligent

action; for it is a fundamental mark of such action. Final causation, action in view of an end, the idea of the end controlling the action—this is, in its most obvious expression that peculiarity of our nature in virtue of which we are termed *rational* animals. Rationality—rational action—is not known without the aid of the conception of final cause. This requires no demonstration. It follows that the conception is a *true principle of cognition—a true and trustworthy element of knowledge—for the sphere of rational life, i.e. for the only sphere of which we have direct knowledge.*

The marks of the action of final causes, learned positively from our own personal experience and from our observation of others who are like us, are order, orderly movement, combination and convergence of forces. Where these are absent, we may be and are sure that there is no controlling final (intelligent) cause. Whenever they are found present in natural objects—as they are pre-eminently in the organic world—under such circumstances that we cannot trace back their origin to the action of an intelligent cause (or causes) known to us through material signs (such as reveal to us, for example, our fellow-men), it becomes a query whether, after all, these marks are not signs of intelligent action, even though the agent in question be invisible to us, or whether they can possibly be accounted for upon any other hypothesis than that of such action. The doctrine of this paper is that they cannot; that the limits and conditions of our knowledge, as above pointed out, render it impossible for us to know any kind of being, except as we apply to it the analogies of ideal being, or any kind of action which is not ultimately resolvable into rational action. But action in view of ends, *i.e.* “final causation,” is the characteristic of ideal being and of rationality, and hence we have every reason—so far as the logical necessities of the case, as a problem in cognition, are concerned—to interpret signs of rationality in nature, *i.e.* signs of the action of final causes) as really indicating rationality. An examination of some other explanations offered to account for marks of design in nature, will confirm our own conclusions.

The insufficiency of chance, as an hypothesis by which to account for such marks, is too obvious, and has been too often pointed out, for us to need to dwell upon it. Cicero’s suggestion that it be applied to explain, if possible, the origin of such a work as the *Annals* of Ennius, through the accidental combination of metallic letters cast upon the ground, was sufficient from the popular point of view, to reduce it to the absurd; and any modern treatise on the theory of probabilities will show its moral insufficiency (*i.e.* the infinite number of

odds against its being sufficient) from the scientific point of view.

Another theory by which it is sought to explain the marks of final causation in nature, is that of blind, natural necessity. Matter and force, it is claimed, are known by us, and are known to be eternal and inseparable. The forces inherent in matter, it is maintained, are few in number; are, in fact, reducible to two, attraction and repulsion, and their necessary, undirected action is alleged to be sufficient to account, together with matter, for the universe as known to us.

The allegation is false. Science, as we have seen, knows nothing of matter, or of force; and the latter conception, in particular, she eliminates entirely from among the number of her valid or constitutive conceptions, retaining it only as an auxiliary or regulative idea, which represents nothing really known to science. The notion, therefore, of matter as the seat of inherent forces is not a scientific one, in the ordinary "positive" acceptance of the term "scientific."

Again, admitting the materialistic notion of matter, with its two inhering forces of attraction and repulsion, an immense induction remains to be accomplished, before it can be shown that these suffice for the explanation of the world (more especially of the organic world).^{*} It must be shown that everywhere in the universe only these forces operate, and that they follow and have followed only their own (assumed) blindly, necessary laws. The demonstration, to be absolutely complete would obviously require what is physically impossible, since so infinitesimal a portion of the universe only is accessible to our direct inspection. The limits even to our possible knowledge of the earth, both in its present condition and in its past history, are, plainly, extremely narrow. Still, where all is and must be largely theory, it would be manifestly unjust not to be satisfied, if the materialistic hypothesis could be verified in a few typical instances. If, for example, the morphology of a single natural-organism were explicable by the hypothesis in question—if it could account for definite symmetry in organic proportions (proportions represented by numerical ratios, and hence themselves representing a harmony, *i.e.* something ideal), it might with some show of reason be alleged as a true

^{*} For the present, as, among others, Herbert Spencer points out, we suffer under a "total lack of information respecting the infinitely-varied and involved causes that have been at work," not only in the evolution of the higher forms of organic life, but, we may also add, in the world-process in general. See Spencer's *Psychology*, new ed. § 208, *note*.

explanation. But up to the present time this has not been accomplished.*

All theories to account for what is not an object of direct observation, it should be remarked here, have to be supported by indirect demonstration, and hence, with perfect logical propriety, the supporters of the materialistic explanation of natural forms occupy themselves largely with the attempt to show the insufficiency of the idealistic explanation. Such is the method partly followed by Mr. Lewes in his articles on "Mr. Darwin's Hypotheses," in the *Fortnightly Review* for 1868. I allude to him specially for the sake of getting the opportunity of saying what Mr. Lewes by his example illustrates—that the advocates of materialistic hypotheses too often misapprehend the true position of their opponents, and hence, in combating it, are fighting a man of straw. Thus Mr. Lewes assumes that the theory to be disproved by him is that of "creative fiats," or that every new formation is the work of a demiurge, whose creative hand takes hold from without of inert materials and forces them into definite relations and shapes. Great circumspectness should doubtless be observed, when we attempt to define the mode in which a divine hand moulds the materials of nature into their definite forms; for, that all natural forces and so-called "matter" are under the active control of the Deity, Christian idealism most surely holds, and must, as we believe, ever continue on philosophical and scientific grounds to maintain. Still, the conception which Mr. Lewes ascribes to those whom he opposes, seems to me clearly to belong to a past century. If it is still held by some, it by no means (we believe) indicates the ground occupied by the majority of intelligent teleologists at the present day. The latter must and do cheerfully admit that the order of things in the world is to be conceived rather as a continuous process than as a series of successive acts. They believe in the general presence of law. In fact, they accept nature just as science shows it to them. They regard their opponents as simply speaking truismatically, when they insist that the formation of every organism is an exceedingly complicated mechanical problem. They are aware that—since such, once for all, is the order of the universe in which we exist—nothing is to be accomplished in the world except on the basis of "mechanical" conditions, and they do not expect

* Since writing the above, the third edition of Dr. L. Beale's work on *Protoplasm* (1874) has come under my notice. What the author states on p. 333 of his work is strongly confirmatory of the statement which I make above, as to that which Materialism has or has not accomplished.

these conditions ever to be overturned, however much they may be controlled and employed—as, for instance, man does, partially, control and employ them. They do not complain if natural ends are not realized by altogether the same methods which man would employ for their accomplishment. They accept all the apparent blunders and impotences of the “Idea,” which would realize itself in nature, as (at least apparent) facts; but they observe that these are simply incidents in a process by which, as matter of fact, *the Idea is, after all, realized*. For, that it is realized, Mr. Lewes admits—as, of course, every one does and must admit—since he says that although (according to him) “the type [Idea] does not dominate the momenta,” yet “it emerges from them.”* Teleologists, of the kind now in view, simply insist that matter and its motions (“forces”) are not undirected, since the facts of natural existence are, they claim, inexplicable on the theory of blind necessity. They take their stand on this fundamental and ultimate question, whether “blind force” is either possible or real (in the last analysis), and holding that it is not, they conceive that intelligence, as a principle in nature—the only one remaining possible—is saved. The methods of this intelligence they propose to ascertain by examination of the facts and no longer by *à priori* speculation.

The theory under discussion is that of matter, with the provisionally admitted forces of attraction and repulsion, as sufficient to explain natural forms. Mr. Lewes, in the articles referred to, may be still cited as representing this doctrine. But his explanations—in this sharing an infirmity of materialistic explanations in general—presuppose what they ostensibly furnish. The shape assumed by a forming crystal, he says, “represents . . . the *direction* of its forces, the polarity of its molecules.” True; but the very thing to be explained is *this very direction* of the forces, this polarity of the molecules, whence the shape results or which it “represents.” Again: “The harmony of a complex structure results from the mutual relations of its parts.” Very true; these relations constitute (materially) the harmony; they are, so to speak, its body; but who or what determines the relations? Further: “The Law of Epigenesis, which is simply the expression of the material process determined by the polarity of molecules,

* It is instructive to note, and pertinent here to mention, the strong language in which Strauss, in his recent atheistic *Confession*, expresses his sense of the presence of the “Idea” in nature. “The world,” he says, “may be defined as a whole of infinitely judicious contrivance” (§ 36).

explains as much of the phenomena as is explicable." That is, *law*, which states the *how*, tells all that can be known or with probability inferred respecting the *law-giver*, or the *whence* and *whither*! What should be shown, in order to justify the materialistic hypothesis, is, that, supposing matter to exist and to possess *ab æterno* and inalienably the forces above mentioned, these forces by their *blind* action would necessarily bring into existence the world as we know it. How far this is from having been accomplished, no one familiar with the results and confessions of natural science needs to be informed, and the above citations from Mr. Lewes may serve to show how far from conclusive are the arguments employed to accomplish it.* And the insufficiency of the materialistic theory becomes still more palpable when confronted with the facts of conscious mind. True as it may be, that, at least for us, mind and a material substrate of mind are correlative and mutually dependent, yet we have the, in this instance, significant authority of Mr. Herbert Spencer for the assertion that "we remain utterly incapable of seeing, or even of imagining, how the two are related." (*Psychology*, new ed. § 56.) In like manner, Du Bois-Reymond, a man attached to materialistic explanations, affirms (in the address above cited) that not only the nature of matter, but also that of consciousness, is a riddle which must for ever remain insoluble for the physical investigator (p. 34).

Still another hypothesis, which is less blind to actual facts than is materialism, but which yet fails to fulfil the conditions of a satisfactory theory of the character and mode of operation of nature's forces, is that of an unconscious principle of reason in nature, manifesting itself chiefly or solely under the form of will (Schopenhauer), or as (unconscious) will and intellect combined (Eduard von Hartmann). Hartmann's *Philosophy of the Unconscious*, in particular, deserves notice, since the work thus entitled is undoubtedly the great philosophical sensation of the present quarter-century in Germany, and the publisher of it announces preparations in progress for its publication in various languages—among others, in English, at Boston, United States. Hartmann admits most fully and

* I may be allowed, in this connection, to refer to the work by Dr. Hermann Ulrich, of Halle, entitled *Gott und die Natur* (Leipzig, 1862; a second enlarged edition has since appeared), in which, on the ground of a most comprehensive examination of the best accredited authorities in positive science, the untenableness of materialistic hypotheses is demonstrated, and God is shown to be the "necessary postulate of natural science." A translation of this work into English would, I am sure, subserve most efficiently the ends which the Victoria Institute proposes to itself.

emphasizes the presence and efficiency of final causes in nature. By new arguments and fresh illustrations he renders freshly impressive and convincing the argument for design in nature. But he seems fatally blind to what his argument implies. It is too obvious to need arguing, that an idea implies a consciousness of some kind possessing it. The independent existence of ideas, say as conceived by Plato, is hardly a part of any modern conception of the world, nor is this notion of them entertained by Hartmann. But this is the only possible alternative to the doctrine furnished by familiar experience, that ideas belong necessarily and only to a conscious subject. Hartmann's doctrine that there is in natural things an *unconscious* (!) intelligence and will, is logically so absurd in itself (being a *contradictio in adjecto*), and so unsupported and even contradicted by analogy, that—especially in a discussion which, like the present, must be brief—there is obviously no occasion to refute it by argument. Hartmann would avoid the necessity of acknowledging a personal God. We may leave the assumption, by which he seeks to reach this end, undiscussed, and content ourselves with accepting the powerful aid of the author's arguments in favour of the final cause as a principle in nature.

That the notion of final causation is a necessary *regulative* principle for our cognition of nature is affirmed by Kant, who, however, denies our right to consider it as having a known objective significance. This is a logical consequence of the fundamental doctrines of the Kantian philosophy. If, as Kant teaches, we know only phenomena, and cannot frame any just notions as to their causes by the use of human categories of thought (all of which, according to him, have only conditional, subjective validity), it is evident that the idea of final cause can be used by us only in judging of phenomena as they are *for us*, and that we are equally unjustified, whether we affirm that everything is produced in nature by the exclusive operation of mechanical or of intelligent (ideal, "final") causation. He who is unconvinced of the correctness of the theoretical basis of the Kantian philosophy (and the demonstration of its untenableness, as above intimated, has been already accomplished), may reject it, and, welcoming Kant's demonstration of the necessity of the notion of final cause as a principle of cognition, may extend it, in the absence of other than Kant's arguments to the contrary, to the realm of nature besides.

We may, then, hold materialism, which claims to rest on science, to be demonstrably inadequate to account for the apparent marks of the action of final causes in nature; its claims are repudiated in the confession which science makes

of the limitations of her own powers. "Unconscious intelligence," on the other hand, as a cause, is absurd; it is infinitely less plausible as an hypothesis than conscious personal intelligence. Nor need the notion of final cause be admitted as a merely regulative element of our knowledge of nature, having no constitutive value (*versus* Kant); for the assumption of the existence of a real, "material" world is not overthrown by argument, and is required by science; and so if, as Kant affirms, the conception of final cause is necessary in thought, there is no special reason, from the stand-point of a theory of cognition, for supposing it to be false in reality. If we must proceed in our knowledge from the known to the unknown, arguing as to the latter from the analogy of the former (and who will deny that this is a fundamental law of all progress in knowledge?), the conclusion is obvious, that we must assume the universally admitted resemblances to design in nature to have indeed resulted from such intelligent ("final") causation, as is alone, within the whole sphere of our experience, known by us to be capable of producing them.

It has been shown that science leaves it to the metaphysician to determine, so far as this is at all determinable, the nature and principle of operation of the true causes in nature. The only possible restriction upon this liberty will obviously be, that theory do not radically conflict with observable fact. Scientific laws of natural action, learned through observation, are laws of so-called mechanical sequence. Does the idea of final cause conflict with the laws of "mechanical" action? The laws of such action are laws of phenomenal sequence, and not of causation. So-called mechanical causes are not true causes. There is nothing, therefore, for the final cause to conflict with. But one thing is to be noticed. If, in this inquiry after the true cause, the expression "mechanical action" is assumed by materialists to cover the operation of so-called blind forces, it is falsely extended to denote what is not known, or to the very thing which is in question, and which "positive" science, when she seriously considers her limitations, acknowledges her inability, from her standpoint, to determine. Science cannot say that any force is blind, since she cannot say what any force really is. No one can show any impossibility that a final cause should manifest itself under what science terms mechanical modes. On the other hand, the order, regularity, and invariability of these modes (laws), and of what is accomplished under them, testify in favour of intelligent causation. And just in proportion as the attempt has failed—as it has completely—to show, in any approximate degree, the sufficiency of (assumed) blindly

operating agencies for the accomplishment of the world-process, are we compelled to fall back upon the only remaining rational hypothesis, that, namely, of the ultimate ideality of force, in its origin and direction, if not also in its essential nature. So far from mechanism, truly understood, and the final cause being opposed to each other, the two are in intimate alliance, our claim being that the former serves the latter, that mechanism is, once for all, in the universe, as we know it, the instrument employed by the Idea (let us say, rather, by the all-wise Creator and Ruler) for the realization of ideal ends.

Teleology is often charged with anthropomorphism. "It is said that it transfers into a sphere entirely different from that of human action—into the sphere of nature's activities—analogies which hold good only within the former. A work of human art, it is or may be urged, is formed through visible instruments, through the hand, whose skilful movements all can see, and with the aid of solid, palpable tools as means. The objector fails to discover in nature the analogue of these instrumentalities. And again, as regards the apprehension and statement of the ends of particular natural developments, it is urged that teleologists regard these too exclusively in their relation to human comfort and convenience, incorrectly regarding these latter as together constituting the great end, with reference to which all things are formed and adapted.

The former of these objections arises from a misapprehension of the point of analogy, which is to be sought, not in man's production of works of art or skill distinct from himself, but in his control of his own body. The force that directs the motions of the hand or other organ subject to the human will, is invisible, immanent in the human organism. So, the agency which directs and combines the forces of nature to orderly ends, is invisible and works from within. The true stand-point of teleology, in this regard, was not misconceived by Aristotle of old (see Aristotle's *Physics*, b. ii. ch. 8), and may be designated as that of immanent causation. The final cause, the Idea, identifies itself, so to speak, with the natural forces at work in any given case, or seizes hold upon them at the very centre whence they operate, guiding them to the realization of itself. And this is but a figurative way of expressing the truth that God, whom we regard as the source of all existence, is present by His power and wisdom in all that exists. Or, looking at the case, not from the point of view of the divine causation, which must on metaphysical grounds be affirmed, but from the stand-point of human observation and experimental description, we must say that the final

cause is a principle *in* nature, and indicates a fundamental mode of the operation of nature's forces.

No study of nature, no account of her products, is complete which leaves out of consideration the final causes, the *ends subserved* in these products, and severally in their parts. The Duke of Argyll has pointed out how Darwin, seeking to explain the development of organic species upon a mechanical hypothesis, constantly employs (with apparent inconsistency) the language of teleology. The case of Darwin is not, in this respect, an isolated one, and all such instances are simply to be explained on the ground that the facts speak for themselves in language too loud to be mistaken; and that they cannot be fully apprehended or described without reference to the adaptations and purposes manifested in them. In fact, were there no final causes in nature, there would be in it no reason, nothing upon which the reason of man could rest in his study of nature. The eye demands light for its own activity; in like manner, human reason must find in the world, which furnishes the material for its activity, something adapted and cognate to itself, something rational, or, in other words, the marks of reason (among which marks final causation is a fundamentally essential one), in order to its own exercise. Since man, as matter of fact, does find material for the exercise of reason in the study of nature, it seems to follow, even from the outside, experimental point of view of natural history, that there is reason in nature, or that nature is under the at least partial control of final causes.

With the conclusion that the final cause is a principle working immanently in nature tallies the significant assertion of German idealism (see I. H. Fichte's recent work, *Die theistische Weltanschauung*, Leipzig, 1873, p. 225), "that nothing extraneous to any individual existence can transform it, but can only excite it to self-wrought development." That is to say: external conditions may furnish the occasion for special developments, which are always, in the normal order of things, simply new adaptations, but the efficient and guiding force is within. Thus the conception of immanent (final) causation, or of God as working in things and not merely operating upon them from without, coheres with whatever facts may have been demonstrated as regards the variation of organisms. That would be indeed an unintelligent or impotent (final) cause, which, under changed conditions, either did not or could not adjust its work to these new conditions. Huxley's account of teleology (*Lay Sermons and Addresses*, xiii.: *Criticisms of "The Origin of Species"*) is therefore unjust, unless he wishes to describe notions held by the unthinking and not

defended by any truly philosophical believer in design. Plato of old perceived, as well as Hegel and Darwin in modern times have done, the obstructiveness of matter—the obstacles it opposes to the direct realization of the Idea. And no rightly-thinking man since Plato's time can, in view of obvious facts, have supposed that "each organism is like a bullet fired straight at a mark." Teleology does indeed claim that the organic and other natural processes in this world, being conformed to laws, are aimed towards more or less specific ends. But it does not claim that the organic world is a collection of units created separately and outright for the realization of distinct and wholly unrelated ideas. It does not ignore the fact of the inter-relation of these units, and that they are dependent on each other and on their relation to the whole world-process in general. It simply notes the *signs* of intelligence, of plan, and perceives the inadequacy of (assumed) blind force to account for them, and hence assigns (hypothetically) the only cause known to be adequate. Huxley has elsewhere, in showing the compatibility of Darwinism with design, shown that he has the idea of another and a more defensible kind of teleology than that which he seeks to discredit, and it is permissible to express astonishment at his assuming—contrary to the facts in the history of philosophical opinion—that the accredited ground of teleologists is that described by him, but held only by the most superficial.

As regards the charge of anthropomorphism in the specification and description of the ends of natural objects, those whom it affects must meet it if they can. We who recognize that God's thoughts are not as our thoughts may be content, if need be, not to know nor to seek for ulterior ends—ends extraneous to the organism itself, such as human comfort and convenience—where there is no direct organic connection pointing to such ends. It is enough to recognize the symmetry, the order, the beauty, the harmony in the organism—things for which the principle of final cause will surely account, and of which there is direct evidence—without assuming the existence of other purposes, the evidence of which is only indirect or even hypothetical. The principle of final cause is burdened with a weight which it is neither able nor justly required to bear when ends are ascribed to nature, our warrant for asserting which may perhaps only be found in the limitation of our experience or of our conceptive faculties.

The CHAIRMAN.—It is now my duty to move that the thanks of this meeting be presented to Professor Morris for the paper just read,* the

* Dr. E. Haughton says :—"In proof of the argument in the last

design of which I take to be, to prove that there is an intelligent Mind working in nature, and realizing itself in nature. I do not quite agree with one or two of the views expressed therein, especially the statement that a metaphysical foundation underlies science. It is difficult, if not impossible, to arrive at anything like certainty in metaphysical inquiries, for in the very outset we are confronted by the impossibility of proof; how then can science be established on such a foundation of *nescience* as this? I am surprised that this paper did not allude to such subjects as the being and existence of God, and to the Bible record. The author has referred to the subject of the creation, and the design of the Creator, who, as I conceive it, created all things for His own Glory rather than for the grandeur of man.

Rev. G. CURREY, D.D. (Master of the Charterhouse).—I can scarcely concur in the objection of the chairman as to the want of reference to the Bible record in the paper we have just heard. It appears to me quite clear that the design of the writer is, to show how we can arrive at a conclusion that there is an intelligent design in the works of creation simply by metaphysical reasoning. It would have been out of place in such an argument to introduce scriptural proofs, which of course rest on an entirely different basis. The purpose of the paper seems to me to be this—to set forth how we can, by a purely metaphysical reasoning, arrive at the conclusion that there is design in creation, and especially that form of design which is represented by the term *final cause*—namely, that this world and all that is in this world, came into being in consequence of, and guided by a purpose and a design which it was its end to accomplish: that seems to be the proposition which the author wishes to maintain. In starting, it is important to bear in mind, that all reasoning on such subjects as this must depend upon the assumption of an analogy between the nature of man and the operations of nature around him. If we do not conceive that there is a resemblance or analogy between our own operations and the operations of nature around us, we are unable to reason at all. Our argument must

section but two of the paper, I wish to mention a fact in relation to the argument which is sometimes put forward by a certain school with regard to organs and functions being created by the necessity for their exercise. Herr Büchner, I think, says that we have not legs for the purpose of walking with, but because we happen to have legs we walk; that eyes were not made for the purpose of seeing with, but because we happen to have eyes we see. The particular fact I wish to mention is one which is probably known to many. It has been asserted that the fishes found in the mammoth caves of Kentucky have not the faculty of sight, and have been born in perpetual darkness. A friend got some of these fishes and sent them home to Mr. Darwin, who found that they had well-formed eyes. Mr. Darwin, when previously written to on the subject, would not believe that they had eyes or properly formed visual organs. It was well known that they were blind; but, nevertheless, they were blind fishes with eyes. When the fishes were sent to Mr. Darwin he could not refuse the evidence of his own senses; though it appeared to be a part of the plan of nature which would not be altogether consistent with his own view of evolution."

depend upon an assumption of such a principle of resemblance ; therefore, that is the first thing to lay down. Then when we look around, in order to discover marks of intelligence in creation, we see in the first instance, symmetry, proportion, order, and the like. These we know do, in human productions, indicate design and purpose, and therefore, by the principle of resemblance and analogy, we conclude that these outward works, on the face of nature, indicate the existence of purpose and design. That is the first manner in which we observe intelligence. Then when we proceed to examine more distinctly the metaphysical argument by which men arrive at the doctrine of final causes, or in other words, at the belief that the world came into being with a purpose and design guiding it, we must start from the known to the unknown. We observe in the first instance, that in doing this we must pursue the metaphysical argument, because physical science will furnish us with no ground for judgment on the point. Physical science is the observation of the laws of phenomena, the gathering together of a certain number of facts to be accounted for by a certain hypothesis. But we do not get at all nearer true cause because we have discovered the law. Take gravitation ; an apple falls to the ground because there is gravitation : that is not the real cause, it is only a law. It is simply the observation of a law, and if we could go further back and find what produces gravitation, we should not be necessarily nearer the real cause. If we are to come to any knowledge of real causes, we must start from the known, and the only thing of which we have direct knowledge is the existence of our own conscious being. I know that I exist, I know that I act with a purpose, and that I am able to a certain degree effectually to carry out that purpose. That is known, that is positive, that is certain. From this then I can infer by analogy (that analogy which supposes a resemblance between the action and motives of beings), that other persons constituted like myself, act from like purposes, and so on. Therefore I can, by indirect knowledge, or by inference, gather information with regard to the principles of action, of persons like myself. But then, I may carry that out further and regard the actions of beings unlike myself in some particulars. In estimating their actions, I must consider some of the particulars in which they differ, and so far as I can estimate these differences, I may be able to discover from what I observe in myself, a good deal with regard to their principles of action. I may apply that to higher beings, and even to a Supreme Being. Taking into consideration what I observe with regard to my own action, and my own powers, I may add to that what I conceive of an Almighty Being. In this way I may arrive at a conclusion with regard to His action, and looking at the world around me, I discover by analogy signs of final cause, that is of a purpose, or of a design in creation. Then, if I go further, I observe the complex character of my own being, the great ends which I and those like me are capable of attaining ; this observation strengthens and supports the hypothesis, that all was created with a purpose and a design. That is the hypothesis of final causes. This seems to me to be the general purpose of the paper, and in such an argument Scriptural proof has no

place. In that general purpose I fully concur. With regard to another part of the paper, an interesting discussion might be raised whether the other hypothesis, namely, that of chance, blind chance and unconscious intelligence, would be more successful in leading to the same result. Upon this I do not propose to enter, but will only remark, the very term "unconscious intelligence" is in itself a self-contradiction, being nothing more than unconscious consciousness, or unintelligible intelligibility. I will in conclusion remark, that the well-known illustration given by Paley, of the watch, rests on the assumption that the operations of the Supreme Being in nature are in a considerable degree similar to the operations of man, and will mention an anecdote respecting Paley's argument. A person was putting forward the argument of the watch. "Suppose," he said, "you were to find a watch on Salisbury Plain, would not your first question be, who made it?" "No," was the answer, "it would not, because I should at once read on the dial-plate the name of the maker." The answer need not shake our faith, for in the voice of nature we have a dial-plate with the name of the maker written in legible characters. This brings us to the limits of a metaphysical inquiry. Important as such inquiry is, and necessary as it is that it should be kept distinct from scriptural arguments, it seems to indicate at once, the necessity and the fitness of revelation. The metaphysical argument is good as far as it goes, but it is not thoroughly satisfactory: it rests upon an analogy and a resemblance, and that analogy and resemblance must to a certain, to a considerable extent be imperfect, when we consider the different nature of a Supreme Being and of ourselves. But notwithstanding this imperfection of the analogy and of the argument founded on it, we are satisfied that they point to the right conclusion. It is a great deal of the truth, but it is not the whole. What does this show? It shows the necessity that there should be a written revelation. We want the name on the dial-plate. And if our philosophy at times fails to assist us, we recur in thought to the noble exposition of the Divine Creator and of the works of God set forth in the Scriptures, and find therein that revelation which our metaphysical arguments show that we need, in order to arrive at a certain conclusion.

The CHAIRMAN.—The last speaker has expressed what I wished to say with regard to the design and the Designer, and I will therefore only add, that I entirely agree with his able exposition of the subject. As to the paper, I should be very sorry to be supposed to object to its drift, being entirely in accord therewith, so far as I understand the object of the author; but I must say that if we were thrown back with Hartmann and the German metaphysicians on nature itself alone for understanding the nature of God, we should not be able to comprehend that nature at all. The arguments of metaphysicians certainly require the aid of revelation, without which they would be insufficient to produce conviction.

Rev. Principal J. H. RIGG, D.D.—I think we ought to thank the author for the able and valuable paper which he has communicated to us. It is a long time since I read a paper with more satisfaction than the acute and intelligent one which we have had read to us to-night. It is evidently

the wish of the author to meet the metaphysical men of science on their own ground, by means of scientific and metaphysical comment. The paper shows, I think, that Professor Morris is a master of his craft as a metaphysician. He has shown us, and I venture to think that it adds some value to his paper, that a Christian writer can be conversant with all the modern ideas on the subject, whether in England or Germany. I confess a difficulty in regard to the failure of nature, but I think it has been met in the only way in which it could be met—argumentatively, and very ably. It appears to me it is met, as far as human reason can pretend to deal with these things, in a satisfactory way, by the suggestions contained in this paper. In truth, his argument is this—that, whether or not the object is fully obtained,—there is clearly a purpose, clearly an idea,—and the mere presence of an idea itself necessitates the admission of a guiding and an overruling mind. Then he says in regard to the main failures: “Is not the idea in the whole brought out, that these very failures are parts of the whole process—parts of one entire law, which is to be exemplified by means of this vast nature, of which God is the mind and of which God furnishes the controlling force?” His assertion is, that it does not imply there is a defect in the whole because there is an apparent defect here and there. While he answers the objection in this manner, and contends that the great result and meaning and idea does emerge, he turns round and says, the mere fact that there is a type you cannot deny—a law you recognise as such, proves this is not mere blind force and mere unconscious struggling. And it is not merely this; he contends that the mere fact that there are types and ideas, whether at one moment fully realized or embodied, or not, proves that there is mind in the whole, and not mere matter. Then I must say also that I quite believe and feel persuaded that science could not be studied—could not be developed,—unless there were continually underneath, an assumption, more or less metaphysical. If we come to analyze, we find that the statement of the commonest laws of science involves a metaphysical assumption—a metaphysical hypothesis, and that we could not put knowledge into any form by which it could be conveyed to another person’s mind without such an assumption. Therefore you cannot attempt to deal with science, or criticise, or expound science, unless along with the whole of it you have a cognisance of the fact that there is a perpetual assumption of metaphysical ideas. And, no doubt, in that assumption of metaphysical ideas consists a great deal of the plausibility with which distinguished scientists have so misled us. There is a perpetual assumption of metaphysical ideas favourable to their own views, and by such an assumption they put into the premises what they mean to bring out in the conclusion. If we take the law of induction itself, which tells us to go to knowledge first-hand, whenever we can get it,—if we go on the principle of induction, the confusion and the assumptions of metaphysical scientists show that what does not harmonize with orthodox religion is false induction, after all. If we keep all our theories in harmony with the truths of our consciousness, as the first things we know, and if we will but deal with the facts of science on the basis of these truths of consciousness, instead of being led to

false conclusions, we shall, I think, be led, on the contrary, to the orthodox conclusions of the writer of this paper. There is in the close, in the last paragraph, a beautiful sentence, which harmonizes with a truth the chairman enunciated in his opening remarks. We are not to conceive that nature is to be made exactly as we would wish it, if we believe in the existence of a God at all. We are not in this sense to construe the truth which lies underneath the doctrine of final causes. This is beautifully set forth in the paragraph in question, where we read :—" We who recognize that God's thoughts are not as our thoughts, may be content, if need be, not to know nor to seek for ulterior ends—ends extraneous to the organism itself, such as human comfort and convenience—where there is no direct organic connection pointing to such ends. It is enough to recognize the symmetry, the order, the beauty, the harmony in the organism—things for which the principle of final cause will surely account, and of which there is direct evidence—without assuming the existence of other purposes, the evidence of which is only indirect or even hypothetical." Now that is tantamount to saying that God is in fact His own law, that He furnishes His own end ; that He has made the universe for His own glory, and that these signs and tokens of beauty and harmony, whether or not we happen to be able to see in them anything subsidiary to our own comforts, or tastes, or wants, are yet in harmony with Him whose glory is to be manifest in all and through all. I take it to be a matter of congratulation for the Victoria Institute that the knowledge of its efficiency and importance has reached Christian thinkers on the other side of the Atlantic, and that a man so able and distinguished as Professor Morris has been led to send us such a paper as this,—a paper which I believe is calculated to do immense service to us at the present moment in correcting a great many crude modes of expression in regard to scriptural evidences and divine things—a paper which will be found a very hard morsel for able and candid antagonists in the other camp to deal with. I have great pleasure in supporting the resolution, that the vote of thanks of this meeting be presented to Professor Morris for the able paper which he has contributed to the Transactions of the Victoria Institute.

Rev. Prebendary C. A. Row.—I agree with Dr. Rigg that the present is an exceedingly important paper. Professor Morris has dealt with all the metaphysical theories prevalent in this country, and which lie at the root of Pantheism. There can be no doubt that this is really the ground on which we must fight the battle of belief in a living God. It is necessary that we should closely examine the validity of the principles laid down by certain popular writers of the present day ; because, if they are valid, there is an end to all belief that a God has created this universe. This is the plain issue, and I fully concur with Dr. Rigg that the author of the paper has handled it effectively ; however, to my mind the paper has one defect ; namely, it is written in a style which makes it difficult for the ordinary class of readers to comprehend its general meaning. As to the omission of any reference to Revelation, no doubt Professor Morris felt that his proper subject was to examine into the principles which lie at the foundation of Theism, on the ground that it is necessary for

us to have a belief in a living God, as the precondition to the acceptance of all revelation. What are the principles which at the present day are put forth by eminent scientific thinkers? They tell us that the argument from causation, order, and adaptation, is invalid and worthless, to prove that there is a God who created the universe. On the validity of this argument is the turning point of all modern controversy between Theists on the one part, and Pantheists and Atheists on the other. In passing, I may say that I prefer the term "intelligent cause," which the author has used two or three times in the course of this paper, to the more usual one by which the same thing is designated "final cause." One point the author of the paper does not seem to have dwelt upon—namely, that order is distinct from adaptation, and that the order of the universe proves the existence of an intelligent mind. The great point this paper brings out is that the human mind is so constituted that it cannot possibly help thinking that order in the universe implies an orderer, adaptation an adaptor, and design a designer. It has been objected that these are conceptions which are purely human, and that therefore we cannot justly apply them to nature. I answer that all our conceptions are human. Force, law, matter, are human conceptions; and we have no conceptions that are not human. If such reasonings are invalid, because our conceptions are only human conceptions, we lay the axe to the root of the tree on which we are standing and render all truth impossible. The theory that reason in a latent state exists in the universe is one which is extensively held and requires to be effectually met, and it would require a paper by itself to meet the theory laid down on that subject. Still, I am sorry that the author of this paper has not in some degree dealt with it instead of laying down that the principle is simply absurd; for it is put forth by many able writers, and is supported by arguments not devoid of plausibility. We all of us do actions by habit, and these habitual actions leave no trace in the self-conscious intellect. A certain class of the instinctive actions of animals seem to be acquired in this way, but I fully agree with Dr. Rigg and Dr. Currey in thinking that the assumption of the existence of an unconscious intelligence diffused throughout nature is absurd. If this principle of unconscious intelligence exists in nature, it must exist in every particle of matter, and I do not see how you can arrive at any other conclusion. If it exists in nature—if, according to the atheistic theory, everything is built up of molecules,—it is quite inconceivable that intelligence can exist except as distinct molecules possessing intelligence—rational atoms, if you like to call them so.

The CHAIRMAN.—Leibnitz asserts that.

Mr. Row.—And also atoms must exist in nature that possess feeling. At any rate, as these views are very extensively taught, and as the object which the Atheist and Pantheist have is, by means of them to evade the idea of a personal God, I think it would be best to grapple with the subject in a distinct paper. I think the present paper is right in resting all our actual knowledge upon our self-consciousness. My self-consciousness and your self-consciousness are as much facts of nature as any physical fact you

can get hold of ; it is vain to deny this. Here then we have a certain groundwork of fact on which to build, and I think the writer of the paper has shown a proper appreciation of it when he endeavours to point out that our conception of force in the physical universe is nothing more nor less than a simple derivation from our own self-conscious action. Here we have a plain and obvious fact, which practical philosophy is bound to deal with as much as it deals with any other fact in nature. This being so, the fact leads up ultimately, to a proof of the being of a personal God. With regard to the definition which occurs in this paper of the "self-conscious Ego," I have my doubts about its being so good a one as might be given.

The meeting was then adjourned.

REPLY BY PROFESSOR G. S. MORRIS, M.A.,

(University of Michigan.)

IN offering any comments on the foregoing discussion, I would wish first to express my appreciation of the kind and sympathetic intelligence with which my paper was received and discussed. The remarks made by various speakers show that the purport of the paper was fully understood, and I should be quite willing to let it go upon the records of the Institute without further explanation or defence than that which these speakers have offered. Still, I embrace this opportunity to present a few final and partly supplementary observations.

A word may be fitting as to the "metaphysical foundation" underlying "Science." That positive science does rest on such a foundation was fully admitted by those who took part at length in the above discussion. The same fact is recognized by men of note in all schools of thought and investigation. Nor are the facts on which metaphysics, or "philosophy," builds, of doubtful authenticity or altogether susceptible of a double interpretation. The paper offered partly failed to accomplish its object, if it did not show that the surest elements of human knowledge are of metaphysical origin.

The conception of metaphysics, or philosophy, as a science, was one of the earliest to be formed, because the philosophical instinct is inseparable from human reason, and must manifest itself from and after the first epoch of cultured thought. Its object is nothing more nor less than to attain to and demonstrate a correct view of the nature of things; and whatever be the end which, in the speculations of different thinkers, it reaches, whether the conclusion be materialistic or idealistic, it is still metaphysical. That is to say, it aims and, sometimes with an unwarranted assumption of absolute certainty, professes to furnish the true theory (science), not of the special laws and inter-relations of things as phenomena, but of their true causes and real nature. It seeks thus to furnish the common element in which all special sciences have their true basis, and in which they are organically united as parts of one harmonious whole—of one general, systematic conception of the universe.

And yet, simple as it may be in its fundamental data and principles, it is a science which appears never complete, and is, in some sense, a perpetual ideal. For its principles are required to have universal application. Whatever new realms of being may be brought to light, whatever new truths may be demonstrated in the special sciences, these must all be shown not to conflict with the principles of our pre-assumed and partially demonstrated metaphysical science. Hence, with the progress of special knowledge, the ever-renewed requirement that the philosopher shall show that his principles dominate the new facts, or new aspects of facts, which the special sciences

bring into view. But in this respect philosophy (the science of principles) is not fundamentally different from any other science of real things, in which, as is well known, there is always a combination of demonstrated fact with mere theory, and in which, too, the endeavour is constantly made, as in metaphysics, to reduce the limits of the latter, and extend the boundaries of the former. Now Christianity and the Bible involve a philosophy of things, which they assume rather than demonstrate. Yet they appeal with wonderful power to all that is best and truest in our natures. This is an experimental and powerful evidence of the truth of the underlying philosophy, or "metaphysics," of Christianity. Far from denying the possibility of philosophy, and its fundamental rank in the realm of human sciences, we ought, therefore, surely to unite in endeavouring to show, arguing on the ground of pure philosophy, that the philosophy (metaphysics) of Christianity, which I have termed Christian idealism, is not only defensible, but is the only philosophy which will fully account for all things and for all special sciences. Again, none can fail to be aware of the extensive rôle which the doctrine of the relativity of human knowledge has played in modern times; and that, too, in the writings of thinkers of the most opposite schools. Now, whatever may be thought of the doctrine in its application to other spheres of science, none, I imagine, will deny that all of our so-called positive science is relative. It is the science of the phenomenal, of things as they appear to us through the nerves, without reference to their ultimate causes and original and true nature. And yet we must believe that there are such causes; that something real underlies or causes the relative, the phenomenal. Now, to learn what is the nature of reality and what are its laws, there is no other method than the metaphysical one, which is founded on self-consciousness, knowledge of the true, rational, ideal self, and of the conditions of knowledge. This method is not dogmatic, or purely deductive. It is founded on self-observation, on an analysis of the necessary conditions of cognition, and is confirmed by a broad and never-ending induction, resting upon the study of the broad universe, which is found to be everywhere illumined by the light of intelligence—the element of man's own self-conscious life.

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, 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 phenomenal.

I made no use of scriptural arguments, since, had I done so, I should have begged the question which I wished to prove. He who accepts Holy Scripture and Christianity admits, necessarily, the doctrines of God's existence, of creation, of Providence, and of the soul's immortality. He admits, therefore, that nature is controlled by and has its origin in intelligence. But my paper was designed to aid those who deny or honestly feel that they cannot intelligently admit the philosophical truth of the

Bible. There are, as I know by experience, thinking minds so entangled in the idea of nature as an original entity, working with blind, mechanical, resistless power, and of man as but a product and part of this natural mechanism, that they see no possibility of the truth of the doctrines of God's existence, of Divine Providence, and of human freedom. Such men must be met on their own ground. I conceive it to be our duty, as members of a society aiming to reconcile Science and Religion, to show our readiness to meet those who cannot yet agree with us, on the ground where their difficulties lie; to attempt to show them that their purely theoretical difficulties may be removed. Once make a man believe that the doctrines of Christian idealism are philosophically, *i.e.* really, possible, and he will not be long in concluding that they are probable, and then really true. Then the Bible will speak to his heart, and find responses in his best and inmost nature. He will find in it the indispensable food for his otherwise famishing soul. He will recognize in religion—and by this I mean true religion, the essence of Christianity—the consummate flower of human life and destiny; and God, as revealed in the person of His Blessed Son, will be loved as the One “who redeemeth our life from destruction,” and “crowneth us with mercies and loving-kindness.”

It would have been a pleasure to me to enter more fully into the discussion of the theory of unconscious intelligence, as the basis of real existence; had I deemed that such a discussion would be wholly relevant to the purpose of my paper, or would not too greatly extend its limits. I will now say, however, that I do not know what atoms are (I know of no one who does). But, if atoms exist, I most certainly believe them to participate, in some manner, in the ideal nature. I believe that God, as a Spirit (or, in philosophical language, the Ideal), is the source of all real things; and hence that all things have a God-given, consequently, a spiritual or ideal, aspect, which is their true being. Now, God's ways (the ways of the “Idea”) are not our ways, and are past finding out. How so-called “material” atoms can participate in the ideal nature without consciousness, I do not know. But so surely as I believe, and as a true philosophy demonstrates, that God is the source of all being, so surely am I convinced that the ideal element in the so-called atoms of the universe (in whatever manner it is to be conceived as existing) is the controlling and fundamental one. If this element is not conscious, it is yet impressed with a nature which compels it to comport itself in consonance with the intentions of that conscious intelligence in which it originated. The theory of an unconscious intelligence in nature as the first in time, as existing absolutely (and not by derivation from the Divine Being), and as that out of which human mind is necessarily evolved, is absurd; because the less cannot be the source of the greater, and because any conceivable form of intelligence, less than conscious intelligence, is absurd, except in so far as it is regarded as having its roots, its origin, its law, in what is conscious.

ORDINARY MEETING, DECEMBER 7, 1874.

CHARLES BROOKE, ESQ., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

This, the first meeting of the session, was held in the Society's new apartments. In opening the session, the Chairman congratulated the Members and Associates upon the Society being so fortunate as to obtain new premises equal in size, and in the same locality as the last, which the Institute had been forced to quit on account of their insecure state.

The minutes of the meeting were read and confirmed, and the following Elections were announced :—

HONORARY FOREIGN CORRESPONDENT :—Professor Joachim Barrande, Paris and Prague.

HONORARY CORRESPONDENT :—Rev. Robert Main, M.A., F.R.S., V.P.R.A.S., *The Radcliffe Observer*, Oxford.

MEMBERS.—Professor A. Duff, D.D., LL.D., Moderator of the General Assembly of the Church of Scotland ; Rev. W. M. Punshon, LL.D., President of the Wesleyan Conference ; Professor W. Lee, D.D., Archdeacon of Dublin ; Rev. Professor Campbell, M.A., Montreal ; H. J. Atkinson, Esq., Acton ; W. Chambers, Esq., 10, Adelphi Terrace ; H. Coleman, Esq., LL.D., B.A., 17, Oxford Road ; C. Godfrey, Esq., B.A., 37, Crane Grove, Highbury ; J. Langton, Esq., Green Lanes, Stoke Newington ; Sir T. D. Lloyd, Bart., Llandyssill ; G. Peacock, Esq., Cape Colony ; F. H. Rivington, Esq., 40, Harewood Square ; W. D. Seymour, Esq., Q.C., LL.D., Recorder of Newcastle ; E. W. Stewart, Esq., Blackheath ; W. D. Ware, Esq., Clifton ; Rev. J. W. Bardsley, M.A., Vicar of St. Saviour's, Liverpool ; Rev. T. Beamish, Vicar of Harome ; Rev. A. Black, Buckhurst Hill ; Rev. W. B. Carpenter, M.A., Vicar of St. James's, Holloway ; Rev. A. M. W. Christopher, M.A., Rector of St. Aldate's, Oxford ; Rev. W. B. Galloway, M.A., Vicar of St. Mark's, Regent's Park ; Rev. S. H. Gem, M.A., Rector of Aspley ; Rev. C. Girdlestone, M.A., Weston-super-Mare ; Rev. C. Gutch, M.A., B.D., Vicar of St. Cyprian's (Life) ; Rev. G. F. Head, M.A., Vicar of St. Mark's, Tollington Park ; Rev. W. Leask, D.D., Sandringham Road ; Rev. J. C. Pinney, M.A., Vicar of Cole's Hill ; Rev. J. Ross, M.A., Vicar of Haggerston ; Rev. W. Y. Thompson, Vicar of St. Matthew's, New Kent Road.

ASSOCIATES.—Professor Boutflower, M.A., Agra, India ; Rev. Professor Watts, D.D., Belfast ; Rev. Professor Woodrow, D.D., Ph.D., M.D., South Carolina, United States ; E. Crewdsqn, Esq., Kendal ; J. G. Hellier, Esq., Cape Colony ; D. A. McCready, Esq., Roscrea ; H. B.

Parminter, Esq., Blackheath ; J. B. Shearer, Esq., Cape Colony ; A. Simcox, Esq., Birmingham ; T. Williams, Esq., Middlesborough ; R. Wood, Esq., Manchester ; Right Rev. Bishop Beckles, D.D., Vicar of St. Philip's ; Rev. C. W. Bardsley, M.A., Vicar of Higher Broughton ; Rev. W. H. Barlow, M.A., Rector of St. Ebbes, Oxford ; Rev. R. C. Bolster, A.B., Rector of Castle Martyr, Ireland ; Rev. R. N. Buckmaster, Kensington ; Rev. W. Hay Chapman, M.A., Parsonage, Westborne Green ; Rev. M. D. D. Churchward, Vicar of Northam, Bideford ; Rev. H. M. Clifford, M.A., Broughton ; Rev. H. Constable, Chaplain to Lock Hospital, Hackney ; Rev. F. H. Currie, M.A., Little Dunmow ; Rev. R. G. D. Frampton, Vicar of St. Mark's, Conishill, Burton-on-Trent ; Rev. J. Harris, Beconshire ; Rev. E. Hartrich, A.M., Parsonage, Douglas Pass, Ireland ; Rev. T. Jones, New Cross ; Rev. E. K. Kendall, M.A., Vicar of St. Mark's, Notting Hill ; Rev. W. E. Knollys, M.A., Rectory of Saltwood ; Rev. J. McNaughtan, M.A., Belfast ; Rev. J. P. Mengé, Milan ; Rev. F. Pigou, M.A., Vicar of Doncaster ; Rev. Gervase Smith, M.A., Secretary of the Wesleyan Conference ; Rev. C. Tait, M.A., Lambeth Palace ; Rev. E. Thrupp, M.A., Vicar of Feltham ; Miss Ashley, Bath ; Mrs. Buckley, St. George's Road ; Miss D. M. Pennefather, Mildmay Park.

Also the presentation of the following Works to the library.

- "Transactions of the Royal Society," Parts 152-5. *From the Society.*
- "Transactions of the Royal Geographical Society," Parts 3-5. *Ditto*
- "Transactions of the Royal United Service Club," Parts 76-8. *From the Institute.*
- "Transactions of the Royal Institution," Parts 3-4. *Ditto*
- "Transactions of the Geological Society," Parts 118-120. *From the Society.*
- "Transactions of the American Philosophical Society,"
13 volumes, 1 Part. *From the Society.*
- "Transactions of the Smithsonian Institution," 1872. *From the Institution.*
- "Transactions of the United States Geological Survey," 2 papers. *From the Survey.*
- "Annual Address of President of Natural History Society of Montreal.
By Dr. J. W. Dawson, F.R.S. *From the Author.*
- "Christendom." By Rev. C. Girdlestone. *Ditto*
- "Creation." By A. T. Ritchie, Esq. *Ditto*
- "Darwinism and Design." By G. St. Clair. *Ditto*
- "A Further Examination of Certain Assaults on Physical Science." By
Professor Woodrow. *From the Author.*
- "Causes of Art." By J. S. Phené, LL.D. *Ditto*
- "Egypt's Record of Time." By Rev. W. B. Galloway. *Ditto*
- "Physical Facts and Scientific Record." By Rev. W. B.
Galloway. *Ditto*
- "Mind and Matter." By Rev. J. Quarry. *Ditto*

"Lord Shaftesbury's Glasgow Address."	<i>From the Author.</i>
"Commencement of the Second Christian Epoch."	<i>Ditto</i>
"Christian Dogmatics." By Van Oostersee.	<i>Messrs. Hodder.</i>
"The Miracle Recorded in Joshua." By late Rev. E. Biley.	<i>Messrs. Hatchard.</i>
"Newton's Principia."	<i>J. W. Lea, Esq.</i>
"Pratt's Mechanical Philosophy."	<i>Ditto</i>
"Sir W. Hamilton's Philosophy."	<i>Ditto</i>
"Records of the Past," 2 vols.	<i>Messrs. Bagster.</i>
"World Scientifically Considered." By C. Thompson.	<i>From the Author.</i>

The following paper was then read by the Author :—

ON THE BEARING OF CERTAIN PALÆONTOLOGICAL FACTS UPON THE DARWINIAN THEORY OF THE ORIGIN OF SPECIES, AND ON THE GENERAL DOCTRINE OF EVOLUTION. By H. ALLEYNE NICHOLSON, M.D., D.Sc., M.A., F.R.S.E., Professor of Biology in the Durham University College of Physical Science, Newcastle-on-Tyne.

NO science, probably, will ultimately have more to say in the proof or disproof of the general doctrine of evolution as applied to the kingdoms of organic nature, than Palæontology. I do not, however, in the present communication, propose to discuss at length this wide question. I propose, rather, to take a more limited field, and to examine shortly the bearing of certain portions of palæontological evidence upon the Darwinian theory of the origin of species,—a theory which is only *one* method of explaining *how* evolution may have taken place, and which is totally independent of the general doctrine of evolution. In carrying out the object which I have in view on this occasion, I shall, for the most part, follow Mr. Darwin through his celebrated chapter on "The Imperfection of the Geological Record," in which he fairly states the chief objections which he conceives to be capable of being brought forward out of geology and palæontology against his theory, and in which he endeavours, with much ingenuity, to rebut these objections.

Before entering, however, upon the proper subject of my paper, it may be as well to indicate the general conclusions to which we might be led, as regards this subject, from a study of palæontology or zoology; since there seems, in the minds of some, both of those who are in favour of evolution and of those who are opposed to it, to exist some confusion on this point :—

First, then, we might be led by a study of the facts of the

case to the belief that no form or kind of evolution of living beings ever has taken place, or ever will take place. This conclusion would relieve us from any necessity of discussing what is known as the "Darwinian Theory," since this presupposes evolution, and is directly based upon it.

Secondly, we might be led to believe that evolution had been the general and universal agent in the production of all the different forms of animal and vegetable life, which have existed in past time, or which exist at the present day. This conclusion would still leave us under the necessity of discussing the Darwinian hypothesis, since this might be false, even if the general doctrine of evolution were true.

Thirdly, we might be led to the conclusion that certain forms of animal and vegetable life had been derived from other pre-existent forms, but that certain other forms had not been so derived. Now, I would here observe that there would be nothing unphilosophical in such a conclusion, supposing it were warranted by the facts. If there are facts which would go to prove that certain animals and plants have been derived from certain other animals and plants, we are warranted in adopting a derivative theory of origin for these animals and plants, but we are not warranted in doing more than this. Every naturalist will admit that the cases in which any direct probability of descent can be established, are limited, and comparatively few in number. The want of philosophy, therefore, if there be any, is on the side of those who, taking what at best has but been established as a probability in a certain number of cases, insist that we must manufacture out of this probability a general law to apply to *all* cases. In other words, it is directly asserted, or tacitly assumed, that if we admit that certain forms of animal and vegetable life (whether we choose to call these varieties or species) have been derived from other pre-existent forms, we must further admit that *all* forms of animal and vegetable life have been similarly derived from a single pre-existent form, that in turn, being evolved from inorganic material. I here protest most strongly against this assertion or assumption. It is an absurdity to maintain that evolution is either wholly true or not true at all; that we must either apply the doctrine to everything or to nothing. It is absurd to maintain that the admission that certain animals and plants have been derived from certain other different animals and plants, carries with it, of logical necessity, the further admission that *all* animals and plants have been similarly derived. Suppose we find that, as a general rule, bodies contract when heat is abstracted from them, are we therefore compelled to

admit that *all* bodies act in the same manner under similar circumstances? If we were so compelled, we know that we should be wrong, and that we should ultimately find our law confronted with certain bodies which do *not* contract on cooling. Similarly, we are not compelled by any necessity of the case either to apply the doctrine of evolution to all animals and plants alike, or to deny its existence and operation altogether. On the contrary, we are perfectly at liberty if we choose, and the facts will bear us out, to believe that some sort or kind of evolution has taken place, and that *some* animals and plants have been produced out of other pre-existent forms, whilst others have been differently produced, and owe their peculiarities to some other cause. It is perfectly open to us, to put the case in a concrete form, to believe that certain groups of allied species have been evolved each from a common ancestor; but we may at the same time consistently believe that the origin and production of these ancestral types has been conditioned and controlled by some totally different law. There are plenty of instances, in point of fact, in which one law continues to act regularly within certain limits, and then has its operation superseded by some higher law.

In the same way, with regard to the Darwinian hypothesis, it cannot reasonably be maintained, that we are either bound to suppose that all varieties of animal and vegetable life have been produced by the action of natural and sexual selection, or that we are shut up, as our only alternative, to the denial that natural selection is a *vera causa* at all. It is impossible to doubt the operation of "natural selection" within certain limits; but the question remains as to what these limits are; and we are certainly not justified in concluding that because it operates in certain cases, therefore all the peculiarities of the structure of living beings can be explained as due to this, alone or combined with "sexual selection."

Lastly, we have one extremely important consideration to bear in mind, and that is that very different meanings may be attached to the term "evolution." Supposing ground should appear for believing that certain forms of life have been evolved from other different forms, we have to admit the partial operation of "evolution" in its real and strict sense; but it still remains to gauge the quality and significance of this process, as well as to assign the causes by which it was brought about. To some minds, "evolution" appears to convey little or no notion of definite law and order, and the whole process appears to present itself as a kind of chance-medley operation, one species becoming converted into another, not along certain

fixed and unalterable lines, but solely according to chance variations in its environment and surroundings, or in its internal structure. On the other hand, there are other minds to which "evolution," in so far as we may believe it to have occurred at all, presents itself as a perfectly orderly and definitely regulated process, as much a part and parcel of the Divine order, and as thoroughly conformable to it, as any other conceivable mode of creation. On this view, certain types of life have been so endowed as to give rise to certain other related types by "evolution,"—the evolution not taking place, or capable of taking place, in any or every direction, but following a certain definite and necessary line. This is the "genetheonomy" of Mr. Davidson and Professor King, the "evolution of species effected mainly through the operation of Divine laws, and not by purposeless or accidental modifications." For my own part, if we substitute, in the above quotation, the word "wholly" for "mainly," I see no difficulty in accepting evolution as an agent in the production of species. It will be observed that this leaves open the question as to *how far* evolution has thus operated, and also as to *how* its operation has been effected, whether by "natural selection," or in some entirely different manner.

Having now cleared the ground by these preliminary considerations, I shall pass on to discuss the method in which Mr. Darwin has treated the difficulties which palæontology offers to the acceptance of his theory of the evolution of species by natural selection, as expounded in the chapter of the "Origin of Species," entitled "The Imperfection of the Geological Record." And I may here remark, that though I have come to the conclusion that Mr. Darwin has failed to remove these difficulties entirely, or even to materially lessen their weight, he has exhibited conspicuous fairness in the manner in which he has stated them, and that his arguments embrace much of the highest value, quite apart from the special conclusions which may be drawn from them. The subject may be considered under the following heads.

1. *The Nature of Extinct Intermediate Varieties.*—Mr. Darwin commences by pointing out that at the present day, supposing his theory to be true, we should not expect to find any forms *directly* intermediate between two given species, or that, at any rate, the existence of such forms must be very rare and exceptional. What we should look for are "forms intermediate between each species and a common but unknown progenitor." It is clear, however, that as regards extinct species, we have a right to look for such *directly* intermediate

forms, if Mr. Darwin's theory be correct; because in many cases we should have the actual common progenitor and the resulting species. If, for example, we suppose that the two living species the Horse and the Ass are descended by evolution from a common progenitor, it may be, and is doubtless, true that we should find no links directly uniting the one with the other. But, looking into "the dark backward and abysm of time," we may perchance find this common progenitor, and then the element "unknown" is eliminated, and we may reasonably ask for the *directly* intermediate forms which unite *each* species with the now known progenitor. In the present instance, most evolutionists would admit Hipparion to be the required common progenitor. No directly intermediate links, however, have yet been discovered between Hipparion and Equus. Or, if, in order to evade this difficulty, it were supposed that Equus and Hipparion constituted two distinct and diverging lines of descent from a still older common progenitor, such as Anchitherium, it would still remain to find directly intermediate forms between each of these and the latter; and no such transitional links have as yet been discovered. The general view, no doubt, is to regard Anchitherium as being the at present oldest known common progenitor of the Horse and Ass, and to consider that Hipparion is the required directly intermediate form, or rather one of such forms. This view, however, disregards the fact that the requirements of the case necessitate the bringing forward of directly intermediate forms between two existing species and the nearest common progenitor that can be found. If Equus has been developed from Anchitherium, and Hipparion has constituted an intermediate stage between the two, then Hipparion is the nearest common progenitor at present known of the existing species of Equus, and we have the right to expect the production of forms directly intermediate between them. Similarly, we should expect to find forms directly intermediate between Hipparion and Anchitherium. In neither case, however, are any such intermediate links at present known.* It

* The new and remarkable forms of Equidæ discovered by Leidy and Marsh in the Tertiary formations of North America, do not supply the desired links between Hipparion and Equus, or between Hipparion and Anchitherium. Thus Orohippus, though closely related to Anchitherium, has four digits in the manus and no antorbital fossa. Miohippus may be regarded as linking Orohippus to Anchitherium, since it has only three digits to the manus, but it also has no antorbital fossa; whilst Pliohippus, though resembling Equus in its digits, differs in the important characters of possessing a large antorbital fossa and an additional upper præmolar. Hence all these forms, though perhaps indicating the occurrence of some kind of evolution, are so distinct and isolated in their characters that

is clear, that though the earlier life-periods of the earth's history may be for ever hidden from us, the period of which we have actual record is sufficiently long to make it certain that we must have in that period many common progenitors of existing species, or of species which came into existence in the later epochs of Geology. We should, therefore, expect to meet, as palæontologists, with numerous *directly intermediate types*; and the very general absence of such appears to me to be, to begin with, a very serious obstacle in the way of the Darwinian hypothesis.

2. *The Lapse of Geological Time.*—The argument under this head I may pass over without discussion. As a field-geologist, I am fully prepared to admit the vastness of geological time; but I do not see that we have at present any sufficiently definite data by which we can estimate whether this time has, or has not, been sufficient to allow of the production of all living and extinct species of animals and plants by the action of natural selection. Geological time, as asserted by Mr. Darwin, is no doubt commonly underestimated; but we cannot at present even approximately determine how long a period has elapsed since the first introduction of living beings upon the globe, and we have not the smallest means of calculating how long a period would be required for the origin of species on Darwinian principles. It seems futile, therefore, to attempt to draw any conclusion from the comparison of two unknown quantities. Sir William Thomson's conclusions, if proved, would undoubtedly seriously affect the position of the Darwinian theory, but it cannot be said that they are certain, and it seems better at present to regard our knowledge as insufficient for the formation of any definite opinion on this subject.

3. *The Poorness of our Palæontological Collections.*—The next section of Mr. Darwin's argument deals with the poverty of our best palæontological collections, which he evidently regards as so great as to render all negative evidence, founded on the absence of certain forms of life, as of no value when opposed to his theoretical views. Unquestionably if we were to take our entire palæontological collections and compare them with the vast number of animals and plants, which we may infer from various considerations to have existed in past time, but of which we have now no traces, Mr. Darwin is

they are necessarily regarded as distinct *genera*. Hence, they do not lead us any nearer to the graduated series of transitional forms, which will have to be found before we can positively assert that *Equus* is a lineal descendant of *Hipparion*, and the latter of *Anchitherium*.

justified in the view he has taken, at any rate within certain limits. On the other hand, it may reasonably be maintained that this poverty of our collections is greatly reduced when we take certain groups of animals, or take the entire faunæ of certain formations. It may reasonably be maintained that the known collections, for example, of Silurian and Devonian fossils are not so fragmentary as to vitiate all the negative evidence drawn from them. In North America, at any rate, where the Devonian follows the Upper Silurian conformably and without any palæontological break of a marked kind, and where both sets of rocks are richly fossiliferous, it cannot be said that the poverty of our collections is such that no value can be attached to the absence of intermediate forms between the species of successive formations. If the Brachiopoda of these formations alone be taken, there are many species of which many thousands of perfect specimens have been collected; and if evolution can ever be proved by palæontology, we might fairly expect the proof here. Similarly, our collections of the fossils of various of the Secondary formations, as regards the marine animals, are sufficiently complete to render any negative evidence drawn from them of very decided value. Upon the whole, therefore, whilst the fragmentary nature of our palæontological collections must be fully admitted, it remains certain that as regards the marine faunæ of certain formations, and as regards certain groups of marine animals, this imperfection of our collections is not so great but that we may attach considerable importance to any negative evidence that they may afford.

4. *The Vastness of Unrepresented Time.*—Every modern geologist, probably, admits that the great geological formations are separated by vast lapses of time, more or less completely unrepresented by any accumulation of sediment. It is also universally admitted that all unconformities, whether between two formations, or as occurring in the limits of a single formation, similarly mark intervals of time not represented in the area where the want of conformity occurs by any stratified deposits. Every want of conformity, therefore, undoubtedly marks a time in which great biological changes may have taken place without our having any record of them now preserved to us; and it may be, as believed by some, that the periods unrepresented by any fossiliferous sediments are actually much longer than those of which we have material record in the form of strata charged with the remains of extinct animals. It is certain, therefore, that we have here a very marked cause of the imperfection of the palæontological record;

and the evolutionist may reasonably claim that many of the proofs of his theory have been in this way destroyed.

This argument, however, cannot be sustained with any confidence, when we come to look at the successive and conformable strata of a single group of beds. Doubtless, the lines between successive strata do mark periods of time in which no sediment was being accumulated, but we have no proof that these unrepresented periods were of any very great duration. When we find, as we often do, two successive and closely-related beds in which the fossil remains are partially alike and partially unlike, it is begging the entire question to assert that the line dividing the two beds *must* represent a long period of time *because* of the unlikeness of the organic remains of the two. Until we can indicate with some preciseness the sequence of phenomena indicated by the sudden appearance of new forms of life in time, we have no right to assume that two successive beds are separated by a wide interval, simply because the upper bed contains one or more new and peculiar forms of life.

It may be admitted, then, that, as regards the entire series of stratified deposits, so many gaps exist that the record of life is seriously mutilated; and hence, supposing evolution to be true, many of the proofs of its operation have doubtless never been preserved to us, whilst many others must have been destroyed by denudation. On the other hand, it is to be urged that no such objection can, in the present state of our knowledge, be brought against certain groups of fossiliferous deposits which we may take in certain known and explored regions. No such objection, for example, can be urged against a large portion of the palæozoic rocks of North America. Commencing with the Clinton formation, we may pass from the base of the Upper Silurian to the summit of the Devonian series, through a thickness of some thousands of feet of sediments, without meeting with a single unconformity or with any *general* palæontological break. The entire series admits of subdivision into a number of subordinate groups, each characterized by some peculiar fossils; so that we have a constant extinction of certain older types of life and a constant appearance of certain new forms. The fauna of each subordinate group is, however, constantly found to be closely related to that of the groups immediately above and below, and there is no positive evidence, either stratigraphical or palæontological, of any long interval of unrepresented time separating the successive groups. In other words, so far as all the positive evidence would show, we have here an area which remained

beneath the waters of a single ocean, and that an ocean richly tenanted by living beings, during the whole of the vast lapse of time between the commencement of the Upper Silurian and the close of the Devonian period; whilst there is no proof of any considerable pauses in the process of sedimentation during the same period. Here, therefore, if anywhere, we ought to find proofs of evolution, if such a process really has taken place; and I shall immediately proceed to examine shortly some of the evidence that we have on this head. In the meanwhile it may be noticed that there is another respect in which the Upper Silurian and Devonian rocks of North America are peculiarly fitted to throw light upon this inquiry. Mr. Darwin has pointed out that richly fossiliferous deposits have been formed mainly during periods in which the sea-bottom was undergoing subsidence; but he remarks that during subsidence few new varieties or species will be formed, owing to the deepening of the sea and the consequent decrease in the inhabited area and the number of inhabitants. The bearing of this remark upon Mr. Darwin's views is obvious; since sediments accumulated during subsidence, when few new species are formed, could not be expected to yield many, or any, intermediate forms. Under any circumstances, I should not attach as much weight to the latter half of the above observation as Mr. Darwin seems inclined to do; but, at any rate, it does not apply to the case I have chosen. There is good evidence that the Upper Silurian and Devonian rocks of North America were laid down in an area of almost continued subsidence; but there is also good ground for believing that the accumulation of sediment kept pace, approximately, with the rate of subsidence; so that the depth of the sea remained tolerably constant, and there was no marked decrease in the size of the inhabited area and the number of inhabitants. We have also evidence that during the greater part of this period the sea was sufficiently shallow to admit of the existence of a profuse and varied marine fauna; and there is ample proof of the continual introduction of new species and varieties.

5. *The Absence of Numerous Intermediate Varieties in any Single Formation.*—It is freely conceded that one of the greatest difficulties which Mr. Darwin's theory has to overcome, is found in the fact that we do not find in the limits of any single formation "closely graduated varieties between the allied species which lived at its commencement and at its close." The essence of this difficulty lies in the words "closely-graduated"; for we do find in any single formation certain intermediate forms, which may perhaps support a partial theory of evolution,

but which do not offer the evidence required by the Darwinian hypothesis. The following are the chief considerations brought forward by Mr. Darwin, to break the force of this objection, though he admits his inability to assign a due proportional weight to each.

a. It is maintained that each formation is probably "short, compared with the period requisite to change one species into another." Seeing that each formation is characterized by an assemblage of living beings peculiar to itself, that few species pass through an entire formation, and that each subdivision of a formation is generally recognizable by its own peculiar forms of life, I do not see how it is possible to maintain this assertion. It may be noted, also, that though the amount of time, as having elapsed since the introduction of life upon this planet, demanded by the Darwinian theory is notoriously enormous, one has little idea of its immensity till one comes to analyze such an argument as that given above. It is admitted that the length of time indicated by our entire series of stratified rocks, is vast almost beyond conception; but the entire series consists of only fourteen or fifteen great formations, and would, therefore, irrespective of the blanks between the formations, correspond, on the above view, with less than the combined life of fifteen successive species. When we reflect on the enormous number of living forms that have died out, and the enormous number of new forms that have come into being, we feel hopeless of forming even an approximate conception of the time which Mr. Darwin asks for the carrying out of his theory.

b. It is alleged, again, that the first appearance of a species in any formation, probably only indicates that it had then first immigrated into that area, and that it might have been in existence elsewhere for a long period of time. This may in some, perhaps in many, instances be true; but there can be very few cases capable of definite proof, and it must, therefore, be regarded as more or less of the nature of an assumption. It can hardly be asserted that in the long lapse of geological time we have not record of the first appearance of *many* species; and we can never know, in most instances, whether the first appearance of a species, as known to us, is actually its first appearance, or is only so for the area under examination. Little weight, therefore, can be attached to this argument.

c. In order to get a *perfect* gradation between two forms, we should require them to have lived in the same area for a long period, during which a thick and continuous series of

deposits were laid down; but these conditions are probably rarely carried out. This is unquestionably true, if we only knew *how* thick the formation would need to be. This we do not know, and therefore it will always be open for each observer to hold his own opinion on this point. Some will be of opinion that the uninterrupted deposition of fifty or a hundred feet of sediment would amply fulfil the above conditions. Mr. Darwin, on the other hand, believes that a whole formation would not be sufficient for this purpose; and there does not appear at present to be any means of coming to an agreement on this point.

d. That every formation has been more or less intermittent in its accumulation is unquestionably true, since the dividing-line between every stratum and the next undeniably marks a pause in the work of deposition. We have, however, no proof that these pauses have been always of even approximately the same length. Sometimes we have reason to believe that they have been very long; at other times there are grounds for thinking that they were comparatively very short. We can, therefore, come to no positive conclusion, as to the amount of time represented in this way, and can thus attach no definite value to any argument derived from this source.

e. The last of Mr. Darwin's arguments which I may notice is that we have no right to look in our geological formations for "an infinite number of those fine transitional forms, which, on our theory, have connected all the past and present species of the same group into one long and branching chain of life." On the contrary, we have only a right to look for a few of these transitional links, and such are actually found to exist in nature. To this it may be replied that whilst we have assuredly no right to ask for an *infinite* series of links, we have a right to ask for a much more perfect series of links than has as yet been brought to light. The transitional forms which are at present known to us,—and there are more of them than might be imagined,—might be sufficient to give an *à priori* probability to some theory of evolution; but they can hardly be said to be in any single instance sufficient to be accepted as proof of the special explanation of evolution advocated by Mr. Darwin.

6. *On the Succession of Life in a Series of Conformable Deposits.*—We have seen that Mr. Darwin admits that the absence of a series of graduated intermediate forms between the species at the commencement of any single formation and those which lived at its close, is a great stumbling-block in the way of his theory. Let us now see what we actually do find in such a case, having in the meanwhile regard wholly to the facts, and

disregarding all theories and all possible explanations of anything which may appear unintelligible. For reasons already stated; I shall select for this inquiry the Upper Silurian and Devonian rocks of North America as being peculiarly fitted for this purpose. We have here a series of distinct rock-groups, all of which are capable of being defined by their fossils, but which follow one another conformably, and which possess a sufficiency of identical or closely-allied fossils, in any two successive groups, to indicate that they constitute a single natural group of deposits, elsewhere represented by the Upper Silurian and Devonian. When most fully developed, the series consists of the following groups in ascending order:—

I. UPPER SILURIAN.

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|---|--------------------|
| 1. Oneida Conglomerate. | } Middle Silurian. |
| 2. Medina Sandstone. | |
| 3. Clinton group. | |
| 4. Niagara group. | |
| 5. Guelph Limestones and Onondaga Salt group. | |
| 6. Lower Helderberg. | |
| <i>a.</i> Tentaculite Limestone and Water-lime group. | |
| <i>b.</i> Lower Pentamerus Limestone. | |
| <i>c.</i> Delthyris Shaly Limestone. | |
| <i>d.</i> Encrinal Limestone. | |
| <i>e.</i> Upper Pentamerus Limestone. | |

II. DEVONIAN.

7. Oriskany Sandstone.
8. Corniferous group.
 - a.* Cauda-galli grit.
 - b.* Schöharie grit.
 - c.* Upper Helderberg or Corniferous Limestone.
9. Hamilton group.
 - a.* Marcellus Shale.
 - b.* Hamilton group proper.
 - c.* Genesee Slates.
10. Portage group.
11. Chemung group.
12. Catskill group (Carboniferous?)

The line of division between the Upper Silurian and Devonian is so little marked that the best authorities are still divided as to whether the Oriskany Sandstone should properly be regarded as the summit of the former or the base of the latter; and it may conveniently be regarded as constituting a bed of passage between the two. In what follows, several groups of the above list will not come into consideration at all, as not yielding

many organic remains, or such as can be made available for the present purpose.

For many reasons it is desirable to restrict our investigation as regards the succession of life in the above-mentioned deposits to a single group of organisms, and for this purpose none offers such facilities as that of the Brachiopoda. It will not be possible, indeed, to study even these in an exhaustive manner, and only the more striking facts brought to light by a consideration of their occurrence in these formations can here be discussed.

In the first place, it is most remarkable to observe how in the larger and most abundantly represented genera closely allied forms succeed each other as we proceed from the base of the series towards the summit. Commencing with a single type-form in one of the lower groups, we find the same form under a somewhat different guise appearing in one or more of the higher groups, and sometimes represented therein by several allied species. I shall give some of the more conspicuous examples of this, drawn from a study of the genera *Orthis*, *Strophomena*, and *Spirifera*.

If we commence, for example, with *Orthis elegantula*, Dalm., in the Clinton group, we have a well-known type nearly allied to certain Lower Silurian forms (such as *O. testudinaria*, Dalm.), and distinguished by its flattened dorsal and convex ventral valve, and by the fine radiating dichotomising striæ with which the surface is ornamented. In the Niagara group the species is continued in full force, and little or not at all changed; but in the Lower Helderberg the species has disappeared, and its place is taken by the closely allied *Orthis plano-convexa*, Hall, and *O. subcarinata*, Hall. In the Oriskany Sandstone no representative of the type has yet been detected, but in the Corniferous group we find *Orthis peloris*, Hall, and *O. lenticularis*, Hall, whilst the Hamilton group has yielded *O. solitaria*, Hall; all of these being close allies of one another, and of *O. elegantula*.

Another series may be taken, having as its type *Orthis hybrida*, Sow. This type commences in the Clinton group in the person of *O. circulus*, Hall, and is represented in the succeeding formation of the Niagara group by the type-form *O. hybrida*, distinguished by its nearly equally convex valves and fine radiating striæ. In the Lower Helderberg the type has a great development, being represented by *O. oblata*, Hall, *O. discus*, Hall, *O. eminens*, Hall, *O. perelegans*, Hall, *O. concinna*, Hall, and *O. assimilis*, Hall; all of these being closely related to *O. hybrida* and to one another. In the Oriskany

Sandstone we have but a single example of the group, viz. *O. muscosa*, Hall. In the Corniferous Limestone, however, a second great expansion of the type occurs, and we find no less than six species of the group, viz. *O. alsus*, Hall, *O. mitis*, Hall, *O. Livia*, Billings, *O. Vanuxemi*, Hall, *O. Semele*, Hall, and *O. Cleobis*, Hall; some of these being hardly separable from one another and from precedent forms. Lastly, in the Hamilton group, besides *O. Vanuxemi*, continued from the Corniferous, we have four fresh representatives of the type, viz. *O. leucosia*, Hall, *O. cyclas*, Hall, *O. Penelope*, Hall, and *O. idoneus*, Hall.

Or, again, we may take another series, which culminates in the well-known *Orthis resupinata* of the Carboniferous rocks. This series commences in a well-marked form with *Orthis multistriata*, Hall, of the Lower Helderberg: it is represented in the Corniferous Limestone by the very similar *O. propinqua*, Hall (so similar as to be almost undistinguishable); it is continued in the Hamilton group by *O. Tulliensis*, Vanuxem, and *O. Iowensis*, Hall; whilst it is represented in the Portage and Chemung groups by *O. impressa*, Hall.

Turning to the genus *Strophomena*, we find exactly the same phenomena. Thus, the large and important group of *Strophomenoid* shells typified in the Lower Silurian by *S. alternata*, Conrad, and a number of allied forms, continues to be represented in the Clinton by *S. alternata*, and, though without any conspicuous example in the Niagara group, is represented in the Lower Helderberg by the two well-marked forms, *S. concava*, Hall, and *S. varistriata*, Conrad. Later on, in the Corniferous and Hamilton groups, we find the type represented by a whole group of forms—*S. inequistriata*, Conrad, *S. inequira-diata*, Hall, *S. Patersoni*, Hall, *S. textilis*, Hall, and *S. hemispherica*, Hall; which Hall considers as distinct species, but which Mr. Billings regards as probably nothing more than varieties of one protean form, which is continued into the Chemung group by *S. Cayuta*, Hall.

Similarly, the *S. Headleyana*, Hall, *S. punctulifera*, Conrad, *S. Leavenworthana*, Hall, and *S. cavumbona*, Hall, all from the Lower Helderberg group, are hardly or not at all separable from the *S. ampla* of the Corniferous Limestone, a species which is also stated by Mr. Billings to occur in the intermediate formation of the Oriskany Sandstone.

Again, the *Strophomena patenta*, Hall, of the Clinton group, related perhaps in turn to *S. pecten*, Linn., of the older rocks, is represented in the Niagara formation by the nearly allied *S. subplana*, Conrad, which is followed in the Lower Helder-

berg by the closely allied *S. radiata*, Vanuxem, and *S. Woolworthana*, Hall.

Evidence of precisely similar import can be obtained from a consideration of the distribution of the species of the genus *Spirifera* within the same formations. The *Spirifera crispa*, Linn., of the Niagara formation, is succeeded in the Lower Helderberg by the closely allied, if not identical, *S. cycloptera* and *S. Vanuxemi*, Hall, which are followed in the Oriskany by *S. tribulis*, Hall, and in the Corniferous by *S. duodenaria*, Hall. Again, the *Spirifera sulcata* of the Niagara group is succeeded by the cognate *S. perlamellosa*, Hall, of the Lower Helderberg, in turn followed in the Corniferous group by *S. raricosta*, Conrad. Lastly, the *Spirifera Niagarensis*, Conrad, which, so far as I am aware, is the oldest example of the genus in the Silurian rocks of North America, is directly succeeded in the Lower Helderberg by the closely related *S. macroleura*, Conrad.

The question now arises—What is the significance of facts such as these,—facts which could be greatly multiplied, and which no competent authority would think of disputing? Are we to consider that the eighteen forms which group themselves round *Orthis hybrida* as a central type, and which are found in the successive formations from the Clinton to the Hamilton, are so many absolutely distinct species, in the old and strict acceptation of this term? Or, shall we simply expand our conceptions of what constitutes a species, extend the limits of the term, and consider that these allied forms are so many more or less distinct varieties of a single protean species? If the latter view were adopted, whilst to the working palæontologist these forms would remain as so many distinct species, and would properly and usefully be designated by so many distinct names, to the transcendental palæontologist they would become simply so many successive phases of one variable form.

It cannot be too strongly borne in mind, as very properly insisted on by Mr. Darwin, that naturalists have no golden rule for determining what are species and what are varieties. Such determinations rest upon the value which certain observers attach to certain characters; and this is especially true of fossils, where, in addition to the actual anatomical or structural characters, we have the additional element of *time* introduced. Specimens which would at once be admitted to be mere varieties if they occurred in a single stratum, are by many palæontologists unhesitatingly set down as distinct species, if they happen to occur in beds of even slightly different age. For the purposes of the stratigraphical geologist, this does not matter, and is, indeed, often useful, since if a certain bed can be

invariably recognized by the occurrence in it of a particular fossil, it does not matter whether this be a true species or a mere variety. Philosophically, however, the system is a bad one, and the specific status of a fossil should be determined independently of its stratigraphical position.

Upon the whole, the most feasible explanation of cases such as those above recounted, seems to be contained in the admission that certain species in certain zoological groups have a great range of variability; that these variable species appear under slightly different forms in each successive period or sub-period; and that, though we may, for the sake of convenient classification and description, call these by distinct titles, they have in reality all been derived from a single primitive type by some kind of evolution. As before remarked, however, this is simply giving a more ample latitude and a broader expansion to our conception of the term "species," and it does not carry with it philosophically the acceptance of the *general* doctrine of evolution. *A fortiori* it does not bind us to accept any particular explanation as to the manner in which these related forms have been produced.

So far as the Darwinian theory is concerned, the facts above recounted do not appear to be in any way specially favourable to it; since, though they apparently point to some kind of evolution having taken place upon a limited scale, they do not show any indications of the graduated series of intermediate forms which is required by the hypothesis of natural selection, and which upon this view must at one time necessarily have existed. If *Spirifera crispa* of the Niagara group, for example, was changed by natural selection into *S. cycloptera* of the Lower Helderberg, this into *S. tribulis* of the Oriskany, and this into *S. duodenaria* of the Corniferous, we ought to find a graduated series of intermediate forms directly connecting them; since no ground can be alleged why each of the intermediate forms of the series should not have had just as long an existence as the four types themselves, and should not, therefore, have had just as good a chance of being preserved as fossils. Nor do the arguments brought forward by Mr. Darwin appear to touch this case, since all the forms in question inhabited a single ocean, the bottom of which was regularly and slowly subsiding, and in which a series of sediments was being accumulated, so far as we can judge, almost continuously.

It appears, then, that even in cases such as the preceding, which at first sight appear to favour the Darwinian theory, we do not find the graduated series of intermediate forms required to prove the case. On the contrary, we find a series of forms

very closely allied to one another, the two extreme terms of the series being conspicuously different, and the intermediate forms more or less completely uniting them together; but, at the same time, all the members of the series so far distinct that a thoroughly competent and skilled palæontologist describes all of them, without hesitation, as distinct and separate species. This is not at all what is required for the proof of the Darwinian hypothesis, and Mr. Darwin is so fully alive to this that, as we have seen, he has devoted much ingenuity to an attempt to explain away the absence of the finely gradational forms, which upon his theory ought to be found within the limits of each great formation.

So far, therefore, as any actual proof of the Darwinian theory of the origin of species is concerned, I believe Palæontology to be at present absolutely silent. The facts of Palæontology point to the operation of some law of evolution, but they do not support the special views advanced by Mr. Darwin. Everywhere we meet with intermediate forms linking together different groups; but these forms are always distinct in themselves and distinct from the types they connect. When we look at the "intercalary" or "linear" types interposed between the great classes of the Reptiles and Birds, for example, Compsognathus, Ichthyornis, Odontopteryx, Archæopteryx, Pterodactylus, and the like, we have a series of distinct structural types, which may as a whole be placed between Reptilia and Aves, but which are quite distinct in themselves, and which are not connected either with one another, or with these two classes by any graduated series of transitional forms. Similarly, Hipparion may be a "linear type" between Anceñtherium and Equus; and in so far as this is probable, it lends support to some theory of evolution; but it does not support the Darwinian theory, as we have discovered no intermediate forms uniting these very distinct types. The same may be said of all, or almost all, of the known "transitional forms," which have as yet been brought to light by the study of Palæontology.

In the particular department which we have been investigating, we have seen that great variability exists in certain groups, and that a reasonable probability has been established that certain related groups of Brachiopods have descended each from a single primordial type. In other words, we have seen it to be reasonably probable that certain species are endowed with such a plastic organization, that when the surrounding conditions change, or in consequence of some unknown and inherent law, they undergo modification, and appear in successive periods under forms so different, as to have been described

as distinct species. We have thus ground for believing that a considerable expansion may reasonably be given to the philosophical conception of what constitutes a species.

There is, however, another aspect of the question to consider. Side by side with the groups of allied species of Brachiopods, which we have seen to occur in the Upper Silurian and Devonian formations, we must place the comparatively rigid, inflexible, and persistent species, such as *Strophomena rhomboidalis*, Wahl., and *Atrypa reticularis*, Linn., of the same formations; and we have also to consider the new types which came into being during the same period, without our being able to show that they have descended from pre-existent allied forms. As regards the persistent types, the two first-mentioned are the most important. *Strophomena rhomboidalis* commences in the Lower Silurian, and continues through the whole of the Upper Silurian and Devonian, finally dying out in the Carboniferous rocks. Though slightly varying in shape and size in certain deposits, it remains practically the same throughout the whole of this enormous period. *Atrypa reticularis*, Linn., commences in the earlier portion of the Upper Silurian, and continues to be represented till close upon the termination of the Devonian period. Unlike the preceding, it is exceedingly variable in size and in other characters, and at least two so-called species, viz., *Atrypa impressa*, Hall, and *A. spinosa vel aspera*, appear to have been founded upon mere varieties of this mutable form. Other species could be mentioned which pass through several sub-groups without apparent alteration; but these two have by far the largest range. *Atrypa reticularis* affords us an instance of a species, which, though very variable, and constantly presenting slight modifications of different kinds, nevertheless retains its specific stamp for a very extended period, and under what must have been very variable conditions. On the other hand, we have in *Strophomena rhomboidalis* a specific type which endured similarly changing conditions, and which survived for an even more prolonged term, but which throughout its entire lease of life never exhibited any modifications of even varietal value.

As regards the appearance of new forms of the Brachiopoda during the period which we have had under consideration, it will be advisable to look to the genera and sub-genera rather than to the species. As each new genus and sub-genus in general contains more than one, and often many, species, the case is thus rendered quite sufficiently strong for our purpose; though it is to be remembered that many new species of the old genera are also constantly making their appearance in the

successive formations. It should also be added that what follows relates only to the North American area, and that some of the types which here appear for the first time in certain deposits, have elsewhere existed at an earlier period. It should further be said that all palæontologists would not recognize the validity of some of the generic or sub-generic forms here enumerated, whilst others of doubtful value have been omitted altogether.

In the Clinton and Niagara formations, which in this connection may be considered together, we find representatives of the following genera:—*Lingula*, *Pholidops*, *Discina*, *Orthis*, *Orthisina*, *Nucleospira*, *Leptæna*, *Strophomena*, *Streptorhynchus*, *Chonetes*, *Spirifera*, *Atrypa*, *Athyris*, *Cyrtina*, *Rhynchonella*, *Pentamerus*, *Stricklandinia*, *Leptocœlia*, *Camerella*, *Zygospira*, and *Trematospira*. Most of these are more or less largely represented in the Lower Silurian rocks; but *Chonetes*, *Spirifera*, *Cyrtina*, *Pentamerus*, *Stricklandinia*, *Leptocœlia*, *Trematospira*, and *Pholidops* represent types which appear now to have first made their appearance in this area. In Ohio, the genus *Trimerella* also makes its first appearance at this period. In the Lower Helderberg epoch, though Brachiopods are very abundant, and many new specific forms come into existence, it is chiefly the already existing genera that are represented, and the only new types that appear are *Eatonia* and *Rensselaeria*. In the Devonian rocks, on the other hand, not only are many of the older types largely represented, but we have a large number of new types coming into existence, and many of these have a very striking development during the period. To say nothing of older types, like *Chonetes*, which are now for the first time plentifully represented, the following new types now make their appearance:—*Ambocœlia*, *Amphigenia*, *Camarophoria* (?), *Centronella*, *Crania*, *Cryptonella*, *Spirigera*, *Leiorhynchus*, *Tropidoleptus*, *Vitulina*, *Terebratula*, *Pentamerella*, and *Productella*. Of these *Terebratula* and *Productella* are of especial importance as being the forerunners of two very important groups of the class.

We see from the above that though the Upper Silurian and Devonian rocks of North America were laid down as an approximately continuous series, and certainly on an ocean-floor which was not once laid dry during their accumulation; nevertheless, new forms of life were constantly being introduced into the area in some manner that cannot be explained; and in many cases the new forms belong to altogether new generic types, which have no near allies in the older strata. This fact, which is, of course, one not confined to the particular

case under illustration, is undoubtedly a serious difficulty in the way of the acceptance not only of the Darwinian theory, but of any doctrine of evolution. Any such doctrine, if it is to be applied *universally*, must stand by Mr. Wallace's law, that "every species has come into existence, coincident, both in space and time, with a pre-existing closely-allied species." This statement of the case, as I have elsewhere pointed out, is obviously too wide, since, even from the evolutionist's point of view, we must *somewhere* come to a point where the organisms (or organism) in existence had no pre-existent types. It is certain, however, that no doctrine of general evolution can afford to admit the sudden appearance of new specific or generic types in time. From all that palæontology teaches us, on the surface at any rate, such new types *have* constantly been coming into existence in past time, as we have just seen; and it is not easy to discover any satisfactory explanation of this troublesome fact. The most obvious way of evading the difficulty, and the one which Mr. Darwin has adopted, is to assert that what appears to us to be the first appearance of new generic or specific types is only due to the imperfect state of our knowledge, and that the said types were really in existence long before the period of the formation in which we first find them. In such cases as concern the first appearance of given types in given areas, and in which it can be shown that similar or nearly allied types have existed in other areas in *older* formations, there is a strong probability that this explanation is correct, and that what we call "first appearance" is merely an instance of "migration." When this assertion, however, is made as a *general* statement, applying to the *general* phenomenon of the sudden appearance of new specific and generic types throughout the entire series of the stratified rocks, then two things are clear.—Firstly, that such an assertion is *only* an assertion, which, even if probable, would ever remain unprovable; and secondly, that such an assertion is in the highest degree improbable, though its falsity likewise does not admit of positive proof. That in many cases, the points where we now note the first appearance of generic and specific types in the geological record, are not the actual points at which they were first introduced upon the scene, either as regards time or space, is likely enough. But, that this is true of *all* the new species and genera that have made their appearance upon the earth since the commencement of the Cambrian epoch, is not only an assumption, but it is one that can only be sustained by making other assumptions equally unsupported by definite proofs. And it may be noted here, that to derive any benefit from this argument, it is neces-

sary to suppose that we are ignorant of the first appearance of *all* those specific and generic types which make their appearance suddenly in the stratified series. In other words we must suppose that fully three-fourths of all the known species of fossils had been in existence an indefinite period before their first appearance in the rocks as known to us. I apprehend that every evolutionist will admit this, since the cases in which it can actually be shown that a fossil species came into existence "coincident, both in space and time, with a pre-existing closely-allied species," are, on the most liberal estimate, not more than one-fourth of the total number of those with which we are already acquainted. All the other species, of which this cannot be shown, must, in accordance with the above *dictum*, have been in existence prior to the period where they now first appear upon the scene.

The types of species and genera, to say nothing of those of families and orders, which make their appearance in the Cambrian period, are so numerous that we are compelled by this argument to assume that they themselves must have been in existence for an indefinitely long period before the commencement of the Cambrian; whilst the types from which they were derived must have flourished in ages so immeasurably earlier that the very imagination is left powerless. Indubitably, there is every reason to believe that the great pile of Laurentian sediments was once fossiliferous, and that the Laurentian period was anything but "azoic." Upon strict Darwinian principles, however, the Laurentian period, long as it must have been, is altogether inadequate for the development of all the forms of life which make their first nominal appearance in the Cambrian. We are, therefore, compelled to assume the former existence of vast Pre-Laurentian deposits, the memorials of an ancient period rich in life, which must have been destroyed by subsequent denudation. No one dare assert that such deposits *may* not have existed; but as we have absolutely no proof of such a thing, their character and contents can hardly be brought forward as factors in a scientific argument. Mr. Darwin, therefore, candidly admits that "the case at present must remain inexplicable."

In the case which we have been considering, the argument employed by Mr. Darwin, though not demanding such extensive hypotheses, is equally incapable of proof, and must, in my opinion, be equally rejected. We find, for example, in the Devonian rocks of North America, amongst many others, the entirely new Brachiopodous type, *Productella*, represented by twenty-one known species, all, of course, equally new. Upon

the above-mentioned argument we have to assume that this is *not* the first appearance of *Productella*, but that the genus, or sub-genus, had already been in existence elsewhere for an unknown but certainly long period, and had only at this time migrated into the American area. If this hypothesis were to be accepted, it would doubtless remove, at any rate, some of the difficulties of the case, but it would not remove all, and there is neither proof nor probability in its favour. If *Productella* had been in existence elsewhere in Pre-Devonian times, it is almost, if not quite, inconceivable that no remains of the genus should ever have been found in the Silurian deposits of other areas,—deposits which have a very wide extension in space, which are enormously rich in Brachiopoda, and which have been most diligently searched and examined for fossils. Even supposing that at some future time *Productella* *should* be found to have existed during the Silurian period, the difficulty by this would only be removed a step further back. We should still have to believe that *this* was not really the first appearance of the genus, and we should still have to inquire why no remains of the genus had been disintombed from the Cambrian deposits.

When I consider the vast number of cases precisely similar in all essential respects to the above, and when I reflect on the great extent of uncertain and unexplorable ground traversed by the above hypothetical explanation of the facts, I feel compelled to reject this argument altogether, so far as its general application is concerned. The continued introduction of fresh types of life, which we know to have gone on since the first appearance of organized beings upon the globe, still remains, in my opinion, unexplained. It may be that when we know the law under which it has occurred, we shall find that it has been in accordance with the Darwinian theory of the origin of species. In the meanwhile there is nothing to lead us to suppose that this will be the case, and it appears to me to constitute one of the greatest difficulties which this and other kindred theories have to surmount, before they can place themselves upon a thoroughly satisfactory basis.

7. *General Conclusions.*—As the result of the inquiry in which we have been engaged,—an inquiry necessarily extremely limited in its range and scope,—the following conclusions may be drawn with more or less confidence. And it may be added, that though I have only here treated of a single comparatively small group of rocks, I know nothing in the entire range of palæontology which would at present confirm with any certainty *more* than is contained in these conclusions, so far as these are

of a positive nature. In so far as they are negative, there is doubtless room for much divergence of opinion :—

1. The common phenomenon of closely-allied forms directly succeeding one another in time renders it a reasonable supposition that in certain zoological groups many forms so distinct as to have been described by competent observers as distinct *species*, may have descended from a single primitive ancestral type.

2. The evidence at present in our hands is opposed to the view that this production of groups of allied forms from as many primitive types has been effected solely or mainly by “natural selection”; though it is probable that this agency may have played a subordinate part in the process.

3. New types of life are constantly making their appearance, without, so far as we know, being preceded by any closely-allied types; and we have, therefore, no positive ground for believing that the origin of such types is due to evolution from pre-existent forms.

4. Variability—even in the most variable groups—has never been shown to be indefinite; but, on the contrary, appears to be confined within certain fixed limits for each species; in some cases wide, in others very narrow. Palæontology shows no instances in which we can positively assert that the variability has been unlimited; and though we meet with types connected by intermediate links, we have also to account for the existence of a vast number of isolated forms, which, so far as our present knowledges goes, stand alone, and are not intimately related to other forms.

5. Even where we find types which may be regarded as strictly transitional or intermediate (as *Hipparion* in its relation to *Anchitherium* on the one hand, and *Equus* on the other hand), we nevertheless are confronted with forms which are in themselves quite distinct, and which could not be confounded with the forms which they serve to connect.

6. We cannot fairly have recourse to the “imperfection of the record,” as satisfactorily explaining the absence of the numerous intermediate types required by the Darwinian theory. Such imperfection admittedly exists, and is in some instances almost hopelessly great. On the other hand, we have had in other instances a fairly *complete* series of successive forms preserved to us. This is the case with the *Brachiopoda* and *Cephalopoda*, for example, and it is by these and similarly well-preserved groups that any theory of the origin of species will have to be tested.

7. The examination of such tolerably complete groups affords

support to the belief that evolution has operated within certain limits, and has been one of the causes which has led to the production of new forms. Even in the best-preserved groups, however, we meet constantly with isolated types, and we are incessantly met with the sudden appearance of new types. An excellent example of this is to be found in the sudden appearance of new species of Ammonites in the Liassic rocks, and their very definite range and complete limitation to known zones. The study of such groups would, therefore, lead us to reject any exclusive doctrine of evolution.

8. Whilst certain types of life exhibit a striking variability, others exhibit an equally striking persistence and immobility. This would go far to prove that *changes in external conditions have little to do with the origin of variations*; since some forms appear to vary even under approximately constant conditions, whilst others remain unchanged even when submitted to the most varying surroundings.

9. In some instances, it can even be shown that entire groups of species have existed without change through periods which we may justly estimate as exceedingly long. Thus, Principal Dawson affirms that of more than two hundred species of fossils, chiefly Mollusca, from the Post-Pliocene deposits of Canada, no one form can be shown to have varied materially, during the long period which separates the oldest boulder-clay from the present time, and in spite of notable climatal and geographical changes.

10. Upon the whole, we may conclude that palæontology, in its present stage of development, offers no strong support, or is directly opposed, to the special theory of the Origin of Species advocated by Mr. Darwin. On the other hand, many known palæontological facts would lead us to infer that, in certain cases and within certain limits, new forms have been produced by the modification of pre-existent types. Palæontology, therefore, would appear to support, at any rate, a partial doctrine of evolution.

11. It remains for future consideration, whether evolution—in so far as it has operated at all—has not been effected by means of inherent tendencies impressed upon living beings by the Creator. On this view, evolution is not a mere disorderly and fortuitous process, by which a given animal or plant is produced out of a different one by the operation of chance and accidental surroundings; but it becomes an orderly process, by which *certain forms of life have from the beginning been impressed with the inherent power of developing in certain fixed*

directions, and thus of giving rise to a definite series of specific types.

12. It further remains for future consideration, whether this orderly process of evolution has always been effected in a *gradual* manner, and whether it has not been occasionally effected by changes taking place *suddenly* and *per saltum*.

13. Finally, it remains to consider within what limits evolution has operated, and what supplementary causes may be found to have acted in the production of new forms of life. Or, rather, it remains to consider whether evolution is a main, or only a subsidiary agency in the production of new species.

The CHAIRMAN.—I am sure the meeting will pass a cordial vote of thanks to Dr. Nicholson for his paper. It is now open for any of those present to make observations thereon.

Rev. G. HENSLow.—I think we must all feel greatly indebted to Dr. Nicholson for this paper: in it he has distinctly pointed out a matter upon which I have reason to think that there is some confusion in the public mind. I mean the distinction between *Darwinism* and *Evolution*; the former, involving as it does the theory of natural selection, I do not hold; but there is a great difference between natural selection and evolution. Again and again have I stood up on behalf of evolution, but I have always felt that natural selection, pure and simple, would never be sufficient to account for it. I do not know, however, that I agree entirely with all Professor Nicholson's views. For instance, with reference to the poverty of our Palæontological collections; in my opinion, a strong point should be made in regard to the evidence that is wanting. Mr. Darwin speaks of the paucity of the geological record; but there is one thing that ought not to be forgotten:—When we examine certain strata and calculate their thickness, we get something obvious before us, but we are apt to forget, at the same time, that every one of those strata is just as much a measure of what is *lost*, as it is of what we have before us. When we consider the Laurentian strata, the question arises, where did they come from? If they are so many thousands of feet thick, there must have been so many other feet of thickness of primitive strata, about which we know nothing at all, and those primitive strata might have been full of life. For instance, take the sand upon the sea-shores of the south-east of England, where the chalk strata are to be found: the sand, of course, is formed from the wear and tear of the chalk-flints, which are derived from the denuded cliff; but if you take the sand of the sea-shore of Scarborough, this is not the first time it really has been sand: the sandy beach results from the denudation of the fresh-water strata which form the rocks round the coast; so that the same sand must have been used at least twice, if not many times over. Every stratum is

the measure, possibly, of several lost strata ; and we do not know how many such there may have been. I was rather puzzled to understand one particular reference to the coming in of new forms ; Dr. Nicholson said we seemed to be certain that sometimes we arrived at the first beginning of a new form : this idea rests solely upon negative evidence, unless he refers to some of the graduated forms ; as, for instance, to one of those species of *Orthis* or *Spirifera* to which the paper refers : but when we suddenly come to a new species or genus, we have no ground whatever for assuming that it is the first, and the only explanation (unless we fancy it was created then and there, which we should hardly do) is that it must have *migrated*. I think the negative evidence is all in favour of migration, wherever we come across a permanent type for the first time ; but so long as it is one of a graduated series, I think we might be justified in saying that it is probably its first commencement. With reference to the horse group of which Professor Nicholson spoke, in which there are not fine intermediate links, it must be borne in mind that evolutionists generally do not necessarily require such fine links, though Mr. Darwin's theory of natural selection does. Mr. Darwin requires extremely small variations, but the question really turns upon this :—how much difference is really required between one form and another ? Mr. Darwin requires a succession of slight differences, and palæontology does not always give them : but may it not be true that some of the higher types of life are formed by “sports”—by slight leaps, as it were, instead of by minute gradations ? I should like to ask Dr. Nicholson, as being a better palæontologist than I am myself, whether it may not turn out to be a law applying to the higher types, that the distances between them are rather greater than is the case in the lower ; the *horizontal* modifications, for instance, being more numerous and more varied, in comparison with the *vertical* modifications. Take the Foraminifera among animals, or the agarics among vegetables, and there you have simple organisms, but there is an enormous amount of variety amongst them—perhaps hundreds of thousands : they are low types, on a common level, as it were, varying to a very great extent ; and I would ask, would not Dr. Nicholson's experience support the idea that the lower the type, the greater the amount of horizontal modification ; but that when you get to the higher forms the modifications come by jumps and leaps ? I should like to know whether that idea has been found to be the case ? It certainly would clear up the difficulty that Dr. Nicholson has pointed out ;—that in the higher groups especially there are these breaks, and that you do not get a graduated series such as you find among the lower types.

Mr. J. E. HOWARD, F.R.S.—I think we are all indebted to Dr. Nicholson for this very able exposition of views, in which, for my own part, I entirely agree. So far as my knowledge extends, there is certainly a law of variability which prevails among some species very much more than among others, and which I have sometimes compared to the swing of a pendulum. If we

could suppose our lives limited to one swing of a pendulum, and ourselves occupied in observing the motion of the pendulum, we might naturally come to the conclusion that the law which carried the pendulum in that direction would carry it throughout the remainder of the circle, through our not being acquainted with another fact, namely, that when it had reached its full swing it would stop its forward motion and return. We find that some species are variable exactly in the way Dr. Nicholson has shown, and these variations are in some instances so great and so considerable, that we might suppose they would be carried on to the formation of a new species. We might come to that conclusion, but then, on further examination, we find that there is a retrocession, a counteracting law,—something which prevents that law of variability from going beyond a certain limit ; as in the case (for instance) of pigeons and dogs, which, though they may be greatly varied in breed and kind, always remain pigeons or dogs. What Dr. Nicholson said about the *Lingula* recalled a circumstance to my mind. I was speaking to the captain of a Welsh slate-quarry about the underlying rocks, very low down in the Silurian measures, when he said, "These are what they call the *Lingula* rocks"; and he asked, "What is that word '*Lingula*'?" I gave him my explanation of what the *Lingula* was, when he replied, "These cannot then be *Lingula* rocks, because they are azoic." I mention this to show how such matters are caught up by intelligent men, where you would scarcely expect that they would enter so fully into such questions. The *Lingula*, then, is one of the most remarkable instances of an unchangeable organization in which the law of variability seems to have no place, because the immense period of time which must have elapsed between the deposition of those rocks in which the *Lingula* occurs, coupled with the fact of the *Lingula* being unchanged down to the present time, certainly seems to be extremely inconsistent with any notion of the evolution of species such as is required by the system of Mr. Darwin. I would further observe, in reference to "natural selection," that we really ought to be furnished with a definition of the exact meaning of the term, for when we ask those that uphold the doctrine what natural selection really is, we can get no answer. What is the power that is called natural selection? Some use the phrase as a sort of modification of divine power, just as we use the word "nature"; but that, I submit, is not a philosophical way of using language. If by natural selection is meant chance, no possible lapse of time would be sufficient for one species to evolve itself into another ; because chance operates as much in one direction as in another, and would never, by itself, evolve one species out of another. Natural selection is a power which I cannot at all conceive of, it seems to be continually watching the operations of chance, adopting those which are beneficial, and casting aside those which are injurious. This is the only explanation of it which I have met with ; and I say again that no possible lapse of time—not even an eternity—would suffice to change one species into another by natural selection, unless you bring some modification of the

Divine or Creative power, apart from mere variation or chance, to bear upon it.

Mr. E. CHARLESWORTH (a visitor).—The problem of evolution, which has now for some years occupied so prominent a place in the mind of the intellectual world, is unquestionably one of those which may be worked out with the greatest benefit to human knowledge. To deal satisfactorily with evolution, or Darwinism, or natural selection, one of the things desirable would be that we should have spread out before us all the types of organic life that have ever existed, or that now exist. This is what we unquestionably want in order to deal with the problem in a satisfactory manner; but we cannot get such a map—we cannot see all these forms spread out; and the question therefore which we have to consider is: can we, upon the imperfect data that we have, deal with the problem in such a way as to make it of any practical utility? I maintain that we can. What is theory? Is it not one of the grandest incentives to observation? When a theory like that of evolution is put before the intellectual world, it sets men observing and thinking, and calls forth a vast amount of brain-power. All this being wisely directed, unquestionably tends to build up a great storehouse of human knowledge, even though ultimately the theory in question may wholly and entirely come to grief. Let me give you one illustration of this. Nearly a thousand years ago there was discovered one of the most lovely and exquisite forms to be found in the animal kingdom, popularly known as the “paper nautilus”; it was found in vast quantities on the shores of the Mediterranean, and other parts of the world, and that nautilus, when associated with animal life, had in it a cuttlefish. You could take up the shell, turn it topsy-turvy, and out dropped a cuttlefish. Then distinguished philosophers told us that cuttlefish dropped out of the shell when it was turned up. It could not possibly have made the shell, for it was a universal law throughout all the science of malacology, that where you had a shell made by an animal, that animal must have a muscular or organic attachment to the shell. We know that that is so in the case of the oyster,—that when you open an oyster you have to cut through the muscle. Then they said the beautiful and exquisite shell of the nautilus never could have been made by that hideous animal the cuttlefish, it must have been made by some other animal. For nearly a thousand years distinguished natural philosophers wrangled, fought, and quarrelled over this great problem, as to whether a cuttlefish did or did not make the shell of the paper nautilus. Look what an elaborate mass of reasoning has been accumulated around that insignificant matter. But what was the result of all this fighting? Why, that hundreds and thousands of naturalists set to work to study the habits of the cuttlefish, and although they did not solve the problem until very recently, they were led to make hosts of other most interesting discoveries, which are of the greatest possible advantage to the human race. This is the way in which I look at this problem of evolution. All the world is thinking and talking of it, and the brain-

power thus called forth will have similar results some day or other. As to the question of fact with regard to evolution and Darwinism, I am truly in a fog; it is a question of high interest, but it is also one in reference to which the data are so imperfect, that it is extremely difficult to make up one's mind. Let me put one case. There is a shell we often see in London which is known as the almond whelk, it lives in vast numbers in our own seas: there is also another kind of whelk which is found in vast numbers on the rocks of our shores, and is called the dog whelk. Scientifically, one is known as the *Fusus antiquus*, and the other as *Purpura lapillus*; and if you take the whole range of the conchological world, you perhaps could not pick out two shell-fish which could be more readily distinguished from each other; a child could see the difference. Go back to geological times, and go to the ancient formation called the Suffolk crag. In the seas which deposited that, there lived these almond whelks and these dog whelks; but if you take 50,000 of the fossil specimens, I would defy any one to separate them into their respective species; they merge the one into the other by the most minute gradations. "There," an evolutionist will tell you, "is a most magnificent instance of the way in which two types of form have diverged so widely that you cannot bring them together now, although in old times they did trench one upon the other, and were in fact one." Now, to take a fact on the other side, look at the Ammonites. The seas of the ancient world swarmed with countless millions of cuttlefish which had shells united to them organically; these fish were not like the cuttlefish of the paper nautilus, but were united to their shells by a muscular attachment. These Ammonites form one of the great wonders of palæontology, for they existed in countless myriads, not merely as individuals, but as different genera and species, all over the world. All over the world the life of these Ammonites ceased at the same time. I thank Dr. Nicholson for his most interesting paper, and as a visitor I would request him, in his reply, to say how the extinction of these extraordinary shell-fish would apply in reference to the doctrine of evolution. If evolution was going on there, what was evolved out of them, and where shall we find any trace of the species to which these extinguished species gave rise?

Rev. J. SINCLAIR.—If I rightly understand the views of Dr. Nicholson, I think they give a scientific basis for the definition of the word species,—that species would include every possible variation within a specific limit.

Dr. NICHOLSON.—With regard to the observations of Mr. Henslow, I would simply say, that I believe we have just grounds for thinking that we can know the first appearance of certain species. It is quite true that if you take every individual instance—if you take each separate fossil—and ask me as a palæontologist, "Are you quite certain that this made its first appearance where you first found it?" I should be bound to reply, "No: nobody can be certain"; but when you take a whole series, we must know the first appearance of a great many forms. Obviously, migration will not account

for many of the facts, although I hold migration myself, and always have done so. Take the Ammonites : we find them for the first time in the carboniferous beds ; if I am told, " That is not their first appearance : it is a case of migration from some other area, as the Devonian " ; or, " They occur in the Silurian beds of New Zealand," it is open to me to say that *that* is not their first appearance either, and that they have migrated from somewhere else. But it comes to an absolute certainty that, in the aggregate, we must know the first appearance of a great many forms, although we cannot make a positive assertion as to individual cases. As to the existence of pre-Laurentian rocks, that is a matter of opinion ; such may have existed, but opinion is not yet definitely settled as to the existence of life, even in the Laurentian deposits ; and as it is quite possible, and indeed probable, that these were all formed out of igneous rocks, we have no right to found any argument on the supposed existence of fossiliferous rocks prior to the Laurentian ; there may have been such rocks, but we know nothing of them. As to the variation of the lower and higher types of life, I should be quite inclined to agree with Mr. Henslow, that there is a great difference, and I think it quite probable that in very many cases the variation is a quick one, and is effected *per saltum* : we know this is sometimes the case among living animals,—Japanned peacocks, for instance, have been produced by a sport.—This is more likely to occur in the case of the higher, than in the case of the lower animals. With regard to the extinction of Ammonites, that is a rather unfortunate instance to take, because there is such an enormous break in all parts of the world between the highest Cretaceous rocks and the lowest Tertiary rocks, that we do not know what became of those Cephalopods, nor of any Tetrabranchiates except the *Nautili*. It is almost certain that we shall find rocks, somewhere, intermediate in age between the lower Tertiaries and the upper Cretaceous, and there we may find Ammonites ; but this is at present conjectural. Finally, with regard to the question as to the origin of species, I had hoped that I had distinctly expressed my opinion that evolution does occur, and that evolution is an operating cause in the modification and production of species. The remark that variation is bounded by definite limits is, all the same, quite true, though you admit evolution. When I say that variation is not indefinite, I am quite prepared to believe that the horse and the donkey have proceeded from a common ancestor, but that does not bind me to suppose that they have descended from an oyster (laughter). Variation must stop somewhere (cheers).

The meeting was then adjourned.

NOTE.

PRINCIPAL DAWSON, F.R.S., in his 1874 Annual Address, as President of the Natural History Society of Montreal, made some remarks, the insertion of which may not be deemed out of place at the close of this discussion. After alluding to the earlier elevation of that coast, he continued :—“ We know that the eastern coast of America has in modern

times been gradually subsiding. Further, the remarkable submarine forests in the Bay of Fundy show that within a time not sufficient to produce the decay of pine-wood, this depression has taken place to the extent of at least 40 feet, and probably to 60 feet or more. We have thus direct geological evidence of a former higher condition of the land, which may, when at its maximum, have greatly exceeded that above indicated, since we cannot trace the submarine forests as far below the sea-level as they actually extend. The effect of such an elevation of the land would be not only a general shallowing of the water in the Bay of Fundy and the Acadian Bay, and an elevation of its temperature both by this and by the greater amount of neighbouring land, but, as Professor Verrill well states, it would also raise the banks off the Nova Scotia coast, and extending south from Newfoundland, so as to throw the Arctic current further from the shore and warm the water along the coasts of Nova Scotia and Northern New England. In these circumstances the marine animals of Southern New England might readily extend themselves all around the coasts of Nova Scotia and Cape Breton, and occupy the Acadian Bay. This modern subsidence of the land would produce a relapse toward the glacial age, the Arctic currents would be allowed to cleave more closely to the coast, and the inhabitants of the Acadian Bay would gradually become isolated, while the northern animals of Labrador would work their way southward. Various modern indications point to the same conclusions. Verrill has described little colonies of southern species still surviving on the coast of Maine. There are also dead shells of these species in mud-banks, in places where they are now extinct. He also states that the remains in shell-heaps left by the Indians indicate that even within the period of their occupancy some of these species existed in places where they are not now found. Willis has catalogued some of these species from the deep bays and inlets on the Atlantic coast of Nova Scotia, and has shown that some of them still exist on the Sable Island banks. Whiteaves finds in the Bradelle and Orphan bank littoral species remote from the present shores, and indicating a time when these banks were islands, which have been submerged by subsidence, aided, no doubt, by the action of the waves. It would thus appear that the colonization of the Acadian Bay with southern forms belongs to the modern period, but that it has already passed its culmination, and the recent subsidence of the coast has, no doubt, limited the range of these animals, and is probably still favouring the gradual inroads of the Arctic fauna from the north, which, should this subsidence go on, will creep slowly back to reoccupy the ground which it once held in the post-pliocene time.

“Such peculiarities of distribution serve to show the effects of even comparatively small changes of level upon climate and upon the distribution of life, and to confirm the same lesson of caution in our interpretation of local diversities of fossils, which geologists have been lately learning from the distribution of cold and warm currents in the Atlantic. Another lesson which they teach is the wonderful fixity of species. Continents rise and sink, climates change, islands are devoured by the sea or restored again from its depths; marine animals are locally exterminated and are enabled in the course of long ages to regain their lost abodes; yet they remain ever the same, and even in their varietal forms perfectly resemble those remote ancestors which are separated from them by a vast lapse of ages and by many physical revolutions. This truth, which I have already deduced from the post-pliocene fauna of the St. Lawrence Valley, is equally taught by the mollusks of the Acadian Bay, and by their Arctic relatives returning after long absence to claim their old homes.”

ORDINARY MEETING, JANUARY 4TH, 1875.

THE REV. ROBINSON THORNTON, D.D., VICE-PRESIDENT,
IN THE CHAIR.

The minutes of the last meeting were read, and the following Elections were announced :—

MEMBERS :—

H. Veasey, Esq., M.R.C.S. (Life), Apsley Guise, Woburn.

Rev. R. W. Corbet, M.A., Stoke Rectory, Market Drayton.

Also, the presentation of the following Works to the library :—

“Transactions of the Royal Society.” Part 156. *From the Society.*

“A New Mode of Signalling on Railways,” by Sir D.

Salomons, Bart.

From the Author.

“The Montreal Daily Witness.” 1 vol.

From Professor Campbell.

The HONORARY SECRETARY stated, that after the letter issued by the Council at the beginning of last December, he need scarcely remind those present that this was a Special General Meeting of the Members of the Institute, convened for the purpose of considering two recommendations of the Council : the first being :—

“That the Trustees are empowered to invest the Endowment Fund in other Securities than 3 per Cent. Annuities, such other Securities being, the Bonds of the Corporation of London, or, Guaranteed Indian Railway Debentures, or Debenture Stocks.”

He would add that these were the only stocks which both the trustees had, after consideration, recommended to the Council.

After some discussion in regard to increasing the number of the securities in which the trustees might invest, the Chairman pointed out that at the moment the trustees were averse to other trusts being named, and that it would not be well to force upon them powers which they did not desire.

The motion was then unanimously agreed to.

The HON. SECRETARY then read the second recommendation, which, after some discussion, passed in the following form :—

“That, at the First Ordinary Meeting in each month, Members having notices of motion on matters of detail relating to the affairs of the Institute, shall give such notices in writing, after the Minutes have been read and confirmed, and any announcements in regard to elections have been made, and at no other time. Each notice shall be signed by its mover and seconder. Such notices to be fixed up in the reading-room, and considered at the following Ordinary Meeting, provided the mover be then present to explain

his views, the discussion of the same to terminate not later than half-past 8 o'clock. For these purposes all Ordinary Meetings shall be considered Special."

During the discussion alluded to, Dr. Haughton expressed an opinion that, if passed, the resolution would afford all members increased opportunities for considering the Institute's work, and so might tend to promote still greater interest in it. Several others having spoken, the honorary secretary, in reply to a question, stated that the resolution could in no way open a door to any alteration in the constitution of the Institute, for the rules effectually prevented that.

The following paper was then read by the Author :—

THE EARLY DAWN OF CIVILIZATION, CONSIDERED IN THE LIGHT OF SCRIPTURE.
By JOHN ELIOT HOWARD, F.R.S.

a. Civilization of Eden, Moral and Intellectual, more than Material.

THE origin and the early history of mankind have recently been discussed without any reference to the history of the human race embodied in the scriptures of the Old and New Testament. It is the ambition of many "thinkers" to start anew with unfettered and unimpeded course on the quest of information, ignoring entirely the claims presented in the Bible to afford historical information on these subjects. In so doing, our philosophers find themselves returning to the speculations of ages past, and discover that every possible phase of thought has been exhaustively pursued to its legitimate results by those who certainly were not their inferiors in mental power—the philosophers of Greece and Rome, and before these the sages of the East. Such a course does not indicate progress, but a real retrocession to the interminable metaphysical disquisitions of the past. It is not a little interesting to see that the newest and most remarkable reveries of scientific imagination return to the conceptions of the sophists of India. Even the notion that "the living body of a man is not a continuous whole," but "made up of a multitude of parts," has its counterpart in the teaching of Gotama Budha.* The President of the British Association (1874) is compelled to exhort that learned body to abandon the idea of a Creator and of creative force, and to change the Darwinian notion of a quasi-divine force of "natural selection" for a system of atheism more logically based, in accordance with the doctrines of Epicurus, who also derived his inspiration from the East.

* See Appendix (A).

“We need *clearness* and *thoroughness* here,” he exclaims. “Two courses, and two only, are possible. Either *let us open our doors freely to the conception of creative acts*, or, abandoning them, *let us radically change our notions of matter.*”

2. For myself, whilst entertaining the greatest admiration for, and full belief in, the atomic theory of modern chemistry, I am not at all disposed to adopt the second alternative, and to “change our notions of matter” to those advocated by Lucretius. I have already shown, to the best of my ability, the stable foundations on which the atomic theory rests; and also the entirely imaginary and unsound theories to which Professor Tyndall would lead us if we follow him in this portentous change, involving all our views of what is divine as well as of what is human and material.

3. I will therefore invite the learned Professor to decide upon his first alternative. There can be nothing unworthy of a philosopher in “opening our doors freely to the conception of creative acts.” On the contrary, every prejudice that would keep the door closed against the examination of such a conception must be regarded as unworthy of the impartiality of a philosophic mind.

4. We find in ourselves a power altogether superior to the things on which our meditation is fixed, and of an entirely different character to the clod on which we tread. And yet we have no ready-formed answer to the inquiry, What is the mysterious *ego*, the all-controlling essence, which in us thinks and wills and reasons? So, in the very first verse of Scripture, the existence of “the Elohim” is assumed as a proposition already conceded; and the action is asserted of a power originating and dominating over all that meets the observation of our senses. As ourselves possessors of a spiritual nature, we are informed that there is a spiritual Being above us. Not having the competence to sound the depths of our own being, neither can we know the One of whom the Bible speaks unless He reveal Himself to us.

5. There can be nothing unphilosophical in such a disquisition. The only question is, whether the proposition be true or not. If admitted, then must the power of the Almighty Being to work miracles or to perform acts of special creation also be allowed, as even flowing necessarily from the analogy to our own nature. What is there (unless it be himself) that man cannot absolutely rule and dominate by virtue of the energy that dwells within him; and this must be conceded, *à fortiori*, of an Almighty Being.

6. The formation of man is ascribed in Scripture to a work of *special* creation, the result of *special* consultation.* Certainly all must admit that man, in his destinies, as head of creation, should

* “And God said, Let us make man in our image,” &c.—Gen. i. 26.

have called for such special thought, if we may so express the formation of the purposes of the Divine mind.

7. We are told that the Elohim made man in *his own image*. Surely the Professor, whose views have so much affected society, must cherish some similar view of the nobility of the nature inherited by man when he asserts that* “the bribe of eternity itself, were it possible to offer it, could not prevent the human mind from closing with the truth.” What is more godlike than the love of truth? But the resemblance does not stop here, for man is, by his very being and nature, a *king*, delighting in dominion; a *poet* (ποιητής), finding a joy in the creations of his own mind; a *husbandman*, sharing with his Creator in the satisfaction of making the earth yield her increase under the control of his wisdom; being permitted also in a vast variety of cases the satisfaction of improving for his own benefit the bounteous gifts of God.

8. All this, and much more, he was originally by *creation*, and not by *evolution*, if we are to receive the testimony of Scripture. He is consequently to be looked upon as a civilized man from the outset. He is even a naturalist, having the task assigned to him by his Almighty Creator of naming, and that, according to their essential qualities, every beast of the field and every fowl of the air. It must also be understood, by the account in Genesis, that the Creator was pleased with this exercise of the powers which He had bestowed upon His creature.

9. According to this conception of the original constitution of man, there can be nothing in science—that is, in *knowledge*—unfriendly to *religion*, or, in other words, to his relations with that Being who gave him power to acquire this knowledge. All his acquaintance with the universe would tend to make him increasingly admire and adore the Originator of such marvels. He is a religious being. Adam, the noble, the unfallen, the head of creation, without whom all would seem to have been made and ordered without any logical connection or result, is the one who is specially appointed to hold communion with his Father in heaven. He is the high-priest of the world, and the friend of its Almighty Architect.

10. He is in the purpose of God to be the head of a race to whom redemption in the second Adam is about to be promised. But how shall this be effected? He is alone, and no heart beats responsive to the emotions which oppress his full soul. Evolution can do nothing for his help; but God still cares for him, and his Almighty Friend provides an help-meet for him, and this not in a second-rate and copied creature, an Adam of inferior structure,—

* *Crystalline and Molecular Forces*, by Prof. Tyndall, p. 13.

as Plato and our modern theorists take woman to be ; but in a perfect model of beauty and of grace, in everything contrasted, and in every respect the fulness of that which was not found in himself. We will not say the complement of what was found lacking in Adam, for the creative mind delights in variety, albeit this variety is blended into delightful harmony. So we see, in the well-arranged Kosmos around us, the robust oak and the fruitful vine having each their own proper place in creation, and we know that the vine would be in no wise benefitted by a self-supporting stem, nor would the oak be graced by bearing aloft on its branches the clusters of the vine. Thus we hold that the mind of the woman is equally perfect with the mind of the man, but perfectly different. No amount of education will obliterate this essential difference ; and no theories of our modern scientists to the contrary will do other than introduce mischief into the hive of the commonwealth. When we read the noble poem of the German Schiller on the praises of woman, we see that we are not alone in believing that woman is the great civilizer. Woman's love of what is decorous and beautiful supplements well man's love of truth, and his admiration of practical wisdom. Yes, woman in her right place is the great civilizing power ; but alas for civilization if she should adopt the theories objected to.

11. The conception that we are taught to entertain as to the genesis of man brings before us at once the nobility of his original and his association with all that is lowly in creation. The Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul. "The Adam" * is elaborated "dust of the [ādamah] ground," † but after the breath of lives ‡ [natural and spiritual ?] has been breathed into his nostrils, this clod of the valley becomes a *living soul*. This is the contrast, and in our opinion a satisfactory contrast, to the opposing doctrine summed up in one line by Lucretius :—

Nullam rem ex nihilo gigni divinitus unquam, §

which denies alike creation and evolution. It is also the declaration of his being a *person*, and not a mere congeries of architectural and sentient atoms.

12. It seems inevitable that I should here take up briefly the discussion of the conception of the existence of a *pre-Adamite race*, and the relation of Genesis to modern theories of the duration of the period of man's existence on the earth.

13. In the first place, then, I object to the notion of a pre-

* אֲדָמָה

† מִן־הָאֲדָמָה

‡ חַיִּים

§ *De Rerum Naturā*, lib. i. 151.

Adamite race, since Adam is the *Biblical* name for *mankind*; and though it is quite possible that the first two chapters of Genesis may embody different accounts (since in the first Elohim is the name of the Almighty agent, and in the second Jehovah Elohim), yet they are obviously accounts of the same creation. If doubt could exist,—as it does exist,—on this point, it would seem to us to be quite set aside by the very name assigned in the first chapter to the ancestors of the human race, as well as by consideration of the nature of the being thus created. It is *emphatically* “*the Adam*” * that is made by Elohim in the course of the sixth day or period, and apparently towards the close of it. His being ushered into the scene prepared for him (or rather “*them*,” v. 28), is the completion of the work which God pronounced very good. God called their name Adam in the day they were created. There is no time after this for the creation of another Adam, and the possibility of any previous formation of such a being is set aside by the very tenour of the document itself.

The identity of the creation of man in Genesis, chap. ii., with that in chap. i. is irrefragably proved by our Lord’s quoting the two together verbatim (see LXX.) in Matt. xix. 4 (Gen. i. 27) and 5 (Gen. ii. 24).

14. On the fifth day the waters were commanded to bring forth abundantly shoals of living creatures and fowls at the same time to fly in the open firmament of heaven; but coincidentally with these huge Saurian monsters (the whole race of Tanninim†), so called from the *length* to which their dragon forms were extended.‡ With these filling earth, air, and waters, the globe was obviously unfitted for the abode of man.

15. It is not till the sixth day that the congeners of man are introduced,—beasts of the field and wild beasts, water-oxen (the whole race of *Behemah*) and creeping things of the earth:§ serpentine some of them, but those formidable dragons are seen no longer. On the evening of this sixth day the Adam was formed; and then came the Sabbath, and creation work ceased.||

* אָדָם Gen. i. 26.—(See Appendix B.)

† “It seems to apply to some large amphibious animal, serpent, or lizard.”—De Sola, *in loco*. אַתְּתֵינָם

‡ See Ges. Lex. *sub voce* תַּנִּינִים Comp. Isaiah xli. 9, Ez. xxix. 3, “The great dragon that lieth in the midst of his rivers,” &c. § רִמָּשׁ

|| “God blessed the seventh day and sanctified it, because thereon he rested from all his work which God had created, *thenceforth to act*.”—(De Sola, Genesis.) “The older commentators, the Talmud, Aben Ezra, &c., properly render לעשות to continue acting.” We find, in accordance with this view, the course of nature acting from that time to this, but *nothing new added* to the course of nature. It is overwhelming to think how much

16. I conclude this part of my subject with the forcible expressions of Carlyle:—"But this I do say, and would wish all men to know and lay to heart, that he who discerns nothing but mechanism in the universe has in the fatallest way missed the secret of the universe altogether. That all Godhood should vanish out of men's conception of the universe seems to me precisely the most brutal error. I will not disparage heathenism by calling it a heathen error that men could fall into. It is not true; it is false at the very heart of it. A man who thinks so will think *wrong* about all things in the world; this original sin will vitiate all other conclusions he can form."*

b. The Loss of such Civilization through the Fall. Early Degradation of Mankind.

17. I accept the declaration in Genesis that man was made in the image and after the likeness of Elohim, and this in connection with having dominion. I shall not, therefore, err (as I trust) in regarding the power and wisdom of the Infinite $\Delta\acute{o}\gamma\omicron\varsigma$ as "shadowed † forth" in the masculine mind, and the grace and sense of harmony so manifest in nature, as reflected ‡ in the feminine understanding. Perhaps it ought scarcely to be taken for granted in this argument that beauty and harmony are inwrought everywhere in nature for their own sakes; but some other occasion may be given for showing why the utilitarian theory of the world's constitution, in denying this proposition, does not appear to be other than "false at the very heart of it."

18. No utilitarian reason can be assigned for the fatal gift of beauty bestowed on the daughters of Eve. The able author of the Victoria Institute paper "On the Principles of Modern Pantheistic and Atheistic Philosophy" has very well (though incidentally) shown that the world would have gone on quite as well in the above sense without this endowment; and we directly trace the connection of,—I will not say the fall of our first parents, but *the depravation* of their descendants to this proximate cause; for "it came to pass when men began to multiply on the face of the earth, and daughters were born unto them, that the sons of God saw the daughters of men, *that they were fair*, § and they took them wives of all that they chose."

of the creation coeval with man has already perished, and how rapidly he is exterminating what remains of his "poor earth-born companions"; excepting those that minister to his desires.—(See Appendix C.)

* *Sartor Rosarius*, p. 160.

† רמות

‡ v. עַלֵם in Ges. Lex.

§ טבת

19. It has ever been found that the "corruption of the best things yields the most evil" results; so we find that Eve, the fruitful mother of all living, the one in whose perfect frame life was, as it were, embodied, becomes the channel through which death enters into the world, and all our woe; and through some strange and ill-understood series of events, which has its counterpart (be it remembered) in all the stories of the early world in heathen lore, the earth became *utterly corrupt* and *filled with violence*.

20. Such is the narrative of Scripture; and if we are to attach any credence to the examination of kitchen middens* in Denmark, or to the inferences derived from relics of poor humanity inhabiting caves in our islands, when these were overspread by herds of the Irish elk or of the reindeer, and when the death-dealing blows of the savage human being came in aid of the wolf or the cave-bear, to exterminate the mammoth, the woolly rhinoceros, and all the monster progeny of earth; we have ever the same unpleasant conviction of the then state of the human race forced upon our minds. Partially, if not universally, *cannibals*,† delighting in nothing so much as in cracking the bones and feasting on the marrow of his fellows, men or women were of such an order that we are compelled to admit the justice of the sentence, which led to their being all swept away by the waters of the Deluge.

21. As illustrative of the probable state of civilization of the then age of stone, I present here a transcript of a drawing originally published by M. de Baye, of a flint arrow,‡ deeply imbedded in and still adhering to a human vertebra. This was found in the caverns of La Marne, together with some 500 more of the formidable weapons in the use of which these savages delighted. One of these flint arrows was discovered in the Grotto of Éyzies (Périgord), lodged in a vertebra of a reindeer, which it had pierced through from one side to the other, after having traversed all the body of the animal § Professor Nilson has found one imbedded in the skeleton of an aurochs, and others in the skulls of stags. This savant has described a human skull, found in an ancient place of sepulture at Tygelsjö, which had been transpierced with a dart made of the antler of a stag.

22. No doubt the rude life of the sportsmen of that day was not without its charms, and amongst these might be accounted the

* I think the reader will prefer this word to the Danish *Kjækken-mæddingen*.

† *Bull. de l'Ac. Roy. des Sciences de Belgique*, t. xx. p. 427, *exceptionally* in France, Lenormant, p. 32; *Cave-hunting*, by W. Boyd Dawkins, F.R.S., pp. 215, 253, 259, 260, 147, &c.; and see the Plate of the scraped human thigh-bone, p. 260.

‡ *Études sur l'Antiquité historique*, p. 385. Chabas. § *Ibid.*, p. 384.

sense of personal danger; since, with all the resources of intellect on the side of man in this war with the brute creation, the advantage must sometimes have preponderated in favour of the huge beasts whom he daringly encountered.*

“Some doubtless oft the prowling monsters gaunt,
Grasped in their jaws abrupt—whence through the groves,
The woods, the mountains, they vociferous groaned,
Destined, thus living, to a living tomb.”

I have been studying the well-executed drawings of the bones of the *Felis spelæa* by Bassin, † which this artist has presented side by side with those of the modern lion, dwarfing our present king of beasts into comparative insignificance. Yet this was possibly not the worst enemy they had to encounter. ‡ In other respects, the life of these antediluvian men must have remarkably resembled those of the Esquimaux; a life full of animal enjoyment, the praise of which we have heard from one of our leading philosophers at a meeting of the British Association at Exeter.

23. The following is a list of the great mammals against whom man would have to contend in this Palæolithic age: §—

The great cavern Bear (*Ursus spelæus*).

The cave Hyæna (*Hyæna spelæa*).

The great Cat of the caverns (*Felis spelæa*).

The Elephant or Mammoth (*Elephas primigenius*).

The Rhinoceros with divided nostrils (*Rhinoceros tichorinus*).

The gigantic Stag, or Irish Elk (*Megaceros hibernicus*).

The Reindeer (*Cervus tarandus*).

The Bison (*Bison europæus*).

The Urus (*Bos primigenius*).

24. M. Lenormant remarks that “nothing is more instructive to the Christian who regards things in the light of the sacred tradition, than the spectacle furnished by the discoveries of geology and of palæontology in the Tertiary and Quaternary deposits. The condemnation pronounced by Divine anger is manifested in a striking manner in the life so hard and difficult which the first tribes of humanity then led; scattered as they were over the surface of the globe in the midst of the last convulsions of nature, and by the side of the formidable animals against which it was needful for them to defend themselves continually. It seems that the weight of this condemnation weighed more heavily on them than it has done since. And when science shows us, soon after the arrival of the

* See Appendix (D). † See *Sciences Nat. Zool.*, vol. xiv. 1870.

‡ Compare the sabre-toothed feline, the *Machairodus latidens*, found in Kent's Hole, &c. See W. B. Dawkins' *Cave-hunting*, p. 331.

§ Lartet, *Sur la Coexistence de l'Homme et des grands Mammifères fossiles*, *Sc. Nat. Zool.*, t. xv. p. 217. 1861.

first men in our regions, phenomena without example since, such as those of the first glacial period, we are naturally led to remember that the old tradition of Persia, perfectly conformable to the Biblical account of the fall of humanity through the sin of its first ancestor, ranges in the first rank amongst the chastisements which followed this fault, at the same time with death and sickness, the appearance of an intense and permanent cold, which man could hardly sustain, and which rendered a great portion of the world uninhabitable. A similar tradition existed also in the songs of the Edda,—the Voluspa.”

25. I extract the following passages from the first Fargan of the Vendidad: *—

As the first and best of regions and countries, I, who am Ahura-Masda, created Airyana-vaëjâ of the good creation; then Aura-mainyus, who is full of death, created an opposition to the same,—a great serpent, and winter which the daevas have created; ten winter months are there, two summer months. . . .

This is about the present climate of Novaia Zemlia.

* * * * * *

Upon the corporeal world will the evil of winter come,
Wherefore a vehement destroying frost will arise,
Where snow will fall in great abundance
On the summits of the mountains, on the breadth of the heights:
From these places, O Yima, let the cattle depart. &c. &c.

26. It has been too little noticed that Scripture evidently indicates a *mitigation* of the curse on the earth after the Deluge.† The curse upon the ground in connection with the sin of Adam, the irreverent transgressor, opens the sad history of the cursed antediluvian world; but the accepted sacrifice of the “reverent worshipper‡” looks forward to a renewed world over which the bow of promise displays, in the varied and yet united beauty of its glorious hues, the token of the renewed blessings fresh from the hand of a now reconciled and pardoning God. The very words used in the Septuagint, in reference to the acceptance of Noah’s sacrifice, are again used in the New Testament in reference to the acceptable sacrifice of Christ (Eph. v. 2).

27. In order to present clearly before the mind the claim for the relative antiquity of the human race founded on recent researches, I take a table§ of sedimentary and fossiliferous strata, and divide it roughly into periods, which may be admitted, for argument’s

* *Avesta*, the religious books of the Parsees. Spiegel’s Trans., Hertford, U.S., 1864, p. 3. † See Gen. viii. 21.

‡ See the old Chaldean name of Noah.

§ By H. W. Bristow, F.R.S., F.G.S., Director of Geol. Survey Eng and Wales; *Life Groups and Distribution*, by R. Etheridge, F.R.S.

sake, to correspond with those of the days of creation. It will be seen that it is only amidst the creatures of the sixth period, and rather towards the end of this era, that any remains attributable to man are to be found. I do not rest at all on the correspondence of the divisions, or their *possible* analogy to the days of the week of creation in Genesis; but we see that, whether in the light of Scripture or of science, man is *comparatively* a very late creation.

28. It is well* remarked by M. Hamy that the proofs of the co-existence of man and of any animal at a special epoch are of three orders:—(1) Man may have left some object of his industry in the ground, which contains the bones of the animal; or (2) he may have marked on these the traces of his work; or (3) he may have left his own remains in the same deposit of earth.

29. It seems to me that the character of proof in the second of these three cases is by much the strongest, as most free from disturbing causes of error, especially when this his work is found connected with the attempt to represent co-existent forms of animal life. I shall therefore present to the eye of the reader a copy of some objects found in the cavern of Savigné, near Civray,† department of Vienne (figs. 1, 2).

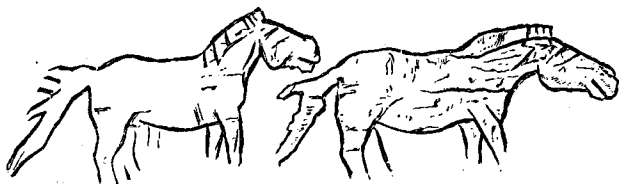


Fig. 1.

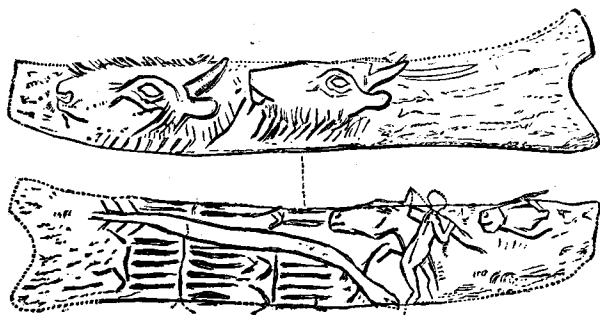


Fig. 2.

* Lenormant, *L'Homme fossile*, p. 11.

† Ed. Lartet, *Sciences Nat. Zool.*, vol. xv. 1861.

30. In the same cave were found the barbed head of an arrow made of stag's horn ; another neatly-made arrow-head of stag's horn also, and provided with deep channels on the barbs, destined apparently for the reception of poison ; a large sewing-needle formed of the bone of a bird ; a small harpoon, which might have belonged to an Esquimaux, together with the following, amid other objects :—

(1) A part of the posterior canon of a stag, on which have been engraved two figures of animals, probably, to judge by the ungainly head, of the elk species : * remains of the reindeer were found in the same grotto. (2) The extremity of a stag's antler broken at the hole by which it was suspended. The head of the animal (No. 2) is probably intended for the bear, which at present inhabits the Pyrenees.

The primitive race of people who executed these drawings are thought by M. Lartet to have resembled the Laplanders, and to have been people of small stature. It does not follow from this that their arms might not be very effective. (See Gibbon's account of the invasion of the Huns.)

31. Another very remarkable instance of the same early taste for drawing, and which seemed the most worthy of examination of all that were shown at the Paris Exhibition in 1867, is described by M. Lartet, the discoverer of this relic. He arrived soon after the workmen employed in excavation at La Madeleine, in Dordogne, had brought to light, but, in so doing, had broken the elephant's tusk, on which a primitive artist has drawn with much life-like fidelity the figure of a mammoth, differing by its long hairy mane, and in other ways, from any kindred animal now existing. The drawing (fig. 3) is on the same scale as the original traced on the ivory. †

32. Such facts, when well attested, carry conviction to the mind, and induce the conclusion that all the great contemporaries of Adam have gradually disappeared from the face of the earth ; his powerful intellect having proved more than a match for their powerful teeth and claws. But we are not furnished with conclusive evidence as to the length of time which it has required to effect this result.

33. To take the case of the Mammoth ‡ thus proven to have been

* Compare the striking resemblance to the Elk in Cuvier's *Animal Kingdom*.

† Other drawings, specially a group of reindeer from Dordogne, may be seen in *Cave-hunting*, by W. Boyd Dawkins, F.R.S., p. 345.

‡ Schoumachoff, a Tungoose chief, about the end of August, 1790, when the fishing in the river Lena was over, repaired, according to annual custom, to the seaside. Leaving his family in their huts, he coasted along the shore in quest of mammoths' tusks, and, one day perceived, in the midst of a rock of ice, a large shapeless block, not at all resembling the logs of drift-wood commonly found there. The next year, visiting the

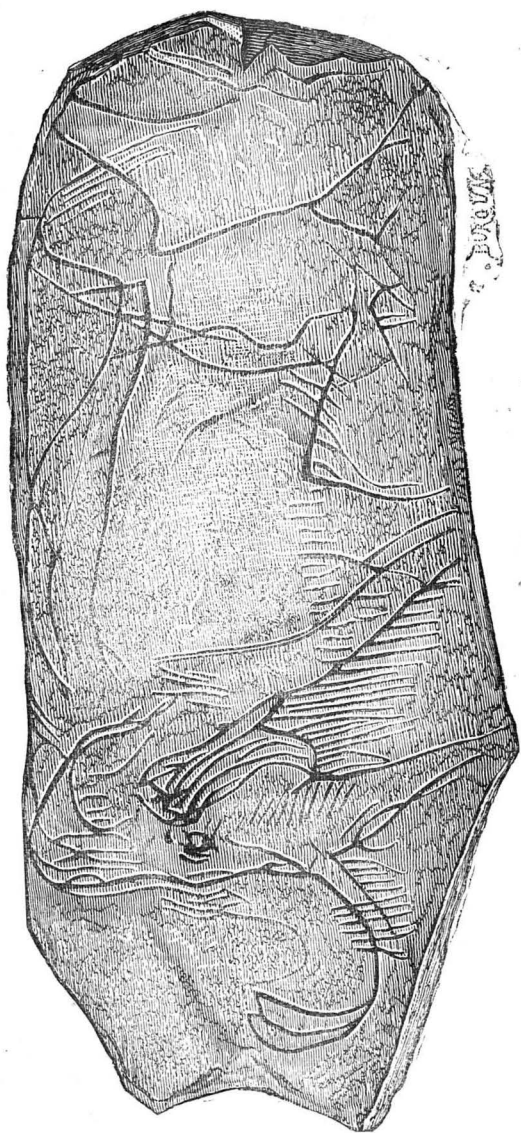


Fig. 3.

one of the giant beasts on which man gazed at some period with admiration ; we may possibly find that the era of his disappearance was, after all, not so very remote. An Egyptian text has recently been found* showing very clearly (having even the *figure* of an elephant to attest the reading) that Thothmes III., who must have reigned about 1700 B.C., killed in hunting 120 elephants for the sake of their tusks in the regions of Assyria. In the second century before our era, and probably long before, the Elephant had withdrawn to India, since Seleucus Nicanor then yielded certain provinces bordering on India to King Sandracottus in exchange for 500 elephants.

34. Now history is just as silent about elephants being found on the banks of the Euphrates as of mammoths on the banks of the Yenisei, at the same period. The former statement seems more difficult of credence than would be the latter. Chemical considerations render it very difficult to credit the continuous preservation of *decomposing* animal remains not even always imbedded in ice, for such a period as is supposed.†

35. It is said of an animal described in the Book of Job,‡

same spot, he observed that the mass was freer from ice ; but it was not till the fifth year that the ice had melted sufficiently to disengage the mammoth, when it fell over on its side upon a bank of sand. He then cut off the tusks, which he bartered for goods to the value of 50 roubles (£11. 5s.), with a Russian merchant. Being satisfied with this, the carcass was left to be devoured by the bears, wolves, and foxes, except what the Yakouts in the neighbourhood cut off to feed their dogs. Previous to this, indeed, he had a rude drawing made of it, which represents it with pointed ears, very small eyes, horse's hoofs, and a bristly mane extending along the whole of its back. In this it has the appearance of something between a pig and an elephant. In 1806 Mr. Adams, of Petersburg, fortunately heard of the circumstance, and repaired to the spot, and removed the least damaged parts to the museum at St. Petersburg. What remained of the skin was so heavy that ten persons had great difficulty in carrying it to the seaside, in order to stretch it on logs of wood. The tusks, each of which was $1\frac{1}{2}$ toise ($9\frac{1}{2}$ feet long), weighed 10 pounds (400 lb.), and the entire animal measured $4\frac{1}{2}$ archines ($10\frac{1}{2}$ feet), by 7 ($16\frac{1}{2}$ feet), long. A most remarkable thing is that it appears to have been *devoid of a trunk*.—From Pantologia, 1819, *sub voc.* Megatherium.

* Chabas, *Etudes*, &c., p. 574.

† “ En 1804 on en trouva un sur les bords de la Néva, si bien conservé qu'on peut encore en faire manger les chairs. Aussi frappé de cette conservation, le savant naturaliste d'Orbigny a été porté à revoquer en doute l'ancienneté du mammoth ; il ne pense pas qu'il puisse dater de cinq ou six mille ans, et croit même qu'il vit encore dans quelque localité ignorée.” —Chabas, *Stat. préhist.*, p. 571.

‡ Job xl. 15. In Dr. Latham's Dictionary of the English Language I find *mammoth* derived from the Arabic *behemoth*. This “the editor suggests from the fact of Arabic intercourse with the natives of the northern parts of Siberia ; being a fact of which there is evidence in the history of commerce, and in the discovery of Cufic coins on the Obi ; whilst, philo-

“Behold now Behemoth, whom I made with thee”—(part of the sixth day’s creation)—“he eateth grass like the ox . . . he moveth his tail like a cedar.”

36. An elephant, some say, is meant to be described here; which neither moveth its tail like a cedar, nor (as we think) eateth grass like the ox. Does it not seem more probable that one of the now extinct mammalia was extant at the era of the writing of this book? The mammoth delineated above had apparently a tail to which the above description might apply. The Hippopotamus, though once abundant in Egypt, and victor of its first king, had no doubt, at the period above referred to, become scarce if not extinct, having been *easily subdued by the natives*.*

37. I have shown that there is no contradiction between science and Scripture as to the fact of the coexistence of man and of the now extinct quadrupeds; that they are, in fact, distinctly asserted in Genesis to have been created at the same time.

38. I cannot say so much as to the imagined length of geological eras, and the period deduced from a reasonable view of the Bible, as to the duration of man’s existence upon earth. When we enter on an examination of this apparent discrepancy, we cannot but feel that data do not at present exist from which to compute these lapsed ages with any accuracy. I have elsewhere touched upon this subject, and on the facile faith with which evidence tending in a certain direction is received by our scientific writers. To some of these it would be a mark of scientific heresy to doubt the universal prevalence of a stone, a bronze, and an iron age; but we find in a quite recent work of one of our best Egyptologists and archæologists the following startling announcement, which it may be best to give in the author’s own words:—“L’âge de la pierre, qu’on suppose avoir existé partout avant la connaissance des métaux n’a laissé aucune trace dans l’histoire, chez aucun des peuples du monde.”†

39. How, then, shall we learn anything about the length of duration of so mythical an era? M. Chabas again says (p. 552):—“L’âge de la période paléolithique, tel qu’il se présente à nous par son outillage, est fort loin de réclamer pour son développement, une espace supérieure aux quarante siècles historiques que nous avons reconnus antérieurement à cette date.”‡

logically, there is like evidence of confusion between B and M in the case of southern words introduced into the native languages of the same districts” In respect to its *immediate* origin, it seems to have reached us through the Russian from the Samoeid.

* See Chabas, *Études*, p. 402. † Chabas, *Stations préhist.*, p. 471.

‡ That is to say, “before our era.”

40. The author admits in the same place that geology might perhaps call for different chronological appreciation:—"If the savans in this science could arrive at pronouncing with a certain unanimity on the length of the phenomena of the Quaternary period from the Pleiocene epoch until our days, and could show the necessity of the hundreds of thousands of years of which mention has been made, the question of the antiquity of man would then take a serious character; but at present there is far from being unanimity amongst observers, or even amongst geologists."

41. My late lamented friend Christy, the companion of Lartet, was confident that the result of their researches would throw back very considerably the date of man's introduction into the world. But now (if I understand right) all this is changed, and there has been a complete *bouleversement*, in the opinion of geologists concerning the diluvian deposits of the Somme and of the Seine; and consequently regarding the antiquity of the age of the prehistoric man who left his remains in these localities. This has specially taken place through the conscientious and complete study of the engineer Belgrand.*

42. Had the gentleman above named been living, we should greatly have valued his more mature and time-sobered opinions, which he would, very probably, have been ready to give to the Institute. Failing this, I can only commend the writings of our foreign archæologists, in particular those of Lenormant and Chabas, to the attention of those who desire to see a really conscientious examination of this question in all its bearings.

43. I cannot do better than conclude my review of this part of our subject in the words of one who has devoted much attention and research to Paleontology,—the eloquent M. Lenormant:†—"We possess *no chronometer* to determine, even approximately, the duration of the ages, and the thousands of years which have elapsed since the first men of whom we find the traces We are, in effect, in presence of phenomena of subsidence and of elevation of which nothing leads us to suspect even the greater or less degrees of slowness; for we know some phenomena of this nature which are accomplished quite rapidly, and others which are produced in so insensible and gradual a manner that the change is not more than a yard in several ages. As to sedimentary deposits, their formation may have been equally precipitated or retarded by the most diverse causes, without our being able to appreciate these. Nothing, even in the actual state of the world, is more variable in its nature (through a multitude

* P. 553.

† *L'Homme fossile*, Les prem. Civ., vol. i. p. 61.

of external influences) than the greater or less rapidity of increase of the fluvial alluviums, such as are the deposits of the Quaternary epoch. And, moreover, the facts of this epoch, or of the anterior times, cannot be measured by the same scale as those of the actual period, for their causes had then dimensions which they have no longer. Thus, the calculations made in reference to the progress of an alluvium, supposed always equal and regular—or, according to other data equally uncertain, which philosophers of too lively an imagination have attempted to make, to establish the time which has elapsed between the interment of the most ancient vestiges of fossil man and our era—are, in reality, nothing but hypotheses without a base, and capricious fantasies. The date of the appearance of the human species, according to geology, *is still unknown, and will probably always remain so.*"

44. I do not attach much credence to the evidence, falling chiefly under our *first* category, which M. l'Abbé Bourgeois thinks that he has discovered of the workmanship of man in the Miocene age. The supposed fossil man of the inferior Pliocene has also been put on the shelf, being unable to stand his ground against the criticisms of M. Hamy. There ensues, in the order of geological phenomena, the first Glacial period, during which there exists no trace of man or of his works. After this, in the era of the Upper Pliocene, the temperature of Europe became, it is supposed, very much such as it is now. It is presumed that at this period England was united to France, and Spain and Sicily joined Africa; that a free migration of animals could thus take place from the north and from the south, and that man also arrived in these countries with them. The proofs of this do not appear very sufficient, especially when taken in connection with the immense changes supposed to have ushered in the Quaternary period, during which the traces of human workmanship become evident and abundant. It is of the men of this period that we have been hitherto speaking; but we must pass on to a short review of the succeeding "Neolithic age," or age of weapons of polished stone. No great changes or vast catastrophes are supposed to have intervened between the above age and the present, which indeed by some is considered a continuation of the Quaternary period. M. De Rossi stated, as his opinion* that the last phase of the Quaternary state of the Tiber coincides with the first periods of the Roman history.†

45. Whatever may be the state of the case, there came a time when the small-handed men of whom we have been speaking followed (as it is surmised) the reindeer in his retirement to more

* At the Congress of Boulogne.—See Chabas, *An. Hist.*, p. 559.

† See Appendix (E).

northerly regions, and became superseded either by a Libyan kind of men, who were before mixed with them, or by better armed immigrants into these regions, A much higher type of civilization now becomes manifest in their remains, which no longer are associated with the monsters of the earth before described. To this period belong various objects of great interest for primeval history, showing that an active interchange of commodities must have begun to exist amongst the nations of the earth. The jade of the East finds its way to the shores of Brittany, and materials for use, and even for luxury, begin to be widely dispersed in traffic.

46. The commencement of this age is not distinctly marked, and its course runs on to an indefinite period of actual historical record. This is shown by the occurrence of bronze in the weapons, &c., belonging to the latter part of this period. Indeed, there is no time in which the use of polished stone instruments can be said to have ceased; for even to this day such are occasionally used. Humboldt depicts a most beautifully finished hatchet, inscribed with various characters of Aztec manufacture,* also a calender of the Muisca † and a bracelet of obsidian of the Muycas. ‡

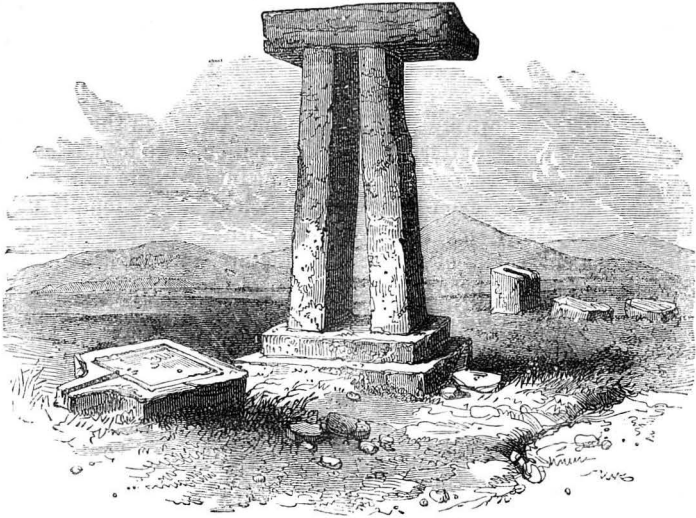
47. But perhaps the most remarkable contrast to the man of the previous period is this, that we now find ourselves amongst a generation of builders of temples, in a rude style indeed, but in the designs of which a motive of religion is distinctly apparent. M. Hamy § says "To the monuments formed of enormous irregular stones, supporting, like gigantic pillars, a great horizontal table, succeed others composed of square stones, placed together in line with a certain amount of art. These pre-historic architects, whose works have been able to resist so many causes of destruction, thus indicate progress." || "Later on, they covered with sculptured figures certain 'allées couvertes,' and they raised at Stonehenge the majestic edifice which offers so many points of resemblance with that other pre-historic monument discovered by M. Mariette, at Ghizeh, and which is known to Egyptologists under the name of the 'Temple of the Sphinx.'"

48. This temple is believed to be anterior in its construction to the dynasty of Menes, the first monarch of Egypt. It is situated by the side of the great Sphinx, and was cleared from rubbish twenty years since by M. Mariette, at the expense of the Duc de Luynes. "Constructed of enormous blocks of the granite of Syène and of Oriental alabaster, sustained by square monolithic pillars, this temple is prodigious even by the side of the Pyramids. It offers neither a moulding nor an ornament, nor an hieroglyphic ;

* *Atlas pittoresque*, Pl. 23. † *Ibid.*, Pl. 44. ‡ *Ibid.*, Pl. 66.
§ Quoted in *L'Homme fossile*, p. 48. || *Ibid.*, p. 46.

it is the transition between the megalithic monuments and architecture properly so called. In an inscription preserved in the museum of Boulaq, it is spoken of as an edifice of *which the origin was lost in the night of time*, and which had been found by chance, buried in the sand of the desert, under which it had been forgotten for long generations.”*

49. I copy from Fergusson's *Rude Stone Monuments* a drawing,

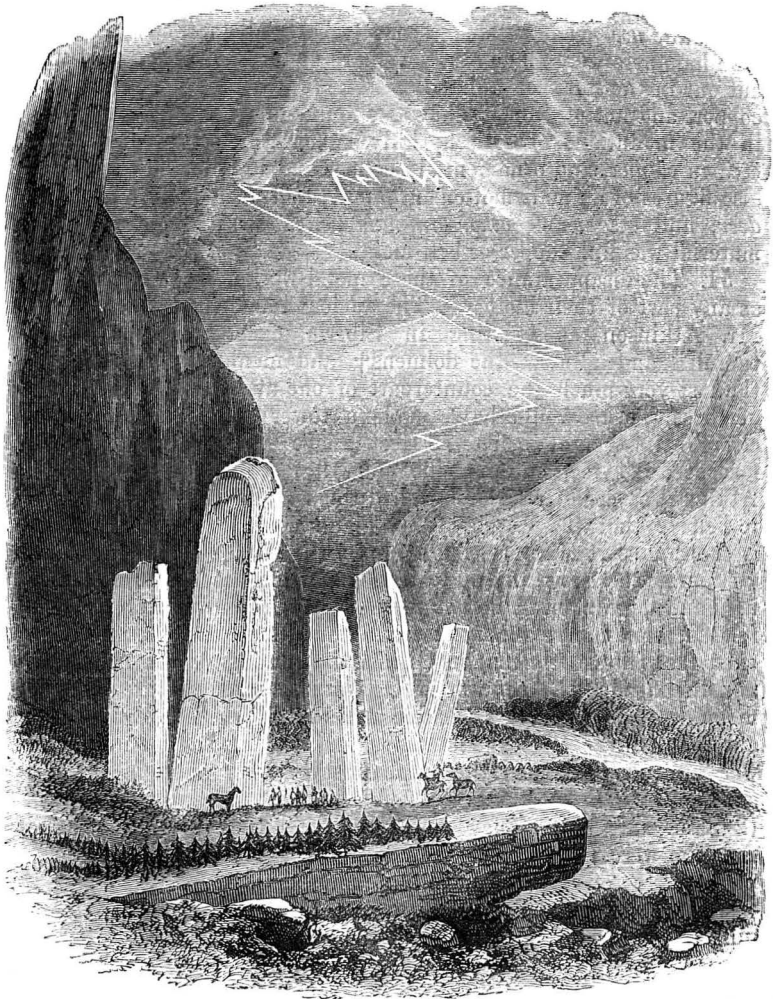


by Dr. Barth, of a trilithon at Elkeb, S.E. of Tripoli, in reference to which the learned author remarks, “The first thing that strikes one is that Jeffrey of Monmouth’s assertion that giants in old days brought from Africa the stones which the magic arts of Merlin afterwards removed from Kildare and set up at Stonehenge, is not so entirely devoid of foundation as might at first sight appear.” The removal of the stones is, of course, absurd, but the suggestion and design may possibly have travelled West by this route. I would add that the inner and smaller circle of “blue stones,” cut from igneous rocks, such as are not to be found nearer than Cornwall or even Ireland, may have been transported even in the vessels of the Phœnicians, for some of them are not large. One of the finest is 7 feet 6 inches high, 2 feet 3 inches wide at base.—(See page 93, same work.)†

* Chabas, *Stat. préh.*, p. 557.

† Mr. Fergusson says that, “without at all wishing, at present at least,

It may be well to consider, before we interfere (as recently proposed) for the preservation of Oriental antiquities, whether, as a nation, we are sufficiently careful of our own.



TOMBS OF THE GENII ON THE KORA, SIBERIA.

to insist upon it, I may here state that the impression on my mind is every day growing stronger that the dolmen builders in France are *the lineal descendants of the Cave men* whose remains have recently been detected in such quantities on the banks of the Dordogne and other rivers in the south of France."—*Rude Stone Monuments*, page 329.

50. A very curious fact has been stated by the traveller Pallas; it is that an ancient people worked the mines of metal in the Mountain of Serpents, near Krassogarsk, on the borders of the river Jenisei (56° N.), *having left on the place the instruments of which they made use*, such as wedges, mattocks, mallets, and hammers. The hammers were made of a very hard stone, of which a part was cut out in the form of a handle. The other instruments were of copper, and not of iron. They also found on the same point, and in the mountains of Irtisch, knives, poniards, points of arrows, &c., in copper, and ornaments in copper and in gold. Pallas cites also figures of animals molten in copper, and principally *elks, reindeer, and stags, and other animals which were unknown*. The material was fine copper or bell-metal.

51. The disappearance of these metal-workers is as remarkable as any part of their history. The ancient remains represented by Mr. Atkinson as existing in Siberia, exactly reproduce the tumuli* and altars,—the dolmens† and menhirs‡ of Brittany, the last very much the counterpart of one at Lokmariaker. One of these blocks would have made a tower large enough for a church, its height being 76 feet above the ground, and it measured 24 feet on one side and 19 feet on the other. Mr. Atkinson says,—“As I approached this spot I was almost induced to believe that the works of the giants were before me.” This is the same sort of impression given by the structures of Morbihan. Of course, there is really no logical connection between large buildings and large men. The two may nevertheless be in this instance related, for it is noteworthy that trilithons like those of Stonehenge exist (as well as dolmens) in Gilead, the country of the Amorites, and in Bashan, the country of Og,§ whose large stature is commemorated in the Bible. The builders of these had probably affinity with the Libyans, as shown in their mode of burial, and were in all likelihood the Rephaims or other aboriginal tribes smitten by Chedorlaomer. Raphia was a progenitor of giants (2 Sam. xxi. 18). They might resemble the old Goths. The Anakim were named from their lofty stature. The giants (Nephelim) before the Flood have quite another history.

52. The very same taste for monolithic structures and rows of pillars, to us without meaning, seems also to have prevailed in America,|| together with the fondness for vast mounds of which we cannot conceive the utility. If we could certainly discover the

* *Travels in the Region of the Upper and Lower Amoor*, pp. 179, 151.

† Pp. 370, 157. ‡ P. 120. See Plate.

§ *Rude Stone Monuments*, Fergusson, p. 442.

|| See for example D'Orbigny's *Travels*, Atlas hist. Antiquités, No. 4, Fig. 8.

meaning of the temple of the Sphinx, it might give us some light on the question. The figure of the Sphinx is supposed to have been dedicated to the setting sun, and though there does not seem to be any certain connection with the temple lost in hoar antiquity, yet it is not impossible that sun-worship was really intended by the constructors of both. As regards Stonehenge, it is clear that the disposition of the stones was connected with the quarters of the heavens,—the circus being due north, and, as shown by Mr. Beck in a communication to the *Times* newspaper,* the stone called the Pointer marks exactly the place of the sun's rising on the morning of the longest day of the year. Mr. Beck says, "As one who has now on several occasions been present and seen the sun thus come up over the 'Pointer,' and strike its first rays through the central entrance on to the so-called altar-stone of the ruin, I commend this obvious proof of solar worship in its constructors to those recent theorists who see in Stonehenge only a memorial of a battle or a victory."†

53. In fact, the above structure was regarded by those who adhered to Druidism, as late as the sixth century of our era, as "the great sanctuary of their dominion"; and the massacre of the Britons by Hengist is represented as taking place on a Baal feast in May.‡ The British Ceres Kéd is associated with Stonehenge, in which she was supposed to be present as "the gentle goddess."§ She has been identified with Isis, and her recovered son Iôr, or the sun, with Horus. Now, Stonehenge was "the precinct of Iôr,"|| and the Sphinx was "the image of the God Harmachou, the setting sun, the sun which shines in the abode of the dead," and so belonged to the times of the companions of Horus.¶ Mr. Palgrave describes a similar structure in the interior of Arabia, and the customs of the aborigines of India illustrate those of our own land. We find the Khonds, the Druids of the East, worshipping in groves, *priscâ formidine sacris*, and indulging in human sacrifices (until 1836). Macpherson tells us that they use neither temples nor images in their worship. They cannot comprehend, and regard as absurd, the idea of building a house in honour of a deity, or in expectation that he will be peculiarly present in any place resembling a human habitation. Groves kept sacred from the axe, hoar rocks, the tops of hills, fountains, and the banks of streams, are in their eyes the fittest places for worship. On the Khassia hills, moreover, rude stone monuments exist in greater numbers than perhaps in any other portion of the globe of the same

* June 22nd, 1872.

† See Appendix (F).

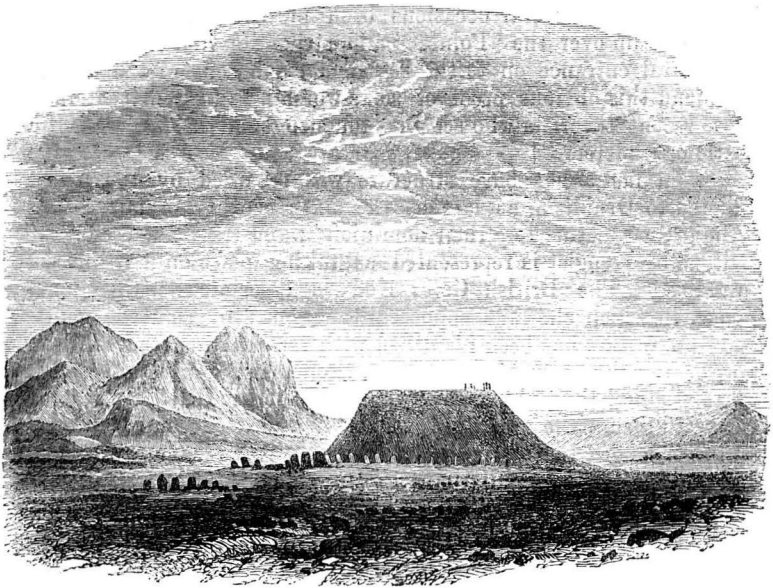
‡ Song of Cuhelyn, in Davies's *Mythology and Rites of the Ancient Druids*.

§ *Ibid.*, p. 316.

|| *Ibid.*, p. 316.

¶ Lenormant, *Les prem. Civ.*, vol. i. pp. 181, 179, 180.

extent. All travellers are struck with the curious similarity of their forms to those existing in Europe. They still erect menhirs in honour of deceased ancestors, whose spirit is supposed to dwell in the stone. The whole subject is very ably discussed in the work above quoted. But I do not remember to have met with any reference to the tablets which the Chinese worship, and in which the spirits of their forefathers are supposed to dwell. This seems to me a survival of the very old custom above referred to. On a review of the whole question, which cannot be pursued further in this paper, I am inclined to believe that the above temple-building



* A LARGE TUMULUS AND ALTARS NEAR KOPAL, SIBERIA.*

age coincides with the dawn of history and with the diffusion of sun- and serpent-worship through the world.

*c. Rise of a Material Civilization in the Race of Cain—
First Separation of Science from Religion.*

54. In the book of Genesis we have the history of Cain, who, as the first murderer, is driven forth from the presence of Jehovah, and the curse pronounced upon him that the ground when tilled

* Atkinson's *Travels*, p. 179.

should not yield her strength unto him, and that he should be a fugitive and vagabond* on the earth. And Cain went forth from the presence of the Lord, and dwelt in the land of Nod, † on the east of Eden. The name of the land was thus evidently derived from the character impressed on the unhappy fugitive. It is traditionally the great desert of Gobi, and the city of Khotan ‡ on its borders, glories in the idea that it is the very city which Cain built and called after the name of his son Enoch. It is at all events to the east of Eden, and a more suited locality could not have been easily imagined. The district produces *copper and iron*, and abounds in the remains of a lost race. § It is evident that the course of the pursuits of Cain must have been suddenly and violently changed, and the whole bent and purpose of the cultivator, thus turned away from his husbandry, was directed towards material civilization and city-building; and the Bible follows for a few short sentences the efforts of the Cainites. || The first city was certainly a remarkable conception, and the realization of the idea in the brief *stone age* recorded in Scripture, must have involved great difficulty and much persevering skill, for it is not till the fifth generation that his descendant Tubal Cain,—“Tubal the smith,” becomes, according to our translation, “the instructor of every artificer in brass and iron.” De Sola ¶ renders it “who sharpened various tools in *copper and iron*.” The family became remarkable in various ways. Yabal was the father of the nomadic people; and Yubal the father of all such as handle the harp and organ. The sister of Tubal the smith was Naamah the pleasant** or delightful one—the first inventress of plaintive music and song. The first poetry recorded is the address †† of Lamech to his wives—a song of triumph perhaps at the thought of the seventy and seven-fold vengeance which the instruments forged by his son might exact.

55. But what has all this to do with the special purpose of the

* נע ונד

† נוד, see App. G and H.

‡ “This city, whose traditions, preserved in the native chronicles, were known to the Chinese historians, boast of an antiquity ascending higher than that of any other city of the interior of Asia. By its own traditions its foundation was associated with an ancient chthonian god with a sombre physiognomy, a master of subterranean fires and of *metallic treasures*, and whom the Mahometans have not failed to identify with Cain. The Baron d’Echstein has shown that Khotan was the centre of a metallurgic commerce, which may be regarded as one of the most ancient in the world.”—Lenormant, *Les prem. Civ.*, vol. i. p. 84.

§ Johnston’s *Gen. Gazetteer*, *sub voce*.

|| See Lenormant.

¶ Following the points in the Hebrew (after Rashi).

** Comp. in Welsh *gwen*, a beauty; *gweno*, the evening star; *gwener*, Friday, day of Venus.

†† See Smith’s *Bio. Dic.*, *sub voce* Linus.

Bible in reference to the chosen race? Were these afterwards deified persons among the heathen? and was the sweetest of all melodies—the dirge over the murdered Linus—a lament of this sister over the handsome youth (Hyacinthus, Narcissus) who ventured on a musical contest with the god of melody, and was slain by Apollo—giving his name to fair and fleeting flowers, and to the tragic *ailinos* of the poets (*αἰ λίνε*).

56. We know not, because the narrative is so abrupt, but it is surely connected with more traditional knowledge which has now perished. Lamech, according to the Jewish tradition, slew his own son; and it is remarkable how many eastern traditions connect themselves with the early history of mankind. Several different features of civilization are marked out in these early traditions, but there is nothing of worship connected with them. All seems, however fair, to be essentially *worldly* in its character. It is most significant that the Scripture drops the unfinished story, and turns at once to the line of the Messiah in Seth,—leaving Cain and all his descendants. Seth, the substitutional one, appears on the scene, and it is from Seth that St. Luke deduces the genealogy of the Messiah. But the current of affairs thus pre-intimated goes on to the end. Throughout the Scriptures the highest civilization is found associated with evil tendencies in Egypt, in Canaan, in Tyre, in Babylon, in Assyria, and in Rome. It is evident that civilization dissociated from religion rests on an insecure foundation. An atheistic community always contains within itself the elements of its own destruction.

57. It is worthy of remark that copper and iron are the metals first worked by mankind. This accords with all that we know of antiquity, and with what we can easily suppose to have been *a priori* probable. Copper, from the comparative ease with which its ores might be reduced, being even found at times in a state scarcely needing the art of the metallurgist; and iron, which it is almost certain, would first be wrought out from its meteoric state into instruments for the use of man. It is, however, to be noticed that Livingstone found the survival of the ancient processes in South Africa, where the smith reduces his iron from the easily worked hæmatite ore, and then forges his instruments from the elaborated material. This is all strikingly presented to the eye in a sketch in the "Last Journals" of this lamented traveller.*

58. The inhabitants of Africa seem never to have known the use of bronze, and there is no evidence of their having passed through an age of stone. They reduced iron by simple metallurgic processes known to themselves. The Egyptians appear, according to M. Chabas, to have been always acquainted with the use of iron,

* Kindly lent to the Institute by Mr. Murray.

which they called *baa*, and even with steel, or *baa en pe*, "heavenly iron," which this author thinks may have been because of its reflecting the celestial vault.* The name appears to have survived in the Coptic *benipe*.†

59. It would seem that the notions of the ancients respecting the founders of metal always bore (probably from tradition) a sinister aspect. It is remarkable to find among the three families of Shem, Ham, and Japhet ‡ the same symbolic representations of the smith-god, under the features of a grotesque and misshapen



dwarf. Whether it is the Phtah of Memphis, when he is looked at specially as the demiurge; the Patèques of Phœnicia, or his Adonis Pygmæon (the god who wields the hammer); or the Hephaistos of Homer, § who hides his deformity in the Isle of

* Chabas, *Etudes*, &c., p. 61.

† See Appendix (I).

‡ Lenormant, *Les prem. Civ.*, p. 132.

§ *Iliad*, xviii. 410, &c.; *Od.*, viii. 311, 330.

Lemnos, and excites the ridicule of the immortals ; or the Mimir of the Scandinavians ; we see always the same consecrated type which is that of the Kobbold, of the Gnomes, and other analogous beings in popular mythologies, and which seems to be a caricature of the races who first worked in metals. One is almost tempted to think of the mark set upon Cain. At all events, the *souvenir* of this first civilization does not recall pleasant associations, nor lead us to suppose any superiority amongst those who addicted themselves to these civilizing arts. Thus the *Telchines*,* sometimes described as marine beings without feet, were workers in brass and iron, and made the sickle of Cronos and the trident of Poseidon. Their very eyes and aspect are said to have been destructive. M. Fougué made the important discovery at Santorin, in the Greek Archipelago, of “ a true Pompeii of the age of stone,” buried under the layers of ashes thrown out by the ancient central volcano of that island, which has never been in eruption since the first historical traditions of Greece. Whole villages were buried under these accumulated strata. They belonged to a social state exactly parallel to that of the “ Lake-dwellers ” of Switzerland. In one of the dwellings there was found a saw of pure copper. By the side of rough articles of earthenware there were discovered a great number of vases of fine composition, and of very elegant forms, with painted ornaments, which showed a resemblance with those of Phœnicia and of Moab, and were evidently brought from beyond sea, indicating an early commerce then existing. The lowest stratum examined by Dr. Schliemann on the site of Troy probably contained remains of the same age.

60. M. d’Eckstein† has specially studied this subject of the races with a magical worship who adored the gods of metallurgy ; and of the corporations which directed their works, and figured in a doubtful character as “ inventors, instructors, magicians, benefactors, and malefactors,” at the same time the instructors of Aryan races, and yet viewed by them with aversion. Although directing the works of human industry, *these did not adore a personal and free God* ; they did not regard with worship the god of the fathers of these races. Their supreme divinity was altogether impersonal, being identified with plastic and primordial nature,—nature in which it was embodied whilst working its metamorphoses as the soul of the world.

61. This early civilization, with all the marks of Cain about it, reappears among the inhabitants of early Babylonia, and the *Tubal* of Genesis x. becomes in the nation of the Tibarenes the great metal-worker of the new world. The limits of the present paper

* Smith’s *Dic.*, *sub voce*.

† Lenormant, pp. 139, 155.

will scarcely allow this theme to be followed out. It will be sufficient to translate some remarks of the Baron d'Eckstein* on the subject.

62. Tubal, the name of a tribe, *the probable name of a corporation*, is the equivalent of the *Telchines* of primitive Greece. We meet in Genesis x. this name, which belongs to a Circassian race,—to that of the Tibareni,—neighbours of the Chalybes, aboriginals of the mountains which border the Euxine Sea, who were forgers of iron and workers in brass, famous in the times of the Argonauts. In Ezekiel, Tubal is in the number of the tribes contributory to the commerce of Tyre, the city to which they delivered the brass of their mountains. The precious stones which are called Tibarenian are also the glory of Tubal. These are tribes against whom Xenophon warred after his Assyrian expedition.

63. It would certainly appear that whilst a large portion of the earth may have been oppressed with a glacial climate, a considerable amount of civilization had been attained before the Deluge in some favoured regions of Asia. If this rises no higher than mere material civilization, we have to inquire whether it was the same in the race of Seth, or whether higher and more intellectual pursuits elevated the minds of these. Concerning this point we have little or no information in Scripture, but it would seem that the lives of these patriarchs were abnormally lengthened, so that they became the prototypes of the demigods of Egypt, and perhaps of other nations. Lives thus protracted must have been used for some purpose, and we can scarcely imagine any exercise of the intellectual powers so certain to arise as those of astronomy and medicine. It is only in connection with the quiet pursuits of agriculture that such long lives could be reached, or the cultivation of the intellect advance.

64. I am, therefore, inclined to think that there is much resemblance to the truth—at all events, considerable probability—in the traditions collected by Dr. Chwolson from the accounts of the Ssabi, as delivered by Mahometan writers. These people identified Idris with Enoch, and assert that he gave certain books, which he had written to his son Methuselah, and to his second son, Ssabi, from whom they derived their religion. Even the Koran keeps up the tradition of this identification. Idris seems to have been looked upon as a great physician and philosopher, and to have been taken up to God by fire from heaven; on which account they burnt their dead, and some of them even burnt themselves alive. Idris,† according to one author, taught his children

* Lenormant, *L'Epoque néolithique*, p. 122.

† Chwolson, *Die Ssaber*, p. 246.

to write, and said to them, "O my sons, know that you are Ssabians, and therefore learn to read in your youth, for you will find the advantage of it in age." They were the learned men—the magi of the period. They believed that Ssabi, or Hermes, wrote a work on the unity of God, and that the writings of Seth and Idris remained till the time of Abraham. The Arabian author Schahradstain calls Hermes a great prophet, and gives his opinion that Hermes was identical with Idris, and first gave names to the planets, and invented the Zodiac, and showed the oppositions and conjunctions of the former. Thoth, or Hermes, was regarded as the real author of everything produced or discovered by the human mind—as the father of all knowledge, invention, legislation, &c. Hence, everything that man had discovered and committed to writing was regarded as the property of Hermes. As he was thus the source of all knowledge and thought, or the λόγος embodied, he was termed τρις μέγιστος, Hermes Trismegistus. It was said that Pythagoras and Plato had derived all their knowledge from the Egyptian Hermes. These works, or some of them, were extant at a late period of the Egyptian history, and Manetho, in his dedicatory epistle to his sovereign, Ptolemy Philadelphus, says, that, according to his commands, he shall lay before the king what he had gathered from the sacred book written by Hermes, his forefather.

65. Moses, who was learned in all the wisdom of the Egyptians, could not have been ignorant of these works, which must have been laid open to his inspection, as presumptive heir to the throne of Egypt.

66. Clement of Alexandria speaks of forty-two books of Hermes, containing the sum-total of human and divine knowledge and wisdom, and treating on cosmography, astronomy, geography, religion, and more especially on medicine. This accords with the account of Berosus:—

In his time [that of Xisuthrus] happened the great Deluge, the history of which is given in this manner. The deity Cronus appeared to him in a vision, and gave him notice that upon the fifteenth day of the month Dæsia there would be a flood by which mankind would be destroyed. He therefore enjoined him to *commit to writing* a history of the beginning, procedure, and final conclusion of all things down to the present term, and to bury these accounts securely in the city of the Sun at Sippara, and to build a vessel, &c.

67. After recounting the Deluge, Berosus continues:—

In this manner they returned to Babylon, and having found the writings at Sippara, they set about building cities and erecting temples; and Babylon was thus inhabited *again*.

68. Since recent researches into the cuneiform inscriptions have

led to our placing increasing confidence in the history of Berossus, it is worth notice that he implies that Babel was inhabited *before the Deluge*. I read in Smith's "Early History of Babylonia,"* that a king, named Zabuu, founded the Temples of Ammit (Venus) and *Samas the Sun, at Sippara*, "in ancient days." There is nothing impossible in the fact that knowledge might be preserved, in the Babylonian manner, on baked tiles, even through such a catastrophe, which for the rest does not seem to have left any very deep impression on the Babylonian plains.

69. The foregoing pages must be looked upon in the light of a preliminary inquiry, necessarily fragmentary and imperfect, from the very obscurity of the subject. I have stopped short at the threshold of the historic era, but have availed myself freely of the light thrown by the Book of Genesis on the creation and early condition and civilization of mankind. In so doing I wish it to be understood that I write only for those who will concede that we have there presented to us a faithful transcript of the earliest traditions of the human family. In seeking to follow the dim light, which in some cases is all that the Scripture affords, and to explore the coincidence of this light with that thrown by reliable geological discoveries, I am conscious that I may have made many mistakes as to *facts*, and still more as to *theories*. In the facts themselves, rightly understood, there can be no discrepancy, always taking it for granted, as above, that the Book is a reliable record.

70. Let us see, then, to what conclusions [inferences] we have, with more or less certainty, arrived.

71. *First*, that Adam, the head of the human family, was created by the Almighty, after special purpose, and in a special manner, in order to reflect His own image; and as a corollary to the above, that no creation of an Adam before the end of the sixth day can possibly be made consistent with either the first or second record in Genesis.

72. *Second*, that even as Adam was designed to shadow forth the power and wisdom, the creative skill, and orderly arrangement exhibited by the Divine mind in the universe, so Eve was intended to reflect the beauty, the grace, the compassion and tenderness of the Divine nature; as a corollary, the sexes are not equally adapted for all studies and pursuits, and have totally different parts assigned, to which the diversity of mental organization predisposes them.

73. *Third*, that civilization in its amount, or in its deficiency, is inseparably connected with the state of the woman; as a corollary that religion is specially needed to support her in her proper sphere, her nature being essentially more weak.

* *Bib. Arch. Trans.*, vol. i. p. 34. Appendix (J).

74. *Fourth*, that a period of violence, and general corruption and degradation of manners, ensued on the fall of the mother of all living; that in all probability, a glacial period of the earth's history rendered most parts of the earth unfertile, whilst the abundant supply of animal food fostered a savage hunter's life (apart from all pretence to civilization), of which we find the traces in the paleolithic period.

75. *Fifth*, that at a subsequent period there arose a race of temple-builders, whose megalithic monuments of all kinds are spread over a large extent of the world, seeming to indicate the general prevalence of sun- and serpent-worship, probably after the Flood. This seems to coincide in part with the Neolithic period.

76. *Sixth*, that in the race of Cain there supervened a material civilization of considerable importance to the future history of the world; this being separated from religion, and, as anticipated by the first author of it, "hidden from the face of Jehovah."

77. *Seventh*, that the life of the patriarchs in the chosen line before the Flood was probably devoted to agriculture in the most favoured portion of the earth's surface; this being the state of society most suited to longevity and to the cultivation of the sciences of astronomy, and also of writing and other researches, much of which knowledge survived the Flood.

78. On the whole, I conclude that the conception of man as a savage, improving himself from some apelike condition up to civilization, is repugnant to Scripture, opposed to the most reliable testimonies as to his early state, and most contrary to the endowment of noble faculties which his Creator has manifestly assigned to him.

APPENDICES.

(A.)

Mr. Hardy, in his *Ontology of Buddhism*,* shows that, according to the teaching of Gótama, there are twenty-eight members of the organized body, but among them no single entity is presented that we can regard as the primary and essential principle to which all the other parts are accessories.

This is exactly the doctrine propounded at the last meeting of the British Association. The idea, "which remained unassailable, that the living body was not a simple continuous whole, but that it was made up of a multitude of parts, which lived a *quasi* independent life."

(B.)

As this important point is much controverted, I must request the reader to turn to the *Englishman's Hebrew and English Concordance* under the head Man. This will suffice for our purpose, and we need only refer to the three first words, Adam, Ish, Enosh. Of these the first is used in all the different senses which we should express by *the human family*, whether as regards the intellect, "for the Lord knoweth the thoughts of Adam that they are vanity"; or his body, for it is in the person of Adam that the slave-dealers traffic;† their way of coming into the world, "though Adam be born like a wild ass's colt"; or continuance in it, "for Adam, born of a woman, is of few days and full of trouble"; or, to finish up his history, "Adam is like to vanity."‡ When Jehovah declares His resolution, "I will destroy man whom I have created from the face of the earth," it is again the same characteristic expression Adam, *i.e.* the human family.§

In chap. xv. of 1 Cor. we find as nearly as possible to be expressed in Greek the same term used for all men who are subject to death, for, as "in Adam all die" (*ἐν τῷ Ἀδάμ*). If, therefore, we search in Scripture for any portion of the human family not sons of Adam, we look in vain. Such would not belong to "the *first* man Adam" (and they could not be before the first), neither could they come under the quickening power of the second Adam, for the first of the human family (*ὁ πρῶτος ἄνθρωπος*) became a living soul, but the last, or, rather, highest, Adam, a *life-giving* Spirit. The first Adam came under the sentence of death, and involved all those who stand under his headship; but the nobler Adam, whilst voluntarily submitting to

* *Manual of Buddhism*, p. 389.

† Ps. cxliv. 4.

‡ Ezek. xxvii. 13.

§ אָדָם אִשׁ אֱנוֹשׁ

the penal sentence which he had not incurred, was declared to be, in resurrection, the Son of God with power, and also the first-fruits of those that sleep—Χριστός, the one anointed with the Holy Ghost, in whom all those who partake of this anointing shall also rise to endless life, for, if the Spirit of Him that raised up *Jesus* from the dead dwell in His people, He that raised up *the Christ* from the dead shall cause to live even the *mortal bodies* of His people by (διδ) His Spirit that dwelleth in them.

As regards the use of the word Adam in Hebrew to signify man, I need only further remark that the term appears to be carefully avoided when angels appeared, or manifestations of superhuman personality. As to Abraham, when we read three men, it is *Enoshim* in the original; or to Manoaah, where the word is *Ish*. Again, in Daniel, "the man Gabriel," and the "certain man clothed in linen," are mentioned under the latter term.

It would be tedious to enter into the question of the peculiar use of *Ish* and *Enosh*, further than to say that both seem to be used with very wide latitude of meaning, as *person* in English. *Ish* has further, as contrasted with *Ishah*, the special meaning of husband. Moreover, where the contrast is between mighty men and mean men, rich men and poor men, great men are always called *Ish*, and poor and mean ones *Adam* (as Is. ii. 9, v. 15, xxxi. 8; Ps. xlix. 2); but the meaning of the contrast is very obvious, as we contrast "a person of quality" with the meanest of Her Majesty's subjects, which humble individual is nevertheless to be looked upon as "a human being."

(C.)

THE GREAT AMERICAN DESERT.

(From the *Times*, September 28th, 1874.)

"The *New York Times*' Own Correspondent writes from Omaha as follows

"That portion of Nebraska which might with most propriety be called the "Desert" is that adjoining the Loup and Niobara rivers, far to the north, near the Dakota line. This is the *Mauvais*es *Terres* or bad lands of the old Canadian voyageurs, and the dreaded "Makoo-set-cha" of the Dakota Sioux, for its white, rugged, and dreary plateaus reveal nought but the most barren desolation. It was, and is yet, a terror to all travellers, for not only is it difficult to traverse, owing to its ruggedness, but it is also devoid of wood and water, the two greatest necessities to the wandering wayfarer. Though forbidding as a landscape, it yet possesses the greatest interest for the palæontologist, as it is undoubtedly the most extensive cemetery of fossil animals in the world. Almost every species known to this continent in its various ages are found there in profusion, and many which have not been found in other portions. It is estimated that *several thousand species* now

extinct lie buried there. Among the latter fauna, which occupy the upper beds, we find several species of camels, varying in size from the present Arabian type to one little larger than a Shetland pony; numerous specimens of the Equidæ, ranging in bulk from the heavy Flemish cart-horse to one the size of a Newfoundland dog, and furnished with three hoofs to each foot, though the lateral ones were merely rudimental. The carnivorous animals are represented by wolves and foxes, some of which were larger than any now living; three species of the hynædon, which were most remarkably rapacious, and five varieties of the Felidæ, whose skulls display the terrible conflicts they had with their contemporaries. Among the larger and more interesting animals found there, owing to the fact that none of them now exist on this continent, are the pachyderms, which were quite numerous. They ranged in size from one no larger than a cat to one having the ponderous dimensions of the African hippopotamus. Several species of the rhinoceros family also roamed over the lacustrine marshes existing there in the tertiary era, and, later still, the elephant and mastodon sought the shade of the tropical forests then prevalent in Nebraska. Of all the animals found, however, none equals in numbers the Ruminantia, for over 700 varieties of one species have been found. Among these the ruminating hogs, to us, are the most interesting, as none now exist. These fossil bones are preserved with the greatest care, for they display no sign of abrasion, and they are as white and clean as if they had been bleached; and the fact that they are not worn in any way would go to prove that they have not been carried any distance by water or drift, and that the animals inhabited the region in which they perished. One peculiar fact in connection with this fossil fauna is that *no crocodiles have been found among it*, notwithstanding the Southern axiom that pigs were made to furnish meat and music to this lazy creature.

“While stopping there, I had the pleasure of participating in a buffalo-hunt, which lasted three days. Few sports are more exciting. This noble animal will soon, however, be among the fauna of the past, for the “pot-hunters” and civilization are rapidly pursuing it to decimation. It is estimated that the “hide-hunters” of Kansas, Texas, Colorado, and Southern Nebraska kill 50,000 each year for the skins alone; that the Indians kill three times that number, and that perhaps 10,000 more are killed by sportsmen and those pioneers who depend on buffalo for their winter meat; thus we have the enormous figure of 210,000 as the annual slaughter. But this even will not represent the grand total, for many calves are captured to be sold to menageries, museums, and to private gentlemen who desire such pets. I cannot approach a summary of the latter, but I think that from 5,000 to 10,000 would be an approximate estimate, though a low one. I have known instances where a hundred of these creatures were caught in a day by being run down, and not more than one-tenth were alive the next; for, though apparently strong, they cannot endure much hardship. By giving the figures in round numbers we may estimate that a quarter of a million bison are destroyed annually, and that, I think, will not be far from the exact number.

At this rate of destruction they cannot last long, so the present generation will probably witness the decimation of the animal most characteristic of the fauna of North America—one with which the history of our plains, pioneers, and trappers is most closely blended.’”

(D.)

“Nec nimio tum plus quam nunc, mortalia secla
 Dulcia linquebant labentis lumina vitæ.
 Unus enim tum quisque magis depensus eorum
 Pabula viva feris præbebat dentibus haustus :
 Et nemora ac monteis gemitu, sylvasque replebat,
 Viva videns vivo sepeliri viscera busto.”

Lucretius, lib. v. l. 985, et seq.

(E.)

“Nous ne saurions raisonnablement nous refuser à conclure, que les âges prétendus de la pierre polie, du bronze et du fer préhistorique se confondent ensemble et rentrent en ce qui concerne les gisements riverains de la Saône, dans les limites de la période historique des peuples Européens.”—*Chabas, Stations préhist.*, p. 523.

“Lorsque M. Mariette Bey voyait à Abydos les ouvriers de les fouilles se faire raser et écorcher la tête avec un silex, lorsque les Arabes de Qournah lui montraient des lances de Bédouines encore armées de gros silex, il s'est cru transporté dans l'âge de pierre, et il est arrivé à cette conclusion ; que l'âge de pierre a vécu en Égypte sous les Pharaons, sous les Grecs, et sous les Romains, qu'il y a encore vécu sous les Arabes, et enfin, que dans une certaine mesure, *il y vit encore.*”—*Chabas, Etudes, &c.*, p. 396.

(F.)

A clerical friend residing in the district, who is well acquainted with these remains and also with those in Brittany, writes me :—

“I am sorry you do not seem to have met with one monument of that religion far more ancient and remarkable than Stonehenge, namely, the temple at Avebury. You speak of Silbury Hill which lies about one mile from the temple. At Avebury the stones are larger than at Stonehenge, and the men of its day had not learnt to use a tool to cut stone. The mortise and socket of the stones as at Stonehenge marks a progress of several centuries. Avebury also is more equal in grandeur to Carnac for size and design. Henceforth I must feel the Druids did to the religion which preceded them what the Roman Catholics did to Druidism—utilized their monuments and called them by the name of the new religion.”

(G.)

“M. Hamy, d'accord ici avec M. Pruner Bey, considère comme la race spéciale des cavernes de Périgord comme la plus civilisée de cette époque, celle à qui l'on doit les dessins et les sculptures, *la race petite et brachycéphale*, qui dans ces caractères anatomiques présente les plus étroites analogies avec les populations hyperboréens, des Esquimaux et des Tchoukchis. Le rapprochement est d'autant plus remarquable et séduisant qu'on retrouve encore aujourd'hui chez ces populations, dans leur habitations actuelles, sous les glaces du pôle, identiquement les mêmes mœurs, les mêmes usages, les mêmes instruments, que chez nos troglodytes de l'âge du renne, et chez les Tchoukchis le même instinct naturel de dessin qui frappait il y a cinquante ans le voyageur Chéris.”—*Lenormant, L'Homme fossile*, p. 43.

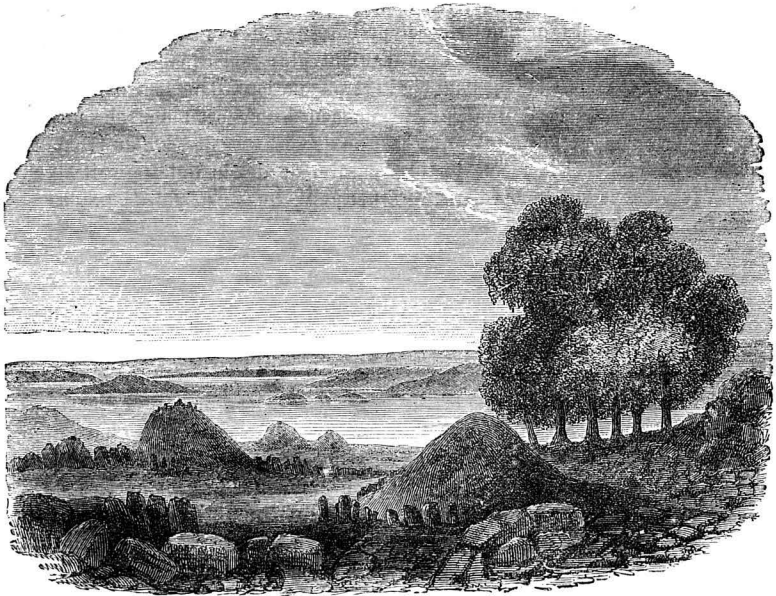
(H.)

The use of these megalithic structures in many cases for tombs does not invalidate their having also been regarded as temples. Up to the eighth or ninth century the descendants of the Ssabians used to make pilgrimages to the three largest pyramids, which they (erroneously) considered to have been tombs of their ancestors. They worshipped the spirit supposed to reside in them, and sought knowledge of future events. In like manner, a work published in 1848 * records, “A species of divination is still practised at Arthurstone, by the neighbouring rustic maidens, who have little idea that they are perpetuating the rites of Druidism, and the mysteries of Eleusis in their propitiatory offering. At midnight of the full moon, if a maiden deposit in the sacred well beneath, a cake of milk, honey, or barley meal, and then on hands and knees crawl three times round the cromlech, she will see, if ‘fancy free,’ the vision of her future lord; if her affections are engaged, the form of the favoured youth will stand before her fearfully bound to answer truly her questions as to his sincerity.” Arthurstone is the name of a very remarkable cromlech on Cefn Bryn, near Swansea. It is, according to Camden, a vast unwrought stone, probably about twenty tons weight, supported by six or seven others that are not above four feet high. It was called Maen Cette, or the Stone of Kéd, and is commemorated in the Triad. “Of the three great labours of Britain, the first was lifting the stone of Ketti; the second, building the work of Emrys (Stonehenge); the third, raising the Mount of Assembly” (or Silbury Hill, in Wiltshire).

* *Tales of the Cymry*. By James Motley. Swansea and London.

Kéd, or Ket, was originally (in all probability) *the moon*. Kits Cotty House, at Aylesbury, had probably the same double purpose of tomb and sanctuary.

The temple of "the White Lady" (Cerid-wen), consisting of a tumulus and ruined walls, is held sacred by the tribes of the Kirghis, and it is said that no animal ever entered its sacred precinct and lived.—See Atkinson *Upper and Lower Amoor*, p. 151.



(I.)

Copper and iron were the earliest metals known, or brought into use by the human family; but till comparatively recently, iron was too scarce and of too costly manufacture to take its legitimate place of utility in reference to the ordinary uses of civilized life. In Egypt it was long an article of luxury, and in the neighbouring nations we are informed of a similar state of things. Thus, whilst the Philistines bound* Sampson with fetters of copper, the Canaanites had chariots of iron (Josh. xvii. 16). A bow of steel is

* We read at a latter period, that Zedekiah met with like treatment from the King of Babylon.

mentioned in two or three instances in the book of Job* and in the Song of David when victorious over his enemies. It may be necessary to mention that the words are all cognate, and that the rendering steel is only warranted as required by the sense. Brass is in almost all cases an unwarranted translation. The name seems to be Shemitic, and to be derived from a root signifying to *shine*. It is, therefore, probable that the use of the word was not in any age carefully restricted by the Hebrews. Bronze belongs to the later period, and may perhaps then be included under the same name.

(J.)

W. Boyd Dawkins, F.R.S., in his *Cave-hunting*, arrives at the conclusion that there is no evidence that the Palæolithic people were inferior in capacity to many of the lower races of the present time, or more closely linked to the lower animals. . . . The historian commences his labours with the high civilization of Assyria and Egypt, and can merely guess at the steps by which it was achieved; the palæontologist meets with the traces of man in the pleistocene strata, and he too can merely guess at the antecedent steps by which man arrived even at that culture which is implied by the implements. . . . Neither has contributed anything towards the solution of the problem of his origin.

The CHAIRMAN.—I am sure I may offer the thanks of the Society to Mr. Howard for his interesting paper, which contains so much archæological knowledge. It is now open for those present to offer remarks upon it.

Dr. H. COLEMAN.—Looking at this paper from the point of view of a logician and metaphysician, rather than from that of a physicist, I cannot agree with it. I agree most cordially with all the paragraphs into which the author has divided his paper, and with the six or seven propositions termed conclusions; but I do not see that the conclusions follow from the premises. I agree with the conclusions, and I would agree with the premises, but I do not see them. Where are the facts which led the author to state these conclusions? Some conclusions might possibly follow, but certainly not these. Had time allowed, I think I could have shown this in every case. I will, however, take two points. In the first place, I would ask what Mr. Howard means by a conclusion which we have with *more or less* certainty arrived at? If it does not result from a certainty, it should not be called a conclusion. In the second place, as to the assertion that Adam was the head of the human family, I could not find any statement in the paper which justified the conclusion that he was, other than the passage in the first chapter of Genesis, in which I agree; but why

* Job xx. 24; Jer. xxxix. 7.

invite us to hear a statement with which we are all familiar? If, on the other hand, Mr. Howard had human testimony to rely upon, apart from the Scripture, why was it not given? I honour Mr. Howard for his great abilities and for the noble use he makes of them to defend revealed religion, but I am bound to protest against what I consider irrelevant conclusions, for their effect upon me is something like the waving of a red flag before the eyes of the traditional bull.

Mr. F. A. ALLEN.—I have been very much interested in Mr. Howard's paper, but should like to make a few remarks upon it. In his 20th paragraph, Mr. Howard refers the existence of Palæolithic man (whom he calls cannibals!) to antediluvian times. Does he believe that such a cataclysm as the Flood would have left the kitchen-middens and bone-caverns undisturbed? Was not the antediluvian world the source, not of barbarism, but of all the civilization and culture of Assyria, Egypt, Greece, and Rome? Mr. Howard also suggests that iron was called "heavenly iron," because it reflected the celestial vault.

Mr. HOWARD.—That is a quotation from M. Chabas.

Mr. ALLEN.—It is much more likely to have been so named from the first iron having been discovered in meteorolites or aërolites which may have been seen to fall from the sky.

Rev. Canon TITCOMB.—I was afraid, when I read the proof copy of the paper, that the discursive character of its illustrations would necessarily lead us into a variety of topics which would, more or less, detract from the unity of this great subject; to my mind it is really a most interesting and important one. There are but two ways in which we can discuss it. The first is that of the worldly scientist, who disregards the Scriptures altogether, and, as a mere philosopher, is not to be blamed for viewing things as they are. He starts with the first dawn of history, looks into pre-historic times through archaeology and palæontology, and then adduces such results as have been brought before him by discovery; he tells us that aboriginal man was a wild savage, a cannibal; not civilized by his Maker, but evolved from a lower animal; having passed upwards, through successive stages of material and moral civilization, until he became at last a reasonable being. The other line is that which Mr. Howard and many others hold; who start with the conviction that the Bible records the truth, and then go on through the evidences which it presents, until they come to external history. The question is whether these two modes of treatment are so far apart that we may not justify Scripture, and yet at the same time acknowledge some of the inferences of our other friends to be correct. The observations of men who explore the early races of mankind through archaeology and palæontology, necessarily lead them to the earliest *visible* remains; but that is in no way a proof that there was not a pre-existing race in some period of the earth of which *no* remains can be found,—I mean—the very race of which the Bible speaks in its earliest

pages. The Christian student should never overlook this ; for in this way the Book of Genesis will supply a fountain of thought which may harmonize with many of the discoveries of archæology. Mr. Howard said in his paper that Scripture described a *brief* period of a stone age ; I venture to differ from him ; it was a *long* period. Hales's chronology makes the stone age in Scripture to cover 1,500 years. Calmet makes the period from Adam to the birth of Tubal Cain to cover 900 years. But Hales's chronology is that most generally followed. Take it therefore on his calculation, and you have a stone age according to Scripture of 1,500 years, during which time there was an overpowering tendency, through the fall of man, toward gradual degradation, leading on to the period of the Flood, when the disorganization of mankind became excessive. But for 1,500 years, though man thus lapsed from the high *moral* condition in which he had been formed by the great Creator, he still had a *material* civilization. This primitive race, existing on the slopes of Asia, would gradually extend itself ; certain waves of population going out in a northerly direction, and so arriving in Europe. Imagine these people under the influences of a severer climate, and of scarcer food than that to which they had before been accustomed ; would they not gradually become more and more uncivilized, their moral and material civilization being lost in inhospitable climates ? Would they not gradually become savage hunters, such as our archæologists find, in proportion as they went further northward and got into Arctic regions ? I take it that the first wave of population going north would represent what our archæologists call the *palæolithic* race. Is this not quite consistent with Scripture ? With a second wave of migration no doubt the art of working in stone would be improved. Chipped stone would be set aside ; and by an improved operation of working, they would arrive at the *neolithic* age. In 1,500 years surely such waves of population might have swept over Europe and Asia, so that it would be perfectly consistent with the Scriptures, that their remains should now be found just where the population went. It was not till afterwards that the metal-working races,—I mean Tubal Cain and his descendants,—came upon the scene. This again would represent another long period, before that higher civilization arose of those great city-builders who founded Babylon and ancient Egypt. This is an interesting way of regarding the subject, and it is one which has been to a great extent overlooked by Mr. Howard in his accumulation of other facts. I believe that if we analyze them carefully they will contribute much to a reconciliation of prehistoric archæology with Scripture. Still there remains the question, as to the non-appearance of these races, or rather of their remains, archæologically, in the cradle of the human family. Why is this ? Because they lived in the sunny climes of Central Asia, and were not brought into such conflict with those terrible forces which were found in northern climes. This, I think, is why we do not discover their bones in caves, along with the mammoth, the rhinoceros, the cave bear. Their remains

have passed away like the bones of modern races in the soft warm earth of those sunny regions. Thus, the fact that the relics of the earliest races are only discovered in northern regions, is, to my mind, not merely in harmony with Scripture, but is one of the greatest proofs that the Scriptures are true. For, as men travelled on, their remains would thus be found in the very order in which we now find them. I can see no difficulty in all this ; and I think that if the discussion takes this line it will make our evening more profitable than if we take up all kinds of *incidental* points arising out of the paper, such as the question of the great antiquity of man, or twenty other things which might be named. We should then have more unity in our discussion. We should then be able to see how really and truly the early dawn of civilization is harmonious with the discoveries, even of the latest archaeologists. (Cheers.)

Mr. D. HOWARD.—It seems to me that the last speaker has called attention to a very important point,—the special method in which this subject requires to be treated. The main question at issue between the men of a certain school and the Christian is, whether the natural course of man's progress is upward or downward. We cannot too clearly keep before us what we mean by civilization : there are two very different things called by that name recorded in Genesis,—the civilization of Cain and the civilization of Seth. It is not by accident that they are thus brought together. They are two entirely different civilizations, that may come together or not, more often not,—the material and the moral. As for some of the philosophers who speak about the progress of mankind, I wish they were a little more logical ; is there any proof, not only that an ape can develop into a man, but even that the ape-like man can ever raise himself in the scale of humanity ? Is not the whole tendency of a degraded race to further degradation ? There is only one thing that can civilize a race that is thoroughly degraded, and that is religion. There is nothing wonderful in any degree of ape-likeness in man, for man has a natural physical resemblance to the animal, and there is no doubt that if the moral nature is degraded, the animal nature gains prominence. It should be regarded as a compliment to some men to call them beasts, seeing that the beasts have so much the advantage of them. This only shows, however, that man is but the wreck of what he ought to be, and is not fulfilling his mission. But the question before us is, is there any proof that the palæolithic or neolithic man ever improved his position in the world ? We do find that certain great races have maintained their position, and they have been those whose religion has been the purest. The possibilities of improvement that we find in the Aryan and in some other races is surely not unconnected with the fact that their religion, poor at the best, was yet not utterly corrupt. The corrupt races have died out, and the religious races have risen. All this is comprehensible enough if we believe the history of Genesis. There is time enough, even in our chronology, to explain all that has really been proved about pre-historic man. Hypothesis

is nothing, and the split flint does not always prove a knife. (Hear, hear.) There is one point that I think we ought always to bear in mind, and that is, that these different ages of stone, bronze, and iron may overlap one another, and they certainly do not follow one another everywhere in unvariable order. They may all have coexisted in the iron age. This is a curious fact, and I have in my possession a proof of it, [in the shape of a stone knife, brought by a missionary from Rara Tonga, where it was used in the last generation for sacrificial purposes. (Cheers.)

Dr. E. HAUGHTON.—At this late hour I will not attempt to enter upon the large question of civilization taken in its widest sense. I would only mention, in relation to the finding of flint implements, that, on one occasion, in which a number of so-called flint arrow-heads had been collected and brought up for exhibition at various scientific societies, the explanation was given of how they came to be found by a person who had actually seen the flints fall from a height, and thus witnessed the making of them. They were flints embedded in chalk, at the top of a cliff, and they fell in such a way that many chipped into arrow-heads and other forms. With regard to Dr. Coleman's criticisms, I think he was hardly fair in his remarks; for when a member takes the trouble to give such a learned paper, he deserves the greatest consideration. There are many points in it which are suggestive and likely to be of much use; for instance, that with regard to the fatal gift of beauty. Dr. Darwin, in endeavouring to establish the doctrine of evolution irrespective of design, speaks of the gift of beauty only in reference to females; but we know there is beauty in flowers; and it would puzzle the wisest logician to find any utilitarian reason for that. God need not have made them beautiful, and this is an argument against Darwin's view, showing, as it does, that it is not merely the things which are gifted with increased endowments which thus receive an advantage over others, but that there is a real design in these endowments.

The HON. SECRETARY.—One word with regard to the existence of a palæolithic and a neolithic age in various countries, and its use as a measure of time. It is acknowledged by Dr. Dawson and other leading geologists, that in different countries the palæolithic and neolithic ages were contemporaneous, and it is still so in modern times, especially in some islands of the Pacific.

The CHAIRMAN.—Perhaps I may be permitted to trouble you for a moment, in order to add a little bit of criticism to Dr. Coleman's. He complained of the whole paper as containing many valuable facts, which, however, were not sufficiently connected. He had no objection to the ribs, but he lamented the want of vertebræ (laughter). I find fault, not with the body of the paper, but with the title. I protest against it, because I want it distinctly to be enunciated, as the view held by this Institute, that man was created civilized. Mr. D. Howard has already put that strongly, by insisting on the fact that there were two civilizations, material and moral; I would go still farther

for I believe that man was created civilized, both morally and (to a very great extent) materially. (Cheers.) He possessed from the first the *δύναμις*, or potentiality of material civilization, which only needed development by contact with the material world. We must look upon the savage not as the original primordial man, but as the degraded man, and I challenge the production of any instance of a really savage tribe having raised itself to a civilized condition. I do not think there is any authenticated instance; but if it has ever taken place, it has been through the power of religion, and of nothing else. Therefore, I only wish that this paper, valuable as it is, should have its title changed. It is not a dissertation on "the early dawn of civilization considered in the light of Scripture," but the light thrown by Scripture upon the early history of undegraded man.

Mr. J. E. HOWARD.—Dr. Coleman, my first critic, finds fault with the paper because I have said that we arrive at certain conclusions, those conclusions being not exactly mathematical conclusions. It does not appear to me at all logical to attempt to deduce the origin of mankind from Adam by any such reasoning as Dr. Coleman's seems to rest upon. My paper was intended for those who would agree with me that the Scriptures contain a truthful record of the earliest traditions of mankind, and therefore I set out with that as a *starting point*, without attempting to prove anything about the authority of Scripture. I merely say, *in accordance with the Scripture*, that Adam in the Hebrew is the name for all classes of mankind. There is only one name for mankind in the Scriptures, Adam being the generic name for the whole human race. There is a passage (Matt. xix. 4-6) in which our Lord takes up the two accounts of the first and second chapters of Genesis, referring to the great question of marriage, and unites them as teaching the creation of man. That is sufficient for me: I take it on the authority of our Saviour. I have already said that my paper must be looked upon simply in the light of a preliminary inquiry. In the case of such inquiries we are often quite unable to prove that which may still be stated, to a certain extent, as at least extremely probable. Mr. Allen made an observation in regard to the Deluge: all geologists admit that there has been more than one glacial period; I certainly did not say the glacial period was in consequence of the Deluge; indeed I indicated that the period before the Deluge was a specially glacial period; but I have no doubt that there were more than one such periods. As to Canon Titcomb's observations, I do not understand why he says he differs so much from what I attempted to say,—that I supposed the Palæolithic period to have been what we should call the Antediluvian period, and the Neolithic to have supervened upon that. I have said the Scriptures only record a short stone period in comparison with the ages that have elapsed, and have supposed that the Palæolithic age and the age of the first working of metals coincided to some extent—perhaps not in point of locality, but certainly in point of time.

The meeting was then adjourned.

INTERMEDIATE MEETING, JANUARY 18, 1875.

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 :—

MEMBER :—

E. Probyn Godson, Esq., B.A. (Cantab), Barrister, 3, Pump Court, Temple.

ASSOCIATES :—

M : A. Lombard, Geneva.

I. B. Nicholson, Esq., Tyrwhitt Road.

J. Wigan, Esq., Mortlake.

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

“Les Nurhags de la Sardaigne.” Par M : A. Lombard. *From the Author.*

“Science and Revelation.” By Professor J. L. Porter, D.D. *Ditto*

“Theological Colleges.” *Ditto.* *Ditto*

“Tacitus.” 2 Vols.

J. W. Lea, Esq.

“Cause and Effect.”

The Publisher.

A paper entitled “Observations on some Remarks upon Teleology and Morality by Professor T. H. Huxley, F.R.S.,” was then read by the Rev. G. Henslow, M.A. A discussion ensued in which the following took part :— Rev. Sir T. M. Lushington Tilson, Bart., Mr. J. E. Howard, F.R.S., Revs. Prebendary Row, J. W. Buckley, T. M. Gorman, J. Sinclair, and the Chairman. The Rev. G. Henslow having replied.

The Meeting was then adjourned.

ORDINARY MEETING, FEBRUARY 1, 1875.

C. BROOKE, ESQ., F.R.S., V.P., IN THE CHAIR.

The minutes of the last meeting were read and confirmed, and the following Elections were announced :—

ASSOCIATES:—Major J. H. Lutman, Shepherd's Bush ; Rev. T. H. Clark, M.A., Clifton ; Rev. Edgell Wyatt-Edgell, Lutterworth.

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

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| "Transactions of the Royal Society," Part 157. | <i>From the Society.</i> |
| "Transactions of the Geological Society," Part 120. | <i>Ditto</i> |
| "Transactions of the Society of Biblical Archæology," Part 1, Vol. III. | <i>Ditto</i> |
| "Theism and Modern Science." By Professor G. Salmon, D.D. | <i>Ditto</i> |

The following paper was then read by the author :—

THE INDESTRUCTIBILITY OF FORCE. By the Rev. CANON BIRKS, M.A., Professor of Moral Philosophy in the University of Cambridge.

THE Indestructibility of Force is one main pillar of that Fatalism which has lately been proclaimed by various writers as some grand discovery of modern science. According to Dr. Tyndall, "it binds nature fast in fate to an extent not before recognized," and is "an idea of the widest grasp and radical significance." Applied first to inorganic, it has rapidly embraced organic nature, and "brings vital as well as physical phenomena under its dominion." Nay, according to Mr. Spencer, the leading exponent of the new philosophy, it is an "*à priori* truth, which lies deeper than any other, and transcends both experience and demonstration" (F. Pr., pp. 189, 192). But before we resign our faith in prayer and worship, in God, Christ, and immortality, to this alleged discovery, let us look it closely in the face, and try to fix its real meaning. Rapid growths are suspicious. So are self-evident truths, discovered only yesterday. Mushrooms, in science as in nature, may grow up in a night ; but forest oaks are slower in their growth, and commonly need centuries to mature.

The doctrine has various names,—the Conservation, the Inde-

structibility, or the Persistence of Force, and the Conservation of Energy. The first has been perhaps the most usual. But Professor Huxley and Mr. Spencer detected in it a serious defect. Conservation seems to imply a Preserver, and an act of conserving. But this jars on the instincts of the new school of materialism, and contradicts its doctrine of the Unknowable. They propose, then, the Persistence of Force as a better name. But their object is hardly attained. Language is obstinate, and brings in moral ideas, in spite of the most careful efforts to exclude them. Persistence, as the dictionaries tell us, means "perseverance in a good or evil course, usually in one injurious," "obstinacy or contumacy." It naturally implies a persevering action in spite of remonstrance or opposition. If the phrase, then, gets rid of the idea of a Preserver and Moral Governor, what does it introduce in its stead? A deaf, blind Fate, which will persist in its course, heedless of all complaints from victims whom it tramples to death, or any attempted control by human or Divine intelligence. The idea it suggests is of the broomstick in the tale, that would persist in carrying buckets of water, till its owner's house was deluged. He cut it in pieces, but the charm was strong in each fragment, and it carried the more. "The mere machine saw and understood nothing. Insensible and without fatigue, it would have carried into his house the whole river." But a higher power, gifted with reason, interposed. The charm was reversed, just in time to avert a great catastrophe, and the senseless, persistent thing persisted in its work no more.

The other variation is still more important, and affects the essence and definition of the doctrine. This Titan of science, like Briareus in Homer, has two different names. It is Force with common mortals, but with analysts its name is Energy. And this is of two kinds, Kinetic and Potential. The conservation is of their sum, and is a privilege which belongs to neither of the two partners, but to the partnership alone.

The Indestructibility of Force, its name with Dr. Tyndall, is a vague expression, and may mean three or four different things. First, the indestructibility or invariableness of Force Proper, as defined in Newton's laws, and dynamical science. Secondly, that of Force improper, that is, of motion or momentum, measured either by the velocity or its square. It will then assert the constancy of the collective or total motion of the universe. Thirdly, it may be the constancy of a Potential function, depending on the laws of force, either actual or supposed. Lastly, it may mean the constancy neither of force nor motion, but of a sum formed from both by some rule or process of dynamical science.

The nucleus of truth in the doctrine, around which has gathered no slight amount of ambiguity and pretentious falsehood, consists of three main elements.

First, a separate fluid of Heat or Caloric, the usual theory of last century, and the basis of the treatises of Fourier and Poisson, has been set aside. The earlier view of Lord Bacon, that heat is a special form of atomic motion, held since by Locke, Rumford, and many others, has gained a complete triumph. By the skilful researches of Joule, Seguiet, Thomson, and others, the number of feet of elevation, which answer in mechanical force to a degree of temperature, has been very nearly determined. In an age of steamboats and railroads, such a determination is of value to engineers, and is well adapted to arrest the popular mind, and seal the triumph of the corrected theory. But in point of abstract science, it is a detail of slight importance. Some such equivalence is a self-evident result, when the view of heat as atomic motion has once been received.

The second truth is wider and more comprehensive. The walls, which parted asunder different classes of motion, or modes of atomic force, have been slowly removed. Hypothesis took the form, in the last century, of inventing distinct fluids for each main set of phenomena to be explained. Thus, in different works, we had one or two kinds of electric fluid, one or two of magnetic, a separate fluid of heat or caloric, and a luminiferous ether, or else a substance of light, shot out with immense velocity. But the progress of research has broken down these artificial barriers. Electro-galvanism, electro-magnetism, thermo-electricity, thermo-magnetism, actinism, and the polarization of heat and light, have bridged over the limits of separation. A heptarchy of sciences has been changed into an united monarchy. All these phenomena are now referred to one ethereal medium, in conjunction with ponderable matter; while some hold that even this is not required, and refer all these changes to the affections of matter alone.

The third element is more important. Let us assume the only forces of a system to be of the same class with gravitation, —attractions or repulsions, that depend only on the distance of the atoms, and increase by some definite law when the distance is lessened. A simple relation between the initial and final distances, and the motions produced, will then result from pure dynamical reasoning. However complex the system and its motions, the amount of motion generated or destroyed will not depend on the paths of the particles, but on the first and last distances alone. This truth, under the old name, *Conservation of Vis viva*, has been familiar to mathematicians ever

since Newton's days. But its application was limited by the opinion, common to Newton and many others, that the atoms, being finite and hard, might collide with each other. In this case motion would be destroyed when they met with opposite velocities, and the formula would fail. But all later researches have rendered this hypothesis of atomic collision less and less probable, though they can hardly be said to have proved its falsehood. And thus the *Conservation of Vis viva*, from a mere conception or hypothesis, has risen into the dignity of a probable fact, so far as physical forces are concerned, in the actual constitution of the material universe; and some analysts have coined for it this new name, the Conservation of Energy.

This old formula of dynamics, borrowed from mathematicians, has passed into the hands of experimentalists in physics and physiology. It then becomes the Indestructibility of Force, and is announced as a grand scientific discovery of the last thirty years. Mr. Spencer, the great apostle of evolution, goes a step further. He calls it the Persistence of Force, and affirms it to be no result of experience, but an ultimate, self-evident truth, of which no inductive proof is possible. Its denial is a pseud-idea, and unthinkable. The human mind, he says, is incapable of thinking the opposite. It is a truth "defying contradiction, and transcending demonstration." Even this does not exhaust its claim on our faith: it is "the sole truth which transcends experience."

But let us descend from this lofty cloudland, this extreme dogmatism of a wholly sceptical philosophy, to the humbler region of plain reason and common sense. Before we can decide the controversy whether this doctrine is true or false, a great recent discovery, or a greater *à priori* truth, which men have always held and could not help holding, because its opposite is unthinkable, or itself a demonstrable falsehood, the mere product of confused thought, we must first settle what it really means. Is it Force or Energy of which it speaks? Or are Force and Energy the same? If distinct, is the doctrine true of both, or of either? Is the indestructibility by human power only, or by any power, human or divine? Is it a conservation without any preserver, or a persistence without any person or thing that persists and perseveres? Is it indestructibility when no one attempts to destroy, and when there is no existence, nothing but an abstract quality, or the mere total of an arithmetical reckoning, to be destroyed? Let us try to unravel this tangled skein, so that we may see clearly the true character of this great experimental discovery, or still

greater *à priori* truth, which some would instate like a divinity on the throne of the universe.

Force, by the usual definition, involved in Newton's first and second axioms, and accepted in all works of exact science, is that which produces or tends to produce or destroy motion. To this definition two objections have lately been made, but wholly groundless. The first is that change in the state of matter with respect to its rest or motion may be produced by other matter in motion without the intervention of any force. But this is a radical misconception. A moving body does not alter, and cannot be conceived to alter, the state of another, except by the intervention of force. When the force varies with the distance, the motion of course alters its amount. Thus there may be immense repulsion occasioned by impact or apparent contact. But assume the absence of attractive or repulsive force altogether, and the motion of one body will have no effect at all on any other. Again, it is said that the resistance of a support is obviously not a force, but a statical pressure. It is, however, obvious that it is a force, *because* it is a statical pressure. For this really answers to one half of the definition. A pressure is a force which *tends* to produce motion, without actually producing it, because it is met and balanced by another.

Let us now begin with the postulate which the doctrine plainly requires, to assume a definite form. Let us conceive the universe to consist of atoms, finite in number, or else all our calculations and reasonings will fail, but inconceivably numerous, and acted on by no forces but of mutual attractions and repulsions, which lessen as the distances increase. Let us further take Force in its proper sense, just defined, on which the Principia and all trains of strict dynamical reasoning depend. Is the total of force, in such a universe, fixed, constant, and invariable? It is one of the simplest truths of Dynamics that it varies continually, from hour to hour, from moment to moment. If attractive forces are in excess, it increases in a condensing system, and decreases with dilatation. With repulsive forces it is the reverse. But it never for a moment continues the same. Of Force properly so called, the doctrine is not true at all, but exactly reverses the real truth.

But Force is the cause of motion, and the motion caused by it often borrows the name. Thus momentum, or the mass multiplied by the velocity, is viewed as a kind of variety of force, and *Vis viva*, or living force, is used to express the amount of motion, as measured by the product of the mass and the square of the velocity. Is the statement true of the *Vis viva* of a system, or the force in this improper sense? On the

contrary, the same remark applies as before. In a system under attractive forces, the motion, like the force, increases when the system contracts, and lessens when it expands. With a system of repulsive actions it is the reverse. But in either case, or a combination of both, the motion is not constant, but may increase continually, from a state of absolute rest to one of immense and ceaseless activity.

The maxim then, that Force is constant, indestructible, and unvarying, whether the term be taken in its strict and proper, or in its less proper and secondary meaning, is quite untrue. It varies in amount continually, with every change in the system to which the forces and motions belong. Let us see whether Mr. Spencer can throw any light on this great difficulty. How does he show that it is a self-evident, *à priori* truth, of which the opposite is inconceivable?

The proof he offers consists of two elements. First, we cannot measure and compare forces without assuming a unit of force. Now this unit is arbitrary. We can never prove by experience that it does not vary. Thus an *à posteriori* proof of the constancy of Force is impossible. Therefore, since it is certainly true, and cannot be proved by any amount of experience, it must of course be an *à priori* truth (F. P., pp. 185-188).

The desired conclusion is thus reached with surprising facility. And plainly there is no falsehood which may not be promoted into an *à priori* necessary truth, in the same easy way. First, assume it to be true. Next, show that no experience has proved it, or can prove it. It will then result at once that it must be an *à priori* truth.

The second part of the proof is equally simple. The equality of action and reaction is Newton's third law, and assumed in nearly all dynamical reasoning. But to assert this is to assert that force is persistent.

Now, first, Newton gives four pages, after stating the law, to prove it by various experiments. This is a strange warrant for the doctrine that it is true *à priori*, and that the converse or negation of it is inconceivable. Next, in a recent work on molecular mechanics, a denial of this principle is assumed in the main hypothesis, and the results of this unthinkable idea are thought out, through nearly three hundred pages of calculation and reasoning. But besides this double disproof of Mr. Spencer's assertion, the Persistence or Constancy of Force, and the equality of Action and Reaction, are wholly distinct and almost independent in their meaning. Let us take the simplest case. Let two attracting atoms fall towards each other in a straight line. Their action and reaction

are equal and opposite. A pulls B, and B pulls A, to the same amount, but in opposite directions. And the result is not the constancy either of force or motion, but their continual increase from zero to an infinite value.

In short, the Persistence of Force, in Mr. Spencer's treatise, means four or five different things, one wholly irrelevant, the rest inconsistent, untrue, and even absurd. First, it is Newton's third law, or the equality of action and reaction. "To assert that action and reaction are equal and opposite is to assert that Force is persistent" (p. 188). This is a truth, but one wholly distinct from the one with which it is confounded. Next, it is the same with the non-annihilation of matter, which means that "the force a given quantity of matter exercises, remains always the same" (p. 177, § 54). Thirdly, it is the constancy of each force in any system of forces; for "to conceive one or more of the forces to have increased or diminished is conceiving that force is not persistent" (p. 193, § 53). Fourthly, it is the constant variation of all forces, attractive or repulsive, by the law of the inverse square. For this law, we are told, is no discovery of Newton, but the inalienable possession of every thinker from the beginning. It is not simply empirical, but is deducible mathematically from the relations of space, and one of which the negation is inconceivable. We are thus taught the double *à priori* truth, that forces cannot be thought of as varying at all, and must be thought of as always varying in one particular way. Lastly by the persistence of Force "we really mean the persistence of some Power which transcends our knowledge and conception. In other words, asserting the persistence of Force is but another mode of asserting an unconditioned Reality, without beginning or end" (p. 189). Thus its final sense is the known and certain continuance, through all time, of some Being or Power wholly unknown, or the constant invariable sameness, in quantity, of some Power wholly inscrutable, and thus incapable of any measurement whatever.

To find what we seek, we must escape from this quagmire of contradictions, and turn to the mathematicians. Their phrase is different, not the Persistence of Force, but the Conservation of Energy. Let us try to learn what it really means.

Force, in dynamics, is the cause of motion, and distinct from the motion it causes. Suppose the force to cease, and the motion caused by it will continue. Let the force still act, and the velocity or motion is increased. Let some opposite force act, and the motion is diminished. Now let two bodies act on each other by a law of force, which depends on the inverse distance, and their motion be measured by the square of the

velocity. Then a certain amount of motion is produced, when they pass from one given distance to another. In repulsive forces, the motion is increased when they recede, and in attractive forces, when they approach nearer. The change in the total motion when so measured, does not depend on the path, but on the initial and final distances alone. The old name of the motion, thus increased or diminished, is *Vis viva*, and the new one, not at all clearer, Kinetic Energy.

In the same case, we may calculate, or express by algebraic symbols, the total amount of force which is exercised in passing from any one distance to another. Such a total, when reckoned, from the actual distance to some natural limit, if such can be found, may be called by the new name, Potential Energy.

The result, in the case of repulsive forces, takes a simple form. The motion increases as the system dilates, and the bodies or particles recede from each other. But the Potential Energy, in repulsive force, has for its natural limits the actual distance and infinity. For then the force of repulsion would vanish, and it becomes less and less, as the distances increase. Thus, the motion or Kinetic Energy increases, and the Potential Energy, a right unit being assumed, decreases by a like amount. Their sum, therefore, or the Potential plus the Kinetic Energy, will be constant and invariable.

But in all cases of mutual attraction there is a serious difficulty. For by such force bodies do not pass from a finite to an infinite distance, but from a greater to a less, from a finite distance to coincidence. Thus the Potential Energy, if reckoned as before, between the actual distance and infinity, where the force vanishes, has a wrong sign. It increases with the increase of the acquired motion, and not their sum, but their difference, will be constant. As a mere matter of calculation, the case is easy. The Potential of an attractive force, if reckoned from zero to its value at any finite distance, must have a negative sign. The total Energy, if the system has started from rest at any finite distance, will be negative also. But if this Energy be taken for the supreme and ultimate power of the universe, a kind of Divinity, to make it an algebraic quantity with a negative sign is too ridiculous. Also to assume an arbitrary distance, within which no attraction can be exercised, contradicts the law, which recognizes no limiting distance. Thus, to save the theory, the Potential Energy, in attractive powers, must be reckoned from the actual distance to coalescence. But then the force, and its total sum, the Energy, become infinite and immeasurable.

The Conservation of Energy thus denotes the constancy of a total formed from three distinct elements. (1) The Kinetic Energy, or sum total of motion. (2) Repulsive Potential Energy, reckoned from the actual to an infinite distance. (3) Attractive Potential Energy, reckoned from the actual distance to zero, where its amount is infinite. But if the repulsive and attractive vary by a mixed law, so as to give a neutral distance, the Repulsive and Attractive energies must be reckoned alike from the actual to the neutral distance, but in opposite directions.

Such is the exact nature of the Conservation of Energy, as a mathematical formula within its own proper limits. It implies and requires a special hypothesis as to the nature of the acting forces, and deduces an important and useful dynamical result. But when turned into an alleged discovery, the result of recent physical induction, or into an *à priori* truth, which enables us to explain the universe without a Divine author, it is transformed into a condensed cluster of logical fallacies and metaphysical contradictions.

And first, this indestructible total, always the same, is a numerical and not a real total. Force, the cause, is not the same with motion, the effect. When a body moves uniformly in a right line, there is motion but not force. When two bodies press oppositely against a third with equal pressure, there is force but no motion. Take any frustum of a paraboloid with a circular base. Take the whole height of the paraboloid for the unit of height, and the circular base for the unit of surface. Then the sum of the height of any frustum, and of the circular top, measured in fractions, will always be unity. But this constant total is a mere numerical abstraction, since a height cannot really be added to a surface, being different and heterogeneous in kind. Thus the alleged doctrine, that force is indestructible, because the total of two kinds of energy is constant, turns a numerical relation into a chimera, devoid of real meaning.

Fallacy the second. Let us waive this first decisive objection, that force and motion are not the same, that a real total cannot be formed of unlike elements by any device, and least of all by confounding them under an ambiguous name; that each of them separately is highly variable, and that what is really constant is a numerical abstraction, and nothing more. Let us admit the power of this name, Energy, to fuse into one total unchangeable and indestructible, these unlike elements, Potential Energy, or force, and Kinetic Energy, or motion. We may at least claim that both elements which compose the

grand total shall actually exist. The *Vis viva*, or Kinetic Energy, does exist. Its amount is the total motion of the system, measured by the square of the velocity of each particle at any moment. But the case of the Potential Energy is just the reverse. It is composed, not of forces that now exist, but of possibilities of forces that would exist hereafter under conceivable conditions of change. The Potential Energy of a pair of atoms, if the force is simply repulsive, is the total of force that they would exert on each other in receding from the actual to an infinite distance. If the law is simply attractive, it is the like total, exerted on each other in approaching nearer to absolute coalescence. If the law is mixed, with repulsion for small distances, and attraction for the rest, then the Potential Energy is the total of force that may be exerted in passing from the actual to the neutral distance. And thus the entire Potential Energy is not the force existing at the present moment. It is a total of the force that may or might be hereafter exercised through as many different periods of conceivable future time as there are pairs of atoms in the whole universe.

To make this objection clearer, let me adopt the same license in a similar case. I wish to prove that the number of persons in the streets of London from day to day is constant and unvarying. And I succeed in this way. First, I note in thought those actually present in the streets this day, and call it the kinetic street population. Next, I contemplate the vast number who, under social laws and conditions, have been determined to use the streets every past day since the city was peopled, and call it the Past Potential of street population. Next, I form a Future Potential of all those who will, under the laws of London life, be led to walk in its streets through all the successive days of its future existence. I sum these three elements, and their total is of course invariable. Here, then, we have the *à priori* basis of a new Sociology, that the number walking in London streets, actual and potential, has never varied, and cannot vary to the remotest age.

Fallacy the third. This total Energy, said to be invariable, is the sum of the actual motions, and of two potencies, measured from the actual to an infinite distance in repulsion, to zero or coalescence in attraction, but in a mixed law to the neutral distance, under the assumed conditions, on which the formula for Energy depends, that attracting points can only come nearer, and repelling points recede. But the real conditions are different, and almost opposite. Each atom, in approaching some, recedes from others. Forces act not only to create or increase velocities, but to lessen or destroy them. In moving

from distance A to distance B, a potency of acceleration disappears. But it is replaced at once by an equal potency of retardation, when the same distance is traversed the opposite way. Now Force is equally Force, whether it accelerates or retards. Thus, when the distance varies, the entire Potential Energy is really unchanged, and one part of it simply changes its name or direction, being the same in amount as before. On the other hand, the motion or Kinetic Energy varies every moment. The sum of both, or the motion plus the Potential Energies, must therefore vary just as much as the motions themselves.

Fallacy the fourth. The doctrine not only confounds motions with forces, and actual motions with forces merely possible and conceivable, not actual, excluding one half of the real potencies themselves. It also involves a further defect, as fatal as the rest. These Potencies, for the main part, are real impotencies. The total is made up from all the forces that would act through all possible changes of distance, if each pair of atoms were left to their own mutual action alone, to the furthest limit. With a purely repulsive law, this involves a finite value, but an infinite distance, and an infinite time. With a purely attractive law, a finite time and distance, but an infinite amount or total. In a mixed law, with repulsion dominant at small distances, the repulsive Potential Energy, to resist union, is also infinite. Now these Potencies, to become real, with a trillion atoms, would require the fulfilment of a trillion times a trillion contradictory and impossible conditions. But our atoms cannot isolate themselves. They are bound by the laws of physics, even if the mind of man is free, and not bound by them. A main part of the Potential Energies are real impotencies, because the co-existence of the other atoms forbids the very condition on which the existence of these potencies depends.

Fallacy the fifth. The whole doctrine assumes that the separate energies, which compose the grand total, are finite and measurable. There is, on this view, a fixed amount of Force or Energy, which travels from atom to atom, and changes its form, but still remains always the same. "We must recognize the amounts as determinate, as necessarily producing such and such quantities of results, and necessarily limited to those quantities" (F. P., p. 203).

Here we meet a double and fatal objection. First, if the total be finite and measurable, who has fixed this limit? The unit of measurement is plainly arbitrary; but the amount or number of these units is arbitrary also. We can plainly conceive it greater or less than any finite value whatever.

What voice, then, has said to this mighty ocean of Primeval Force, Hitherto shalt thou come, but no farther, and here shall thy proud waves be stayed ?

By the laws of force, however, so far as science has detected or conjectured them, the force depends on the inverse distance, and will be infinite when two particles touch or coalesce. The energy, which is the integral of the force, will then become infinite also. What the doctrine, therefore, requires, is a vast summation of infinites, a strict, equated total, made out of trillions of trillions of things each immeasurable.

Such is the five-fold contradiction involved in the so-called Persistence, Constancy, or Indestructibility of Force, on its dynamical side. But the metaphysical or ontological falsehoods it involves are not less numerous.

The first of these is the same as with the twin doctrine, the Indestructibility of Matter. In the Neo-Lucretian philosophy God is a Being wholly unknowable and unknown. "The Power which the universe manifests to us is utterly inscrutable" (F. P., p. 146). And Force, too, like God and Matter, is wholly unknown. "It is a truism to say that its nature is inscrutable" (p. 170). "It is impossible to form any idea of Force in itself, and equally impossible to comprehend its mode of exercise or law of variation" (p. 61). Yet we are taught that this wholly unknown Being, whether he has a will to do it or not, cannot destroy one particle of this wholly unknown and unknowable thing or quality, which we call Force or Energy. Nay, we are assured that this is an *à priori* truth of the first order, on which all science is based, which every one has always believed without knowing it, and could not help believing. Can there be conceived, I would ask, a worse superlative of hopeless, incurable contradiction ?

Contradiction the second. The doctrine assumes that motion or Kinetic Energy is the same identical thing or quality with Potential Energy, because of a numerical equivalence, when reckoned in one especial way. But this is wholly untrue. A rectangle, when its breadth is the unit of distance, has its length and its area or surface expressed by the same number. But a length and a surface are not on that account the same. Kinetic Energy is the sum of the squared velocities, or the squares of the rates of speed at which every pair of atoms change their distance from each other. Potential Energy is the sum of all the pulling or pushing forces that might or would be exerted under a given law of force, in the change from one distance to another. A rate of actual speed, multiplied into itself, is one idea. A sum of pushes or pulls, not actual, but

possible in many successive instants to come, is clearly another. To call them the same thing transformed, because the number denoting them may be the same, is not more reasonable than to say that a company of travellers are the same with their own railway tickets, or that these tickets are the travellers themselves transformed. A cannon-ball is shot upward at the rate of a thousand feet a second. The doctrine affirms this speed or motion to be the very same thing with the place of that ball on the top of a mountain three miles high. But such an identity is metaphysically inconceivable, and practically absurd.

Contradiction the third. Motion, by the theory, may be transferred from one body to another, remaining the same motion still. It may reverse its direction, and be the same motion, if its rate be the same. On this assumption alone can the indestructibility or persistence of that part of the Energy, which consists of motions, be maintained. The motion is to be one and the same, whether it moves five feet a second northward, or rebounding from a wall, five feet a second southward; or whether B, after collision, moves five feet a second northward, and A is at rest; or whether A is at rest, and twenty-five other bodies move one foot a second northward, or whether B moves four feet a second in one direction, and C three feet a second at right angles, A being at rest. But the sameness and identity of motions, when neither the moving thing, nor the direction, nor the speed is the same, but all in turn different, does violence to the fundamental laws of human thought. The transfer of motion, in a few simple cases, is a lawful and expressive term. It describes the fact by an easy figure. But when mistaken for a logical truth, and turned into the basis of a theory of the universe, it is wholly and palpably groundless. In a collision, the motion of the body arrested, and of the body impelled, are not and cannot be the same motion. They are not the same in the subject, and motion is the quality or state of a thing, not a separate existence. They are not the same in time, for one has ceased when they separate, and the other has no existence before contact. They are not the same even in direction, except in a very limited class of collisions. In short they admit of every conceivable kind of diversity.

Contradiction the fourth. The motions, which compose and form the Kinetic Energy, need to be abstracted from their direction, and from the particles or bodies which move, and when this separation has been made, to be summed in a total, which constitutes one main part of the new indestructible divinity. But by this severance, the motions neutralize each other, and the total disappears. In a universe, the parts of

which act and react on each other, the centre of gravity or action must be conceived immovable. There is just as much motion up and down, forward and backward, to the right and to the left. Real motions must be motions of something or other. If many motions are really summed into one motion, it must be the motion of some one thing or body. But when we thus dismiss the individual bodies, and retain as fixed and permanent the motions only, the plus and minus values neutralize each other. Thus the only result of the summation is not motion at all, but absolute rest. Treat these forces, not as attributes inseparable from particular bodies that move, but as things, like liquids, that may be poured from vessel to vessel, and they resolve themselves into a collective movement of nothing nowhither, and wholly disappear.

Contradiction the fifth. The Potential Energy supplies another element of confused thought and metaphysical incongruity, as striking as the last. It depends for its real existence on our confounding the present instant with millions on millions of finite periods of future time, or intervals of possible future change. The countless millions of periods, which every pair of atoms would require in passing from their actual distance to zero or infinity, are assumed to be all in present existence, and included alike in each passing moment. The Kinetic Energy is counted once only, through all successive instants, in the common part of it, however much it may be increased. But the Potential, whether it increases or diminishes, is reckoned over and over again, in the common part of it, however many instants of time there may be.

Contradiction the sixth. The theory affirms the force of the universe to be persistent and invariable in amount, but to undergo incessant changes of form only. It is indestructible as adamant, but exceeds Proteus himself in its capacity and appetite for transformation. But when Force is divorced from matter, of which it is the quality, and turned into a supreme divinity, these transformations are left without any cause or possible explanation. No higher Power or Will is allowed to interfere. Force, blind Force, must reign supreme, binding mind and matter alike in the bonds of fate, and admits of no rival near its throne. But why should it inflict on itself a perpetual self-torture? Why cut itself, from moment to moment, into innumerable sections or fragments, no sooner reunited, than triturated with new divisions without end? Why is this Force, our new divinity, condemned to a fate like that of the wandering Jew, so as to rove from atom to atom, from world to world, throughout infinite space, with no limit to its wanderings, and no motive for its restless

change? Now it is solar force, and now terrestrial; now sensible in masses, now latent and atomic; now a wave of light, and now of sound; now buried deep in the earth, and now vanishing in the infinite azure of heaven. What other power compels the blind Titan to weary itself in these ceaseless transmigrations? We can easily conceive one body, endowed with active power, pushing or pulling, seeking or avoiding, another. But how can we conceive a particle of motion, which is not a thing that moves, but an abstract quality or relation, pushing or pulling another particle of the same force? And even were this conceivable, since our total includes all the force in the universe, what other force can remain by which this blind Samson of modern speculation is compelled to grind for ever in his dreary prison-house?

A last contradiction remains. The Indestructibility of Force, in its only definite sense, depends on our forming or conceiving a vast total of Potential Energies. This total consists of as many elements as there are pairs of atoms in the universe. Each element, again, can only be calculated by conceiving all the rest of the universe cancelled and destroyed, and that pair of atoms to exist and act alone. As each partial Energy can only be conceived and reckoned under this hypothesis, so it can have no real existence, unless this conception is restored. The theory, as taught by Mr. Spencer, thus involves an almost infinite amount of self-contradiction. It affirms, first, that the total quantity of matter in the universe cannot be conceived as diminished, any more than conceived to be increased (F. Pr., p. 143). Next, it affirms as a twin doctrine, a primary truth, transcending demonstration, the fixed, invariable constancy of the total Energy of the universe. Yet this constant total, for its very existence, requires not only the conceived, but the actual destruction of the whole universe, save two atoms, as many times repeated in each single moment as there are pairs of atoms in all its countless worlds.

The Persistence of Force, it thus appears, is no grand *à priori* truth, anticipating experience, and transcending demonstration. In the form it assumes in Mr. Spencer's work it condenses into one ambiguous phrase a dozen demonstrable errors and contradictions. The view in Dr. Tyndall's address, that it is at once a result of modern induction, and an *à priori* truth, needs no refutation. One alternative clearly excludes the other. On the other hand, the conservation of *Vis viva* is neither a proved conclusion, from ample scientific induction, nor a self-evident and necessary truth. It is the consequence which results from a conceivable hypothesis on the forces of the universe, that all

of them are functions of the inverse distance, and of that alone. It fails in three cases, all conceivable, one probable, and another certainly true: that the ultimate atoms are finite, and may come into direct collision; that forces exist, such as vital forces seem to be, depending on time as well as distance; and that selection or choice mingles with the action of force, so that all change is not blind, indiscriminate, and purposeless activity. And even when these cases are excluded, the constants of position, which are three times as many as the atoms of the universe, could never be determined by the mere laws of force. They must be explained by the will and foreseeing wisdom of the Supreme Architect and Governor of the universe, and can be reasonably accounted for in no other way. For, as Newton truly observes, "blind necessity, which is the same always and everywhere, could never produce this wonderful variety of natural things."

A third view has still to be examined,—that the Conservation of Energy, though not a necessary truth, is still a proved result of scientific induction. The author of the interesting paper on Force and Energy, read here two years ago, adopts this position. His doctrine is that the energy of the universe is shown by experiments to remain unchanged, not that it is unchangeable. The creation of matter, he says, must imply the creation of energy. Those who deny the possibility of one, must deny the other also. They must, in fact, deny the existence of Omnipotence. The writer complains, also, very truly, of the confusion and ambiguity with which these two names, Force and Energy, are often used. But his own definitions of them seem to me clearly erroneous, and the attempt to prove the principle as a universal, though not a necessary truth, wholly to fail.

Three fundamental errors have been already pointed out, which contradict the first principles of clear dynamical reasoning: that statical pressures are not forces, that friction is not a force, and that one body in motion can move another without the intervention of any force whatever. The last of these would reduce the whole science of dynamics to a heap of ruins, and undo and unteach all that Newton and his successors have taught and done.

The statements concerning Energy, and its relation to Force, seem to me plainly inconsistent, and neutralize each other. First, force is that which produces mutual attraction and repulsion (§ 8). Next, it is attraction or repulsion, a push or a pull (p. 28). The second statement is exact, and not the first. It cannot be attraction or repulsion, and something else which

produces them. But further, its character is "the power of imparting energy" (§ 8). Now since it has just been defined as a push or pull, or the power of imparting motion, it follows that motion and energy are the same. But "power of imparting energy" is denied to be a true definition, because "energy may be imparted by other matter possessing energy, without force" (p. 3, l. 14). And again, "energy is not, as frequently assumed, synonymous with motion." But by the definitions the only test of force is the impartation or extinction of motion, and if force may be characterized as a power of imparting energy, then energy is and must be motion.

But another definition is offered, the power of doing work. This merely transfers the obscurity to another word. For what is this work to be done? If not motion, or some change in the position of masses or atoms, what else can it be? But if the work to be done is moving things from one place to another, then force and energy come to be the same, as before energy and motion. Still further, in §§ 24, 25, light and heat are said to be accurately defined as "a very brisk agitation of the insensible parts of the object." Yet in § 29 we read that they "have frequently been illogically designated as 'modes of motion' by able physicists," and this "has led them into a hopeless confusion of the terms, force, energy, and motion." But a very brisk agitation is certainly a mode of motion, so that the paper is a fresh instance of that confusion of which its writer justly complains.

The source of all this perplexity seems to me very clear. Force is one distinct idea, motion is another. Force is the conceived cause of motion. Motion is the perceived effect of force. Each may be actual or possible. There are forces which now act, and others, different in amount, which may act in different circumstances. There are actual motions, and motions possible or conceivable. Energy is an ill-devised term for confounding together these different ideas, to gain thereby an apparent constancy which does not exist. Kinetic Energy is not force at all, but a sum total of actual motions. Potential Energy is not motion at all, nor actual force, but a sum total of conceivable forces under varied, non-existent conditions. The introduction of these ambiguous terms, instead of helping scientific insight, breeds endless and almost hopeless confusion. Energy is mistaken for a third thing, distinct alike from force and motion. It is not synonymous with motion. It is not synonymous with force. It is something which transfers itself, without force, from body to body, when motion is transferred, and yet is not motion.

Force has the power of imparting it, but energy can impart or transfer itself, without force. Heat, light, and the rest, are not forces, but forms of energy. They are brisk, vibratory agitation. Yet neither are they "modes of motion," but forms or kinds of energy. All this hopeless labyrinth of confusion arises from confounding two distinct ideas under one ambiguous name, and then fancying that we have discovered a third object of thought, distinct from both, and hereby effected a grand scientific discovery.

To recover clearness of thought we must hold fast this simple truth: Kinetic Energy is one thing, and Potential Energy another, quite distinct. The first is motion, the second, force, the conceived cause of motion. The first is actual motion. The second is not actual force, but a summation of possible future forces. Assume that forces depend only on the distances, and have acted and will act, only within limits of distance somehow defined; and the increase or diminution of motion will of course answer to the sum total of past force exercised; and when the remaining possibilities of force, up to the conceived limit, are added to this past effect, we shall have not really but numerically, a constant sum.

Like Force, Energy produces motion, and still is not Force. It is transferred when Motion is transferred, and is not Motion. Force and Motion both convey it, and still it is neither. Heat, Light, and Sound are not forces, nor, as some illogically say, modes of motion, but forms of energy. Yet Bacon and Locke have well defined the first, and might have defined the others, as "brisk, vibratory agitations."

All this confusion is the natural result of mixing up two ideas under one ambiguous name. Sometimes it means one, sometimes the other. All the properties of each may thus be affirmed and denied of it in turn, and with equal truth. Kinetic Energy has all the characters of motion, not of actual or possible force. Potential Energy has those of a sum total of possible forces, but not of actual force, or of actual or possible motion. This third something, called Energy, distinct alike from force and motion, is an idol of the marketplaces of science. It is an illusion and shadow, though some dare attempt to place it on the throne of the universe.

Let us examine the doctrine, freed from this ambiguous and deceptive phrase, on the side of induction and experience. The conservation of motion, to pass from an hypothesis into reality, requires three conditions to be fulfilled. First, in Physics, it excludes the notion of ultimate incompressibility, which Sir W. Hamilton and Mr. Spencer alike accept as a fundamental law

of thought. For motion would be destroyed by collision of finite atoms, which stop each other, without gradual repulsion, by their impenetrable extension alone. Next, in physiology, it excludes all forces which are functions of the time, or which begin at a fixed time, reach a maximum, and sink to zero at or within some given period. It excludes also discriminating attraction or repulsion, determined not by mere distance, but by relation to some type or model. Now these are exactly the two characters which life and living organic powers appear to possess. Thirdly, in humanity and theology, it excludes all forces which depend on the desires of sentient creatures, and the choice and will of a reasoning and moral agent, human or divine. The first of these three conditions is probable, but not yet proven. The second is both unproved and improbable. The third is not only unproved and improbable, but certainly and most mischievously untrue.

Mr. Brooke's paper on Force and Energy, on this higher side, is a total contrast to Mr. Spencer's Principles and Dr. Tyndall's address. Instead of binding nature fast in the bonds of fate, to the destruction of all morality and religion, he confines the doctrine to physics as its only legitimate scope, and views it, even there, as wholly subject to the wisdom and choice of an almighty and omniscient Creator. But within the limit of Physics the contrast ceases, and is replaced by a strange resemblance. Both Mr. Spencer and Mr. Brooke affirm the doctrine, almost with equal confidence, and both alike, without consciousness of the inconsistency, reject and set aside the conditions essential to its truth. My own theory of Matter and Ether, published twelve years ago, satisfies those conditions. I still believe it, if not true, to be a close approach to the truth, and a help to its future discovery, and expect that the real laws of nature, if different from those I have suggested, will equally fulfil these main conditions. But Mr. Spencer, who takes the doctrine for a necessary truth, and Mr. Brooke, who thinks its truth indisputable, from the inexorable logic of facts, and clear as the sun at noonday, deny four main premises, required for an intelligent acceptance of the doctrine, and thus reduce it to ashes with their own hands.

The Conservation of Motion, or the use of the Potential Function, as a dynamical formula, applies to any system, great or small, where all the forces are functions of the mutual distances of the atoms alone. To make it the known law of the universe, two things must be proved and known,—that such atomic laws do exist, and that no forces or powers operate

beside them. Its truth thus depends on these four formal conditions.

First, we must know, not only that atoms exist, but all the laws of force which exist between them. But Mr. Brooke affirms (p. 31) that we know nothing of their nature, and at the close of his paper repeats the statement once more. And Mr. Spencer lays down among his first principles that matter is inscrutable and unknowable, and that any force of matter on matter at a distance is inscrutable also. If so, the conservation of motion, according to one view, is unthinkable and inconceivable, and according to the other, wholly unproved and unknown.

Secondly, the doctrine involves the view of atoms as simply centres of force, not finite, impenetrable part of extension. And this for two reasons. Distances can only be strictly measured from some point, not from a bulk or space, for then the attraction or repulsion would have many different values at the same time, which is impossible. And next, these impenetrable atoms, by meeting, would destroy each other's motion. Hence Newton, who held this view of them, held, as the proper consequence, no conservation of motion, but its slow and ceaseless extinction. Yet Mr. Spencer sets aside the notion of force centres as wholly unthinkable, and Mr. Brooke includes it among those questions which are yet wholly unknown. Thus, by their own statements, a second main pillar of the doctrine is broken down and destroyed.

Thirdly, the doctrine requires the admission of an ether distinct from common matter. For if no forces exist but those which depend on the distance, and no kinds of substance but one, there can only be one single law of force, and that one is already known,—the law of the inverse square, or universal gravitation. It would follow that no repulsive force could exist, and no cohesion or electric action more powerful than gravity. The conclusion is plain. Repulsion and cohesion are evident facts; and we must either reject the condition on which the conservation of motion depends, or accept an ether of some kind, distinct in its laws of force from matter. Now Mr. Brooke, like Mr. Grove, denies the existence of such an ether. He conceives that matter, immensely attenuated in the planetary spaces, can transmit vibrations of light, or have an elasticity almost a billion times greater than that of the air, which causes the waves of sound. The contrast of direct and transverse vibrations only increases this difficulty, instead of removing it. For direct attraction or repulsion must be more, not less, intense than that which is oblique and indirect. Thus,

by this denial of ether distinct from matter, the doctrine of Conservation, in its very basis, would be made not only doubtful and unproved, but even impossible.

Fourthly, the doctrine, to meet the facts, requires the existence of a law of repulsion, in some ethereal medium, depending on the distance, and varying far more rapidly than gravity, and also an intermediate law of cohesive attraction, which may be that of matter on ether. Now, Mr. Spencer affirms gravitation to be a necessary result of the laws of space. If so, either a repulsion, or any attraction varying by a higher law than the inverse square, is impossible in the nature of things. For no atoms can attract and repel each other at the same moment, or attract by two different incompatible laws at the same time. How can statements so plainly contradicted by all the facts of science be the basis of new and improved philosophy?

Again, the doctrine implies that every atom is a centre of force, varying ever in its amount, but acting every moment on all other atoms. Yet the paper asserts that matter may impart motion without any force, by its movement alone. Now this is a double contradiction of the doctrine. For, first, it supposes that a moving body can be without any force, which sets aside the Newtonian law, and also every other that satisfies the conditions of the problem. And next, it introduces a new law of force, depending on the speed, not the distance, which is equally fatal to the truth of the theory he undertakes to prove.

But I must draw these remarks to a close. The Conservation of Motion, as a physical theory and hypothesis, does not mean that the total motion of the universe is constant, for it is ever varying, and must ever vary, by any probable laws of force. It does not mean that force is motion, or motion force, for one is the cause, the other its effect. It does not mean that the sum of the forces is constant, for they vary separately as each distance varies, and collectively, as the whole system contracts or expands. It does not mean that their sum is constant, for under many conceivable alternatives both the forces and the motions may increase together. It does not mean that the total of all force, at all conceivable distances, is a constant, measurable quantity, for by the assumed laws this total, in each pair of atoms, and much more in their collective sum, is infinite and immeasurable. It means, really, that the true constitution of matter and ether, the medium of light and electricity, is that of centres of force, which repel more and more, and never touch, and not that of finite, solid atoms, which being impenetrable, not repulsive, would suddenly stop in collision and destroy the opposite motions. As a key to the various modes

of action in lifeless matter I believe the theory to be true, though direct proof of its truth, by strict induction, is far beyond the actual attainments of science. But the conditions it involves, and without which its truth is impossible, seem quite hidden from many of those who are loudest in its praise, since they contradict and deny every one of them in turn. When its claims are carried higher, to bind all nature fast in fate, make prayer unreasonable, responsibility a dream, and the moral government of a Creator and Judge impossible, the folly and self-contradiction are extreme. For the doctrine is not proved at all, except in the region of matter, from which choice and discrimination, pain, pleasure, emotion, duty, faith, love, are wholly absent. And even within its own proper limits, where the eye is not blind, it points clearly and irresistibly to higher truths. Such forces, varying with the distance, cannot act at all without distances assigned to the atoms, and in the law itself there is nothing to assign them. They point upward to the choice of a Supreme Will. And the law itself repeats the same lesson in another form. Whether attractive or repulsive, it loses itself in the infinitude of distance at one extreme, as the atoms diverge, and the infinitude of force at the other, when they coalesce into one. Thus the law loses itself in the mystery of Divine Omnipresence on one side, and on the other, in the abyss of the Divine Omnipotence. It repeats, in humbler tones, and from the lowest platform of science, the lesson which crowns the noble unfoldings of Christian Theology. "For of Him and through Him and to Him are all things, to whom be glory for ever. Amen!"

A vote of thanks was then conveyed to Professor Birks for his able paper.

Mr. C. BROOKE, F.R.S.—Inasmuch as some views put forward in a paper of mine have been alluded to and directly contravened by Professor Birks, I think I may fairly claim the privilege of being the first to make some observations. I am free and happy to say that the main object of Professor Birks's paper—that of confuting the infidel and irreligious tendencies of modern scientific thought—is entirely in harmony with my own views, and with the intention of my paper already referred to; but, inasmuch as I am accused in the paper before us of falling into the very same class of errors which I have imputed to others, I think it but fair that I should be permitted to clear myself if I can. Now, in legitimately attacking a theory, it is of course desirable to represent what it does, and not what it does not mean; but I must express my regret that in this paper I think the doctrine of the conservation of energy is represented to mean a great many things which, so far as I understand it, it does not mean, and was never supposed to mean by any of its advocates. The

length of the paper, and the lateness of the hour, compel me to make my observations as brief as I can, and I will therefore refer, in the order in which they occur, to several points in the paper. I would first make a remark on the following observation contained in the fourth page:—

“Force, by the usual definition, involved in Newton’s first and second axioms, and accepted in all works of exact science, is that which produces or tends to produce or destroy motion.”

Now this is the very definition of force to which I have in my paper distinctly objected. If this be taken as the definition of force, then what occurs on the top of the next page,—

“A moving body does not alter, and cannot be conceived to alter, the state of another, except by the intervention of force,”—

is perfectly true; because if everything that alters the condition of a body with regard to its rest or motion is force, then it must be force that alters the condition of its rest or motion; but if that definition be not tenable, then the observation which is made upon it falls to the ground. Then, in the fifth page, Professor Birks asks:—

“Is the total force, in such a universe, fixed, constant, and invariable? It is one of the simplest truths of dynamics that it varies continually, from hour to hour, from moment to moment.”

Now, what is here meant by the variation of a force, but the variation of its action? Take one example—the force of gravitation. Does any one doubt that the force of gravitation is a constant, invariable force? Is it not a fact that on the very invariability of the force of gravitation the accuracy of all the predicted results of astronomy depends: the truth of all the calculations with regard to the movements of the heavenly bodies,—the exact period of an eclipse or a transit of Venus,—depends on the assumption of the force of gravitation being constant and invariable. How is a force to be measured? I conceive that the only measure we can have of a force, or by which we can compare it with another, is to take its action upon a unit quantity of matter at a unit of distance. If the action of any force upon a unit of matter at a unit of distance be at all times the same, then, I say, the force is invariable. It acts with different degrees at different distances; but that is not an increase or diminution of the force, but of its action according to distance, and these appear to me to be two very different things. Professor Birks says:—

“Let us further take force in its proper sense, just defined, on which the *Principia* and all trains of abstract dynamical reasoning depend. Is the total of force in such a universe fixed, constant, and invariable?”

The force is fixed, constant, and invariable, but the amount of its action will depend upon the nature of the material on which, and the amount of the distance at which, it acts; and therefore Professor Birks’s subsequent remark that force varies continually has no real bearing upon the question. In the next paragraph we find the following passage:—

“Thus momentum, or the mass multiplied by the velocity, is viewed as a kind of variety of force, and *Vis viva*, or living force, is used to express the

amount of motion, as measured by the product of the mass and the square of the velocity."

Now force and momentum appear to me, if they mean anything at all, to mean two totally different things, and therefore I cannot conceive how momentum can be viewed as a kind of force. The latter part of the passage, referring to *Vis viva*, appears to me to be giving a meaning to the word "motion" which it does not bear. As I understand it, motion is nothing more than the act of moving or changing place. If you say a body is in motion, you mean it is changing its position in space; if you say it is not in motion, you mean that it is in the same position that it occupied before, that is relatively; for, of course, everything on the surface of the earth is moving in common with the earth; but we mean motion in relation to the earth. If we say a body is at rest, we mean at rest with regard to the mass of the earth. Therefore we must all bear in mind what is the real distinction between actual and relative motion, and that we are constantly inclined to speak of relative motion, and to give it the name of actual motion. We are inclined to say that any object upon a table is at rest, whereas we know that it is moving round the axis of the earth, and moving together with the earth on its orbit; and if the sun is progressing through space, it is also partaking of that motion. Therefore, to say a body is at rest does not mean that it is occupying the same absolute point of space, but relatively at rest with regard to the objects by which it is surrounded. Then Professor Birks says:—

"Thirdly, it is the constancy of each force in any system of forces; for 'to conceive one or more of the forces to have increased or diminished is conceiving that force is not persistent' (F.P., p. 193, § 53). Fourthly, it is the constant variation of all forces, attractive or repulsive, by the law of the inverse square."

A force does vary. The force of gravitation is a constant force: its action depends on the inverse square of the distance of the body acted upon by it; but the force itself does not vary. Here, I think, is an instance of a force being confounded with its action. Then Professor Birks says:—

"Now let two bodies act on each other by a law of force, which depends on the inverse distance, and their motion be measured by the square of the velocity."

But is their motion to be measured by the square of the velocity? Supposing one body moving at the rate of one foot per second, and another at the rate of two feet per second, if I ask what is the relation between their motions, any one will tell me the motion in one case is double that of the other; but according to this we should say one is four times the other. If motion be a change of place, it can only be measured by the amount of that change; and if one body travels at the rate of one foot in a second, and the other at the rate of two feet in the same time, it is quite clear that the motion of the one body is double the motion of the other. But in this case I think motion is confused with energy. Then, again, Professor Birks says:—

"The old name of the motion, thus increased or diminished, is *Vis viva*, and the new one, not at all clearer, Kinetic Energy."

Now I grant that Kinetic Energy and *Vis viva* have the same meaning ; but motion is neither the one nor the other. It is perfectly true that if you have two equal bodies moving, one at the rate of one foot in a second, and the other at the rate of two feet in a second, the one moving two feet will have four times the Kinetic Energy or *Vis viva* of the other ; but that is a different thing from having four times the motion of the other. Motion appears to me to have a meaning perfectly distinct from that of Kinetic Energy, or *Vis viva*. Professor Birks says :—

“Let us admit the power of this name, Energy, to fuse into one total unchangeable and indestructible, these unlike elements, Potential Energy, or force, and Kinetic Energy, or motion.”

Now, potential energy is not force, and force is not potential energy. Kinetic energy is not motion, and motion is not kinetic energy. If you assume that potential energy and force are interchangeable terms, and that kinetic energy and motion are interchangeable terms, you get into a confusion from which it is very easy to show contradictions ; but as a matter of fact they are totally different things, and I cannot illustrate this more forcibly to your minds than by giving an example. Suppose I have two balls of equal size in my hand, and let them drop together ; they reach the earth at the same instant of time, if they are dropped at the same instant. We should say that those balls had the same motion. They reach the earth at the same instant, travelling side by side, in exactly the same time. But let us vary the experiment, and put a sheet of glass on the ground under my hand. Let me drop one ball, and it rebounds harmlessly ; then let me drop the other, and it breaks the glass. That is not the effect of the motion, but of the kinetic energy which the balls respectively possessed : the first happened to be a ball of soft wood, and the other a ball of iron or lead. Now, although those balls may have had the same motion, they possess very different amounts of kinetic energy, or, according to my own definition, a very different power of doing work. One has power of doing work in smashing the glass which the other has not, and that depends on the amount of energy or work which it has acquired. Energy—*ἐνέργεια*—simply means work, and the amount of work in each of these bodies is measured by the mass multiplied by the square of its velocity, and inasmuch as there is much more mass in the leaden than in the wooden ball, it has in the same proportion so much more kinetic energy, and does work which the wooden ball is incapable of. This, I think, points out a clear mental conception of the difference between motion and energy. Motion, as I conceive it, is one thing ; energy is a totally distinct thing. Professor Birks, at page 291, gives us a humorous illustration of “kinetic energy” and “potential energy” as applied to street population. He will forgive me if I quote in reply the saying of a German author :—“If wisdom be attired in the parti-coloured garb of folly, for the purpose of exciting ridicule, the ridicule is due to the garb and not to the wearer.” Then Professor Birks says :—

“Fallacy the third. This total Energy, said to be invariable, is the sum of the actual motions.”

Energy is no sum of motions. My own opinion on the "fourth fallacy" is that the author has confounded motions with forces, and I think that will explain a great deal of what he has stated in the course of his paper. Then he says :—

"By the laws of force, however, so far as science has detected or conjectured them, the force depends on the inverse distance, and will be infinite when two particles touch or coalesce";

and some subsequent argument is founded on the summation of these infinities. But so far as we know, it is impossible for two particles to touch or coalesce. The opinion of Newton was that the distance between continuous particles is indefinitely great compared with the magnitude of the particles themselves. We know there is no limit to the contraction of most bodies by cold, and we can only suppose the particles come into actual contact when we reach absolute zero of temperature—a degree of cold or negation of heat which is utterly unattainable, and which probably never did or will exist in nature. It therefore appears to me that any argument founded on the introduction of infinite qualities, which must necessarily be introduced if the particles touch, falls to the ground, because it cannot possibly be assumed. Then Professor Birks says :—

"Contradiction the second. The doctrine assumes that motion or Kinetic Energy is the same identical thing or quality with Potential Energy, because of a numerical equivalence, when reckoned in one especial way. But this is wholly untrue. A rectangle, when its breadth is the unit of distance, has its length and its area or surface expressed by the same number. But a length and a surface are not on that account the same."

In the first place I maintain that motion and kinetic energy are two totally different things, and any contradiction founded on the assumption that they are identical falls to the ground, because they are not synonymous terms. Of course, as the author says, a length and a surface are not the same; but that has nothing to do with the question—with a rectangle, the width of which is the unit of length, the length of the rectangle will be the length of the other side, whether it be longer or shorter. But what does that mean? It only means that there are as many units of length on the other side of the rectangle, as there are units of area in its surface. In a rectangle which is one inch wide and five inches long, the length of the rectangle will be five inches and the area five square inches. These are merely the numerical equivalents or the co-efficients in the two cases, but no one would infer from that that length and surface mean the same thing, or can be added together. Then again Professor Birks says :—

"A cannon-ball is shot upward at the rate of a thousand feet a second. The doctrine affirms this speed of motion to be the very same thing with the place of that ball on the top of a mountain three miles high."

This is certainly not affirmed by any doctrine with which I am acquainted. I do not know where Professor Birks will find any such argument used by any writer on the subject: they are two totally different things, having no relation to each other. The doctrine, as I and its supporters understand it, is that if a ball is shot up at the rate of 1,000 feet in a

second, it will continue rising until the attraction of gravitation which is continually pulling it downwards and diminishing its progress upwards, at last arrests it, and its velocity upwards becomes nothing; it comes to rest at a certain point. If a shelf be there placed under it to support it, the ball is then said to have acquired a certain amount of potential energy, or energy of position. What does that mean? It means simply that if it be allowed to descend again from that point to the earth, it will in its descent acquire exactly the same amount of energy which was expended in propelling it, and that is a fact which no experiment or proof in any way can controvert. Again:—

“Contradiction the third. Motion, by the theory, may be transferred from one body to another, remaining the same motion still. It may reverse its direction, and be the same motion, if its rate be the same.”

Certainly not; no one can say that motion in one direction is the same as motion in an opposite direction. I do not know any author who has ever stated that, and it seems to me to arise from a misapprehension of the theory which the author is endeavouring to combat. Then, in another passage, Professor Birks has called potential energy the amount of force which would be expended in bringing a body from an infinite distance to the place it occupies. And he goes on to say:—

“Contradiction the fifth. The Potential Energy supplies another element of confused thought and metaphysical incongruity, as striking as the last.”

If the definition he has already given be correct, it is true that there is an element of confused thought and metaphysical incongruity, but that I fear is the fault of his definition of potential energy. Then we have this passage:—

“But how can we conceive a particle of motion, which is not a thing that moves, but an abstract quality or relation, pushing or pulling another particle of the same force?”

We cannot, of course, conceive a particle of motion. Motion is a change of place, and a particle of motion has no meaning. No one that I know of ever attempted the use of these expressions.

Professor BIRKS.—You will find them used both by Mill and Spencer.

Mr. BROOKE.—Then we have this passage:—

“Three fundamental errors have already been pointed out, which contradict the first principles of clear dynamical reasoning: that statical pressures are not forces, that friction is not a force, and that one body in motion can move another without the intervention of any force whatever.”

I would hardly go into that, but if the definition which Professor Birks has given us is to be generally accepted, then anything that changes the conditions of a body is force. Certainly friction is a force. This table is a force, as it arrests the falling of this book to the ground. But it appears to me that this involves a contradiction in terms which is unsuitable to the real meaning of the word, which I think had much better be considered and defined in the way that I have elsewhere defined it. I will now only make one or two further remarks. There is one point personally affecting myself

which I am bound to refer to. Professor Birks, in criticising my paper on Force and Energy, says :—

“ Still further, in §§ 24, 25, light and heat are said to be accurately defined as ‘ a very brisk agitation of the insensible parts of the object.’ Yet in § 29 we read that they ‘ have frequently been illogically designated as “ modes of motion ” by able physicists,’ and this ‘ has led them into a hopeless confusion of the terms, force, energy, and motion.’ But a very brisk agitation is certainly a mode of motion, so that the paper is a fresh instance of that confusion of which its writer justly complains.”

Now, I fear Professor Birks has overlooked my argument. I will read one of the paragraphs in my paper which is referred to, and leave it to speak for itself. I say at the close of the 23rd section of my paper “ John Locke writes :—‘ Heat is a very brisk agitation of the insensible parts of the object, which produces in us that sensation from whence we denominate the object “ hot ” ; so what in our own sensation is heat, in the object is nothing but motion.’ It would be, perhaps, still more precise to say, ‘ heat arises from,’ &c., in place of ‘ heat is,’ &c., because the latter part of the definition states heat to be, not the motion, but the perception of it.” Then I go on, in my 24th section, to say :—“ Precisely the same definition will serve equally for light, if ‘ light ’ be substituted for ‘ heat,’ and ‘ luminous ’ for ‘ hot.’ It would then read thus :—Light is a very brisk agitation of the insensible parts of the object which produces in us that sensation from whence we denominate the object luminous ; so that what in our sensation is light, in the object is nothing but motion.” I therefore maintain, in the last few lines of my 23rd section, and pointedly state that heat and light are not to be accurately defined as a very brisk agitation of the insensible parts of the object, but as the result of that brisk agitation. To say that one thing is another, and to say that one thing is the result of another, are certainly very different statements. What I have said will show that he speaks of me as having made the very error which I have imputed to others. If the definition of force which I have given be taken as the true definition, I think that that, with what I have said in my paper, and with the illustrations which I have given to-night, will establish the point that the conception of force is a distinct mental conception, apart from the conception of its operation. You may have a magnet, and you may have a mental conception of the force situated in the pole of that magnet ; and that conception is quite independent of any action of that force. You may have iron, which the magnet attracts, or bismuth, which it repels, or the similar pole of another magnet, which it repels ; but the idea of the force existing in the magnet is to me entirely independent of its exercise upon another body. So in the same way the conception of the existence of a force appears to me totally different from the conception of the action which it produces. There is only one other point I want to refer to, and I certainly must admit it was an oversight on my part. Professor Birks refers to my paper as having spoken of force producing, and being the cause of that action between particles or masses of matter by which they are drawn together and

separated from each other. He then refers to a sentence in the discussion at the end of the paper, in which it appears that I spoke of force as being an attraction or a repulsion—a push or a pull. Now what I meant to say, and what I thought I said, was, that force was attractive or repulsive, and that it produces either a push or a pull; that is to say, that a push or a pull is the result of a force, but is not a force itself. If I did say what is attributed to me in the report, it was an oversight. I am sorry that I have detained you so long; but I felt, in justice to myself, that I was bound to show I was not guilty of the errors imputed to me. (Cheers.)

Mr. E. PICKERSGILL.—I should like to refer to a few particulars in which it appears to me that Professor Birks has been a little unjust to the author of *First Principles*, who is the chief exponent of those Neo-Lucretian views which the Professor has attacked. In the first place, with regard to that expression, “the persistence of force,” which Professor Tyndall and Mr. Herbert Spencer have used—

Professor BIRKS.—And Professor Huxley.

Mr. PICKERSGILL.—It appears to me that, in being so severe upon that expression (he says it reminds him of the proverbial broomstick), Professor Birks has confined himself to that position of orthodoxy which is certainly the position of myself, and which, I suppose, is the position of the majority in this room. But it seems to me that he ought, for the time at least, to have transferred himself into the position of Professor Tyndall and Mr. Herbert Spencer. “The persistence of force” may be a very terrible expression to orthodox thinkers, but to thinkers who are not orthodox—such as those to whom I have alluded—I do not see that it is terrible at all, and it appears to express very fairly that idea which Herbert Spencer intends in his *First Principles*. Then I take this passage from the paper:—

“Is the total of force, in such a universe, fixed, constant, and invariable? It is one of the simplest truths of dynamics that it varies continually, from hour to hour, from moment to moment. If attractive forces are in excess, it increases in a condensing system, and decreases with dilatation.”

Let us consider the conditions of the material world as proposed in this paper. It consists of a vast—not infinite—number of atoms, between some of which there is exercised an attractive force, and between some of which there is exercised a repulsive force. Now, suppose the attractive forces are in excess, and that the system is condensed. Now, it is perfectly true that, upon the condensation of that system, the total sum of attractive forces will be increased; but is it not equally true that the total sum of the repulsive forces will be diminished, and therefore that the difference between them, *i. e.* the net total of force, may remain precisely as it was before the condensation? There are one or two other points to which I should like to call your attention. Professor Birks says:—

“Yet we are taught that this wholly unknown Being, whether he has a will to do it or not, cannot destroy one particle of this wholly unknown and unknowable thing or quality, which we call Force or Energy.”

Now, Mr. Herbert Spencer does not suppose the existence of an un-

known being, *independent of that force*, as Professor Birks has represented in the foregoing quotation. Force itself is the divinity which these philosophers would wish to seat upon the throne of the universe. Mr. Herbert Spencer does not assume, first, an unknown being corresponding to God, and then the force, but that force itself is the unknown being, the God, the Divinity of the universe. Lastly, the Professor gives us an illustration to which attention has been already called.

“A cannon-ball is shot upward at the rate of a thousand feet a second. The doctrine affirms this speed of motion to be the very same thing with the place of that ball on the top of a mountain three miles high.”

Mr. Brooke took exception to that statement: I am sorry that I did not quite follow him in his observations, but the illustration, as it appears to me, in order to be quite consistent with what has gone before ought to be this:—Suppose a cricket-ball is thrown up by a human arm at the rate of 300 feet a second, then the doctrine affirms that that speed or motion is the same thing with the force in the arm which threw up the ball. Before I sit down I should like to refer to one aspect of the question in regard to which I quite agree with Professor Birks, namely: Mr. Herbert Spencer's position that “the persistence of force” is an *ultimate* idea of the human mind. In fact, Mr. Spencer wishes to place us, in regard to that idea, precisely in the position of Molière's Monsieur Jourdain, who, without knowing it, had all his life been talking prose. We, in the same way, without knowing it, have always been believing in the indestructibility of force. That appears to me to be a most dangerous position to assume. As Professor Birks has most ably put before you, it would involve most dangerous conclusions, and would provide a way for the introduction of most crude and mischievous principles. You first assume that a thing is true, and having shown that it cannot be proved *à posteriori*, you further assume that it is *à priori* truth—a truth which has always been believed by men, and which cannot possibly be disbelieved. If you admit that principle it will be obvious to every one that you admit a principle which might have most dangerous results.

The Rev. S. WAINWRIGHT, D.D.—Had the last speaker not been a new member, he would have known that we are not in the habit of talking of what is orthodox or heterodox, but that the one aim of our discussions is to sift each question brought before us, and find out the truth. (Hear, hear.) On this ground I am bold enough to take my stand by the author of the paper, and without doing what I am sure he would not wish me to do—attempting to defend every line and letter that he has written. I say he has gratified us with an admirable argument, and ably sustained it. (Hear, hear.) At the same time I do not desire to oppose Mr. Brooke. Professor Birks and Mr. Brooke have said very much the same thing on a great many points. Professor Birks says very distinctly that force and motion are definite things and can be defined. Mr. Brooke says exactly the same thing. Mr. Brooke says motion is one thing, energy is another—that is exactly what Professor Birks has said. Professor Birks says that

force and motion are definite terms which he used in a definite sense, but he complains of the confusion attaching to the term "energy," and incidental to the use of that *tertium quid*. Another point on which they are at one seemed to be urged against Professor Birks: Mr. Brooke asks, "How can you conceive a particle of motion?" But he has fastened upon one part of a passage and left the rest; for Professor Birks himself says, "How can there be such a thing as a particle of motion?" The passage runs,

"What other power compels the blind Titan to weary itself in these ceaseless transmigrations? We can easily conceive one body, endowed with active power, pushing or pulling, seeking or avoiding, another. But how can we conceive a particle of motion, which is not a thing that moves, but an abstract quality or relation, pushing or pulling another particle of the same force."

I think the difference between Mr. Brooke and the Professor is divergence rather than antagonism. No doubt there are some points of antagonism, but I think it is in the interest of the pursuit of truths that we have not yet reached, that we should minimise rather than magnify divergencies on subsidiary points. Let me give two illustrations of what I mean. I cannot quite take up arms against this paper, and condemn it for being too clear. I remember the remarks of Archbishop Whately. Mr. Brooke gives us a German apophthegm, but I do not think it applies to Professor Birks and his "garb of folly." He does what Socrates did in his day, and tries to take the power from those who make the worse appear the better reason. Whately talked of a certain class of minds who never were satisfied with anything sufficiently clear to enable them to see to the bottom; only stir up the mud, and then they would cry, "How deep that is!" I thank the man who lets the sediment go away and gives the clear stream, and therefore I am obliged to Professor Birks. If the doctrine of the persistence of force is as I understand it, and as I know it to be expressed by Professor Huxley and Dr. Tyndall, it is the doctrine of the broomstick without the possibility of the existence of another power outside to interfere with it. That is the question at issue, and we ought not to allow such a doctrine to take a place to which it has no right, or to usurp a place as an established truth, before it has given credentials and stood its ground successfully. There is a German author who gives us an illustration on another subject. He says, "You talk of Providence; and of Divine government, and Divine action, and so on. Will you tell me what room there is for it in the world? You are on the sea-shore, where there is a particular grain of sand ten or fifteen feet from high water-mark. Perhaps Divine Providence, you think, might have taken that grain of sand and let it be half an inch nearer or further from high water-mark. Do you know what it would involve if you prayed to God or to Providence for such a result, and your prayer was answered? That particular grain of sand is where it is because the force of the waves has been exact and definite, and that has been the result of the force of certain storms that have raged, and they have depended upon climatal conditions and atmospheric changes, and they in turn have depended on the nature of the

soil and the atmosphere, and the attraction of mountain ranges and currents. But to have altered these climatal conditions would have involved pestilence and the slaughter of millions of mankind ; and so you must have had a reconstitution of the universe, a different shape for the continents, and a different direction for the currents, in order to get that particular grain of sand half an inch higher or lower." Now that is the doctrine of the broomstick pure and simple. (Laughter.) Yet one of the most distinguished men of our time—for I do not hesitate to say that I revere the name of Charles Kingsley—has thought it right to say that to pray for fair weather was, in fact, to pray that God would alter the shape of the continents, and the size of the solar and lunar bodies, and the rate at which they spin round. Notwithstanding my reverence for the man, I am bound to say that he said that as a Christian preacher. I have taken that case of the grain of sand for this reason : I say that what you are saying might be true in a conceivable world, where there was no such thing as another source of force that you have left out of the calculation. But there is another force—that of volition. There is a physical force, but there is also a primary force of volition, which makes the physical force obedient to it. We live in a world where there are not merely physical forces which act molecularly, but there are also chemical forces, and other forces entirely apart and distinct from chemical, physical, and molecular forces. Volition is a force. Human volition can change, and has changed, the destiny of nations, tunnelled the Alps, and bridged the seas ; and if it has transformed so many things, it is in the highest degree unphilosophical to say that you can have a world of volition without a primary volition, just as it would be unphilosophical to say you can have a force of gravitation, and yet deny the existence of a great reservoir of force of which that force of gravitation is one single specimen. Dr. Tyndall says the facts of religion are to him as certain as the facts of physics ; and when he has said that, he has given us all we ask for, and there will continue to be more things in volition than are dreamed of in his philosophy, until he has admitted volitional, emotional, intelligent forces, adequate to the facts of the case. (Cheers.)

Mr. C. R. MACCLYMONT.—I do not rise to propose any fresh points of controversy on this question. There seems to me, however, a broader view of the relation of physical science to theology, suggested by the discussion, which I wish to direct the attention of the meeting to for a moment. Though Professor Tyndall has undoubtedly a certain faculty of stating in popular fashion the mere superficial aspects of the questions with which he deals, it seems to me a pity that he should be selected as the typical man of science, in discussions such as these ; for undoubtedly he is the weakest of the band whose conclusions theologians at the present day feel called upon chiefly to protest against. But is it true that the conclusions of science which we have heard discussed to-night are really antagonistic to the doctrines of sound orthodoxy ? I continue to think that such doctrines as those of the Conservation of Energy, or of the Origin of Species, when examined in the true spirit of science, are not only not opposed, but are in strict agreement with

the teaching of the old authorities of the Church. These doctrines may indeed be stated offensively, as in the flimsy phrasing of one like Tyndall. But even in his writing—as in the article on prayer, of which we have heard so much—we see how the larger conclusions of science are gradually approximating in their result to reassertion of the true relations of Deity to the World and Man, as we have them in Augustine and others of like authority in the Church. There is no real conflict between the highest science and the widest orthodoxy. It is only when the theologian fails in faith or charity, and the man of science fails in knowledge or reverence, that the conflict seems to arise.*

Professor BIRKS.—It is very difficult for me, at this hour, to reply to the

* Mr. J. E. Howard, F.R.S., remarks as follows upon the persistence of Force, or the conservation of Energy:—Is it not probable that the true solution of this question is one which involves a much more fundamental agreement than is admitted on either side? On the part of our “thinkers,” for whom Mr. Herbert Spencer may stand as the mouthpiece, we find it to be admitted that the result of their deepest researches into the nature of things involves this conclusion, that the forces of nature, however largely convertible the one into the other, are not capable of being destroyed; and further, that the storehouse of force in the universe is inconceivable and inexhaustible, and apparently illimitable. Underlying all the forces of the universe, philosophy requires one permanent, inexhaustible, continually immanent energy, which cannot be conceived to abate for a single moment one fraction of its potency, without the ruin of the whole. The philosophical name of this first cause is FORCE. The Scripture likewise informs us of power everywhere existing, either potential or actual. The term by which this is designated is *δύναμις*; and when this power goes forth in action, it is termed energy—*ἐνέργεια* (see Eph. i. 19, &c.). All things are upheld by the word of His power, which is continually exerted in the maintenance of the creation. This power is constantly ascribed to God, (Matt. xxvi. 64, &c.) and even identified with Him, as in the passage to which I have referred; and as this *δύναμις* is all treasured up in the Almighty, He is called “the blessed and only Potentate (*δυνάστης*). The potential energy of His power has been shown in the raising up of Christ from the dead, which foreshadows and involves (1 Cor. xv.) the dead being raised by the putting forth of power which is yet in abeyance. This power of God can never suffer the smallest imperfection or diminution. It is ever new and ever young. Therefore we read in the New Testament: “I am Alpha and Omega, the beginning and the ending, saith the Lord, which is, and which was, and which is to come, the Almighty.” In the Old Testament we have the same truth, set forth in the very name Jehovah; and He is constantly represented as everywhere present and acting, not only amongst His people, but in nature. Thus, in Psalm civ., the operations of nature are directly ascribed to Jehovah; and where we see the laws of nature, the inspired Hebrew poet saw the God of these laws; instead of praising Sabaoth, he praised the Lord of Sabaoth. So that the believer in revelation comes at once to the perception of force in nature; but this force, potential or actual, is an attribute of God. Is not the advantage of clearness of definition very much on the side of Scripture? and is it not an immense relief to the mind to rest upon a loving, heavenly Father, rather than to feel bound to the chariot-wheels of inexorable fate?

The philosopher may worship FORCE, but we worship GOD.

somewhat discursive remarks which have been made upon my paper. But I must claim, in fairness, to offer some explanations, because of the unusual form the discussion has assumed. Mr. Brooke has occupied nearly the time of a second paper in opposition to my remarks. My paper was prepared before I knew that Mr. Brooke had read one on a kindred subject, and mainly in reference to Mr. Herbert Spencer's *First Principles* and Dr. Tyndall's recent address. In fact, it continued a line of thought in a paper read at the Brighton Congress. When the Honorary Secretary sent me Mr. Brooke's paper, I could not avoid making some remarks upon it, since I differed from it so widely. My criticisms upon it were quite supplementary, and almost unavoidable, and I am sorry this part of the subject should have this evening had an unnecessary prominence. I stated very clearly that Mr. Brooke's views were in entire contrast with those of Mr. Spencer and Dr. Tyndall on the moral aspect of the question. But we are here to maintain truth honestly, without respect of persons, and cannot safely disguise our conviction that certain views are wholly false, even though they are shared by some friends who are on our side in the main controversy. My chief object was to show that Mr. Spencer and Dr. Tyndall are not only wrong in their application of their theory of force or energy to moral questions, but in their conception of the principle itself, and that their view, when closely examined, is stored and steeped with logical contradictions. Now since Mr. Brooke adopts their doctrine, in words, as a grand recent discovery of science, and then discards Newton's definition of force, and frames a new one of energy in order to remove the difficulties which it involves at every turn, it was essential for me briefly to point out what I conceive to be such fundamental errors, and so fatal to the possibility of a clear conception of my argument. One first and main question between us is whether we are bound to use the fundamental terms of science in their usual sense, accepted by the standard authorities, or may vary them at our own pleasure, and adopt wholly different ones in their stead? The definition of force which I used is that of Newton and all his successors. Mr. Brooke himself quotes half a dozen leading authors who agree in it, but only to charge them with having gone wrong together. He distinguishes force from the action of force, and makes the contrast of force and energy to be, that the first is potential, and the second actual. But the force of Newton's *Principia* and all dynamical works of authority is actual force, measured by its present actual effect in change of motion. And the only energy which is force in any sense is called "potential energy," as its very definition, in Dr. Thomson and Tait's treatise, and similar works, where the conservation of energy receives scientific treatment. So that Mr. Brooke exactly inverts the relation between them by the usual and accepted definitions. The result of such an arbitrary change and reversal must be interminable confusion of speech and thought. His force is the mere possibility of force to be exercised hereafter, and his action of force, or energy, is the force, in Newton's sense and that of all dynamical treatises, which exists and acts at any particular moment. Now if we include all the possibilities of force, past, present, and future, under the name of

force, it is a very easy and simple inference that its total is invariable. But to speak of this as a great scientific discovery is a mere illusion. Mr. Brooke has charged one passage of my paper with misplaced ridicule. It is really nothing more than an exact and logical description of the error involved in Mr. Spencer's theory. An eternity of possible future actions of force is summed up into a total; and then, having replaced present, actual force, by a formula, which includes all the past, present and future, the unchangeableness of this total, from time to time, is taken for some great discovery. I should be sorry to appear to speak with contempt of any person of high reputation. But there is a great temptation, in these days, where there is general reputation for ability, to disguise and overlook the most serious logical contradictions, and reviving the principle of human authority, to apply it to these newest names in sciences, so as to create a real danger and stumbling-block to the faith of Christians. Mr. H. Spencer, no doubt, is a person of great ability and intelligence; but when I examine his work closely, I know of none which abounds more in direct and fatal contradictions. I believe that I have done him no injustice in my remarks. He has been seeking to build up a philosophy which treats theology as an impossible science, and gets rid of the Great First Cause, the God of the Bible, altogether. But the basis of the whole argument lies in proving, first, that the principles of religion and science are alike inscrutable, and then in dismissing theology as hopelessly dark and blind, and treating science as an open field for fresh discoveries. If the inscrutable nature of its first principle is a reason why nothing can be known in religion, the argument will equally prove that nothing can be known in science. I believe, with him, that much is known, and can be known, in physical science, though all its fundamental ideas lose themselves in mystery. And in like manner we can know, and ought to know, much concerning the character and works of the Supreme Creator, while we confess, with Hooker, and Scripture itself, that "His nature is unsearchable, His greatness beyond our capacity and reach." My object has been to show that Mr. Spencer's First Principles do not give us any clear conception of his so-called Persistence of Force, but that he contradicts himself at every step, when he would explain his own meaning. As to the conservation of energy, that is, of *Vis viva*, I deny altogether that it is an *à priori* truth. It is the result of a special dynamical hypothesis, which might or might not be confirmed by inductive observation. We have no right beforehand to assume its truth as self-evident. It is a doctrine which Newton did not hold, but its reverse. When imposed upon our faith, not as a probable deduction from the facts of science within certain defined limits of mere mechanical change, but as an *à priori* truth, which is to sweep away all religious faith as superstitious error, and put the universe under the dominion of a blind Fate, we are bound to oppose it with all our might, and show the gigantic delusion and falsehood on which it rests. The theory, in the shape it has latterly assumed, is false to the best interests and true dignity of man in the present life, as well as to the hopes of the life to come.

I cannot, at this hour, reply in detail to Mr. Brooke's strictures, or those of one or two other speakers, but I have heard nothing which convicts me of any mistake, or which I do not feel that I could easily answer, and prove the correctness of my own statement, and the error of the counter-statement, did time allow. But a real discussion of the objections I entertain to Mr. Brooke's statement this evening, and his former paper, would require a second paper a full hour in length. The thoughts I have offered are not hastily put together. They are the partial outcome from years of meditation on these subjects. Though no practical experimentalist, I have studied mathematical and physical science with interest from childhood. And I feel that most of those who talk so loudly about the grand discovery, whether they call it Conservation of Force, Persistency of Force, or Conservation of Energy, do not even understand their own meaning; and that all genuine discoveries, even in mere physics, are only steps in an ascending pathway, that must lead careful and thoughtful minds continually upward to the throne of God.

The meeting was then adjourned.

ORDINARY MEETING, FEBRUARY 15, 1875.

THE REV. PREBENDARY ROW, M.A., IN THE CHAIR.

The minutes of the last Meeting were read and confirmed, and the following Elections were announced :—

HONORARY FOREIGN CORRESPONDENT :—Professor K. A. Wurtz, President of the Association of France for the Advancement of Science, Paris.

ASSOCIATES.—Rev. J. Kennedy, D.D., M.A., Stepney Green; Rev. T. Ragg, M.A., Lawley Vicarage; E. R. Gayer, Esq., Tavistock Square; Miss S. Neale, Brighton.

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

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

From the Society.

“Number.” By Rev. C. Girdlestone.

From the Author.

“Seven Lectures on Scripture and Science,” 2 copies. By
J. E. Howard, Esq., F.R.S.

Ditto.

“Five Important Truths of Scripture.” By C. Darby, Esq.

Ditto.

The following paper was then read by the Author :—

*AN EXAMINATION OF MR. MILL'S THREE ESSAYS
ON RELIGION.* By the Rev. W. J. IRONS, D.D., Pre-
bendary of St. Paul's, Bampton Lecturer for 1870, &c.

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A general anxiety as to the subject of Mr. Mill's views.
The charge of Atheism against the candidate for Westminster proved this.
(His refusal to meet the charge was a surprise.)
The interest in his views was enhanced by his reputation,
And by his expected treatment of the logical arguments as to Theism.
Mr. Mill's book now issued seems to have disappointed all parties.
The three Essays to be examined are defective in arrangement :
But have a rough kind of unity.

ESSAY I.—"NATURE."

"NATURE of a particular object," according to Mr. Mill:
And also, "Nature in the abstract."
The definition of the "Nature of each particular object" fails ;
Not providing for "common Natures." Hence the first dilemma.
"The abstract idea of Nature," as expressed by Mr. Mill, also fails to serv
the purpose of the argument,
And he finds that it needs subdivision ;
And cannot even then be used in Moral inquiry.
Hence his second dilemma.
Mr. Mill's failure compared with "Socratic analysis."
(Its philosophic crudity.)
Comparison of Mr. Mill's treatment of Nature, and its treatment by Science.
(Illustrations—) Cuvier.
Bacon.
Mr. Mill's confusion of his own definitions.
A double definition seems forced upon him by the argument.
Without it Mr. Mill could not proceed to his object in this Essay.
The "Sequi Naturam" is the thesis denied by Mr. Mill.
And that in both his senses of "Nature."
His further dilemma as to those two senses of "Nature."
His two senses of Nature prove incoherent as hypotheses ;
Yet he opposes them to all previous philosophy in discussing "Sequi
Naturam" ; and next, logically fails.
Still further modifications of his definition of Nature ; but in vain.
Philosophy, science, and even poetry, all love and "follow Nature."
Mr. Mill now brings his indictment against Nature as Evil ;
And he would vindicate this by considering "attributes of the Creator."
Mr. Mill here confuses the Præ-phenomenal with the Phenomenal, in dis-
cussing God's Power. He does not give his own idea of Power.
He also mis-states the rule "Sequi Naturam."
(Yet he is himself better than his argument :

Mr. Mill's unconscious admissions, compared with St. Augustin against the Manichæans, c. xxxiii.)

Again, What is Mr. Mill's idea of Goodness ?

Comparison of the ideas and method of Socrates with Mr. Mill's.

All must recognize Evil as a fact.

How the Christian philosophy recognizes it.

The theory of the uneducated is here ultimately unthinkable.

Mr. Mill's world imagined.

The Christian treatment of the real facts of the world.

Difficulty of the Moral science of the future.

The philosophy of Volition must again be examined.

ESSAY II.—“UTILITY OF RELIGION.”

How the writer comes to discuss this Utility.

The question as stated by Mr. Mill;

With a possible exception in favour of a “Religion of Humanity.”

Bentham and Comte are followed by him.

Du Coulanges gives a complete refutation of Mr. Mill's supposed facts.

Examples in opposition to Mr. Mill's suppositions.

Anterior necessity hinders not a subsequent utility ; but supports it.

(The utility of Christianity specially.)

The idea of “Reward”—its philosophy referred to.

ESSAY III.—“THEISM.”

The tone of this Essay on Theism.

Anecdote of Shelley.

Story in Herodotus.

Mr. Mill's account of his own training.

Arrangement of the Essay.

Its introduction,—the calmness of tone :

But it is not very hopeful.

First Inquiry—Whether the *idea* of the will of a Creator contradicts Science ?

Professor Tyndall and Mr. Morley here oppose Mr. Mill's dogma.

Second Inquiry :—What is the *evidence* for a will governing Nature ?

The *à priori*, as showing the contradiction implied in the “Second Inquiry ;”

And Mr. Mill's *ignoratio elenchi*.

“Causation,” as belonging to the *à priori*.

Mr. Mill's mistake in stating the proposition.

Further inaccurate use of “Abstraction.”

Self-contradiction of Mr. Mill's argument here.

The “Consensus omnium”—historical, yet partly *à priori*.

Mr. Mill does not meet the difficulty of the fact.

Consciousness, and the grounds of the *à priori*.

(Grounds of the *à priori* implied in the Cartesian argument.)

Moral character of thought, as right or wrong—also *à priori*.

Views of Plato and Aristotle, how here related.

The subject is at first metaphysical ; and as such not treated by Mr. Mill.

“Argument from Design : the *à posteriori*.”

Paley's statement of it, *Natural Theology*, chap. iii.

Recent objection to Design. Reply.

CONCLUSION.

The book.

The writer.—The Subject. (Notes A, B, C.)

A general anxiety as to this matter.

1. **EVERY ONE** was anxious to know the real opinions of Mr. Mill on the primary subjects of Religious thought.

At the time of the election for Westminster, some ten years since, the charge of Atheism was freely brought against Mr. Mill—some said unjustly—as constituting a serious disqualification for the task of legislator in a country still professedly Christian. It was remembered that a judge in open court had refused evidence offered by a witness who avowed unbelief in God. Deism being thus regarded as the least amount of creed expected

The charge of Atheism against the candidate for Westminster proved this.

in a public man, Mr. Mill, when suspected and questioned, refused to satisfy the inquirer on this point, urging that no one had any right to demand a confession of the religious opinions of another. He said, too—and the evasive saying dazzled a few—that he thought it a duty to vindicate entire liberty of thought as belonging to men in Parliament as well as out of Parliament.

They, then, who had looked for a warm and instant repudiation of the “charge” against Mr. Mill were certainly disappointed, and took refuge in admiring his courage. It was said, “If he would admit nothing, he would deny nothing”: he simply, “on principle, would not be cross-examined.” It was found to be useless even for those who yet were importunately asked to elect him as their “representative,” to urge that they had a right to know his principal opinions, and that that knowledge might touch the principal opinions of some, at least, of the electors; and also that frankness between electors and elected was but fair. No; Mr. Mill maintained his position, and was supported in it by persons of eminence in Church and State, who preferred to allege that there was no *arrière pensée*, and at all events resolutely subscribed to promote his return to Parliament.

2. There can be no doubt, too, that the desire to know Mr. Mill's views was not mere curiosity. Many hoped for a grand thoughtful book. Then he was regarded even by the popular mind as what, in the language of the day, is called a “thinker”; a logician, of even terrible exactness. (The vulgar, indeed, commonly suppose a logician to be pre-eminently a thinker, not knowing that his science, as such, is primarily engaged with the technicalities and modes, rather than with subjects, materials, or even grounds, of thought.) The announcement, then, that some “Essays on RELIGION” had been found among Mr. Mill's papers after his death, was not unwelcome to the world. It was painful to observe, however, the tone which soon began to prevail

The interest in his views was enhanced by his reputation.

His refusal to meet it.

both with the non-religious and with some of the religious portions of the community; the former anticipating, the latter dreading, the expected "searching analysis" (p. 4) of all the grounds of Theism.

3. Another source of interest in the subject was doubtless found among those who had observed the Theistic controversy from a higher ground. The more recent, and too evidently feeble, surrender in some quarters of the *à priori* defence of "first truths," (and therefore of the Religious first truths), raised among many the anticipation of a great dialectical display—(some sort of attempt perhaps like that of Professor Clifford and others to resolve into simpler elements the axioms and postulates of Euclid): or, again, it was surmised that Mr. Mill could not help dealing with the *à posteriori* as Mr. Herbert Spencer had done, or might possibly be found working very near to Professor Huxley's protoplasm, or to Professor Tyndall's molecules.—The result, however, of the publication of Mr. Mill's book has been the disappointment probably of all classes. They who long persisted in saying that the candidate for Westminster might be a believer in God, have found that they were mistaken. They who were hoping for some new force of argument to support unbelief were not prepared for so halting a champion. They who expected a really scientific manipulation of these solemn subjects may justly have a sense of surprise, if not humiliation. The collapse was unprecedented in literature. The editorial Preface, with natural partiality perhaps, expresses an opinion that these Essays are "exhaustive." The editor of the *Fortnightly Review* is scarcely of that opinion. Indeed it should be added, in justice to Mr. Mill's kind panegyrist, that it is acknowledged also, in her Preface, that the Essays are not a "connected body of thought." (See Preface.)

And by his expected treatment of the logical arguments as to Theism.

Mr. Mill's book now issued seems to have disappointed all parties.

4. We find ourselves of course under a kind of necessity, in examining a book on such a subject, to compare it as we go on with principles we ourselves vindicate. It must be remembered, however, that we are not writing a treatise, but examining one which comes from an assumed master on his side of the questions raised. And we shall insist on good reasoning at all events.

The Three Essays to be now examined are defective in arrangement.

The titles of the Three Essays are "Nature," "Utility of Religion," and "Theism,"—an arrangement, we would observe, somewhat illogical, leading to a certain overlapping of the subjects, and not providing for the entire discussion. This is an inconvenience to begin with.—Lord Bacon, for example, in the *De Augmentis Scientiarum*, having

to deal with the same matter, fitly divides the objects of Philosophy as "God, Nature, Man," the three comprehending the universe of thought, yet each being so far distinct ideally as to be capable of treatment *per se*. We feel at every turn, that many confusions, assumptions, and ambiguities, some anticipations which ought to have been proved and apparent concessions which have often virtually to be recalled, might have been spared had Mr. Mill's arrangement been more logical. Unhappily he begins with no precise premisses. Having to treat of "Religion," he felt obliged to look to "Nature," for he denied the Supernatural. He had Religion as an existing *fact* to deal with; and so also to consider common arguments for God; and the teaching of Christ.

Comparing the book with the writer as known to us by his own Biography, there may indeed be recognized a kind of order in his course of thought. Born and brought up with no Religion, his father having relinquished even Presbyterian Calvinism, he seems to have been "left to Nature" by no fault of his own, while yet we see him feeling in thought for Religion of some kind, as his life wears on. Quite naturally, it may be, in such a position he scarcely came across Christianity as an Historical Revelation: it stood on one side. The discarded Presbyterianism of his father seems to have brought to a previous close any real Christian examination. Mr. Mill began where his father left off, and never seriously turned back. Yet he found he could not but think of Religion, and write about it in some way. It seemed as if he were not able to help it. It was the subjacent thought of his books, even when not expressed. Was a "Religion" to be found by him, then, in "Nature"? And could he trust Nature?—He thinks not, but he will say "why." Might Religion, however, since it existed on every side, be a delusion of some "Utility" even if untrue?—He doubts that; but he will see. But, to try yet again,—Is there a God at all? What are the logical arguments for it? But was not the Christian Founder a marvellous fact of the past, influencing a vast moral future?—He would consider yet again.

The three Essays thus may be easily accounted for, as to their form, and show a rough coherence of their own. Most readers will probably suppose their sequence to be sufficiently practical even if unscientific, though their want of right method will be seen often to mislead the writer. We will take them in their own order, however, (for we must take the work as it is), and endeavour also to look at the Essays as what they announce themselves to be, and what we wish they had been, investigations "according to the Platonic method (p. 4), questioning and testing common maxims and opinions."—(See Note A.)

But have a rough kind of unity.

§ 1. *Nature.*

5. The Essay entitled "NATURE" begins by calling attention to the meaning of the terms "Nature, natural, and the group of words derived from them, or allied to them in etymology." ^{Essay I.} Nature is the platform on the level of which, one would think, a man who has no Religion must needs stand (§ 4). If that fail him, he has nothing to look to. We are willing to pause here at once. This part of the examination must not be lightly made, either from Mr. Mill's point of view or our own, for it is absolutely necessary. Nature and Revelation — Nature and Grace — and Nature and the Supernatural, are in such sense correlatives, that the student of the latter may not decline the former.

It may seem needless to premise, that "Nature as it now is" is not regarded by the Christian philosophy as the rest of man's heart, or a satisfaction for all his thoughts. But rejectors of the Supernatural usually take the Natural as their alternative. We own that we were not prepared for such an account of Nature *de facto*, as would enable Mr. Mill to repudiate Nature as completely at last (p. 58) as he had repudiated Revelation. As his latest effort, he would tear off the mask which enabled Nature to tempt man to any Religion at all. But his treatment of Nature will be found as unjust and illogical as could be possible.

We are led, as just observed, to expect a Socratic inquiry; and first, as to what is meant by the "Nature of any particular object." But the writer at once proceeds, without any inquiry Socratic or otherwise, to announce as "evident," *à priori*, a governing definition of his own. He looks around him, and then says, "that the *Nature* of a particular object (as of fire, water, or some individual plant, or animal), evidently is the *ensemble* or aggregate of its powers or properties; the modes in which it acts on other things, (counting among those things the senses of the observer), and the modes in which other things act upon it; to which in the case of a sentient being must be added its own capacities of feeling, or being conscious. The Nature of the thing means all this; its entire capacity of exhibiting phenomena" (p. 5).—Mr. Mill does not observe that each object may even thus be more than we know.

From this definition "of the Nature of any given thing," or particular object, we then advance to what is called "Nature in the abstract," which is described as "the aggregate of the powers and properties of *all* things," the sum of all "phenomena together with the causes which produce them" "the unused capabilities of causes" being also

included in the definition of "Nature in the abstract,"—"consciousness," "capabilities," and "causes which produce phenomena" being indefinitely conceded, so as to include apparently everything, (even "Religion," or the desire for one, if it existed anywhere)—(p. 5). This is explained a little farther on (p. 6), as being "not so much the multitudinous detail of the phenomena, as the *conception* which might be formed of their manner of existence, as a mental whole, by a mind possessing a complete knowledge of them." This then would seem to be unattainable by man.

6. The "Nature of a particular object," and also "Nature in the abstract," being thus defined, we should next have expected some exact application of these two definitions to the critical purpose of the inquiry. It is to be observed at once, however, that these definitions provide for no use of the term "Nature" as an abstract term applying to any *number of particular things* which have, (as a little Socratic questioning here would have shown), what the world takes to be some Nature in common.* The two definitions given provide only for each "particular thing," and for the universal "abstraction"; yet the only illustration of his definitions which Mr. Mill proceeds to give is one which suits neither of them, and only suits that which he omits. "It is," he says, "a law of the Nature of water, that under the mean pressure of the atmosphere at the level of the sea, it boils at 212° Fahrenheit." If he means by this, that it is a "law of the nature of *all* water," what is this but indirectly admitting *common* nature to many waters, each in itself a "particular object" or "thing," with this in "common"?—A further endeavour to supplement the first definition of the "nature of *each particular object*," by here adding the idea expressed by the unexplained word "Law," is useless, because all the *modes* in which each particular thing "acts" are, in both cases, previously included in the very wide definition of its "Nature" (p. 5).

not providing for "common natures": hence his first dilemma.

"The abstract idea of nature," as expressed by Mr. Mill, also fails to serve the purpose of the argument,

7. Not only does Mr. Mill's definition of the "Nature of each particular object" thus fail, however, in his own chosen illustration, which requires a recognition of a Nature *common to several objects*, but the broad definition of "Nature in the abstract" proves also to be equally unpractical; and so we have an emendation of it as early as possible.

After adverting (p. 7) to "the phenomena produced by Human agency," Mr. Mill proposes, (and feels obliged to

* Take a sentence, for instance, which every one understands, "a touch of *Nature* makes the whole world kin"; Mr. Mill's definitions of "Nature" will give us no assistance in treating of such pervading "Nature."

do so), further to recognize two principal meanings in the word "Nature" even as an "abstraction." "In one sense Nature means all the powers existing in either the outer or the inner world, and everything which takes place by means of those powers. In another sense it means not every-^{and needs} thing which happens, but only what takes place ^{subdivision;} without the agency, or without the voluntary and intentional agency of Man." This is inserted easily by Mr. Mill, as though we all knew that the "Voluntary and intentional agency" of man were an admitted part of his philosophy—which, however, he quite neglects. After this new complication of his definition of "Nature in the abstract," (separating "Man" from "Nature" in a way approaching to Bacon's more logical division), Mr. Mill proceeds (p. 9) to inquire, whether the word Nature is used in either of his two senses, when "Moral obligation" is connected with it? In other words, this is actually ^{and cannot} to inquire whether his own definitions, or any of them, ^{even then be} are available in the practical questions before him? ^{used in Moral} ^{inquiry.}

He finds, and owns, that the philosophy and jurisprudence of the world adopt the rule of "following Nature" in some way, as good in morals and politics. All thinkers before him, (as they would decline the theory, for instance, that water may "run uphill,") declined, on the principle of "following Nature," to impose on mankind, as Duty, what was repugnant to their "Nature" in its best, that is its truest, condition. Yet our author, in the midst of this *consensus* ^{Hence his second dilemma.} against him, still prepares boldly to question the "Sequi Naturam." We must let him do it then in his own way, for he is apparently in great straits.

It is difficult to understand—and we cannot help saying so even now—what Mr. Mill would have us *follow*, if not Nature; for, according to the "definitions," whatever we do is a following of our own particular Nature; and our own particular Nature (be we "things," "objects," or "conscious beings"), is part of the "aggregate," or "Nature in the abstract." But how, properly speaking, can we choose to *follow* at all?—Let us try, however, to follow Mr. Mill.

8. Mr. Mill's purely speculative definitions, as thus put before us, seem indeed, by this time, to have bewildered him. It might have been otherwise had he kept at all to that "Socratic method" which he promised us (p. 2). Let us see: Socrates would have probably begun by asking his hearer various questions of his own practical experience, to bring out the actual use and meaning, or meanings, of this word "Nature." He would have taken ^{Mr. Mill's} examples. He would have asked, for instance, whether men ^{failure compared with the} are said to have the same "Nature" as animals? or how far? ^{Socratic analysis.}

and in what sense? He would have inquired what the term "*Human Nature*" meant?—Whether it included women as well as men? Whether we did not consider it the Nature of a certain number of plants to grow out of the earth?—And found the Nature of fishes to be herein different from the Nature of such plants?—And of birds, again, different? And of man also different? From these, or similar inquiries, the Platonic dialogue would have sought to elicit thoughts and facts as to the term "*Nature*," the outcome of all which would have been no speculation, but a statement of the general result, as testified by the minds of all men.—So Mr. Mill's method is the opposite of the Socratic, and seems almost ostentatiously to comprise all the faults which modern philosophy has been wont to condemn in inferior dogmatic inquirers.

But let us look closer; for Mr. Mill's entire view of the subject of Religion which he proposed to treat is made dependent on his definitions.

9. To regard a mass of objects, and then just affirm that it was the "*Nature*" of the antecedents to produce, or lead to them, is, to say the least, no analysis, but very raw and unobservant dealing with facts. This is Mr. Mill's method, and we object at the outset, that it is uncritical as well as illogical. It evades investigation, instead of entering on it. If Mr. Mill had said, for instance, "I deny all species (with Mr. Darwin); I consider that the science of the future will generalize more and more, in some respects, and individualize more and more in others; I ignore classifications, and decline to notice or inquire into distinctions," he would have been candid; though he would in that case have had difficulty in advancing to his consideration of the subject. Adopting so uncouth a way, he would have been obliged to violate every principle of examination, Socratic or utilitarian; for any one must needs be foiled who attempts to construct a theory without previous consideration of facts.

We must ask attention to this, for it well displays Mr. Mill's primary error. The first movement of the philosophic mind, after a fair induction of particulars, is towards discrimination and arrangement. Without this, the whole universe might be indexed, and no science arrived at. The competent thinker, (*See Note A,*

at the end of this paper), on regarding any objects, or series or number of objects, begins to look for the, at least possible, *differentia* of each being; at all events for that which now distinguishes it from other beings; and perhaps, also, he would look in each class for that which marks it off from other classes. None but the rudest, and the most uneducated usually, *à priori* discard the special characteristics of particular objects, or orders, and their mutual points of contact, and just aim to construct, (so far as life and memory hold out), a Chinese alphabet

Comparison of Mr. Mill's method with that of all science.

Its philosophic crudity.

of all things. Now this is Mr. Mill's method. Let us place it in contrast with Bacon's or Cuvier's carefulness when they define. (*See also Cicero, De Nat. D., and Aristotle, Eth. ad Nic.*)

10. Take Cuvier first; He writes thus;—"Dans notre langue, et dans la plupart des autres, le mot Nature signifie : tantôt les propriétés qu'un être tient de naissance, Cuvier. par opposition à celle qu'il peut devoir à l'art; tantôt enfin les lois qui régissent ces êtres. C'est surtout dans ce dernier sens que l'on a coutume de personifier la Nature, et d'employer par respect son nom pour celui de son Auteur." Every one must recognize at once the simplicity, penetration, and genuine reverence of this, and is prepared to follow the ensuing distinctions of that chapter of Cuvier, (*on Methods*), as clearly as if each paragraph had been elicited and confirmed *in extenso* as it might have been by that Socratic questioning of phenomena and uses, which Mr. Mill promised and did not give. The line is drawn between the Nature of a being, and the Artificial acquirements of that being; then we are taught to observe the laws which regulate beings; and finally reach the abstraction, or, as Cuvier says, the personification, which may be regarded as in some sense including the whole.

11. Lord Bacon, as an example not likely to be questioned, may come next. In the Sum of the Second Part of his *Novum Organum*, he writes thus, in the true Bacon. spirit of that *Sequi Naturam* which Mr. Mill cannot understand: "Homo, Naturæ minister et interpres, tantum facit et intelligit quantum de Naturæ ordine re vel mente observaverit; nec amplius scit aut potest." Here, again, is the genuine ring, the true echo of all science and all philosophy since man began to think of his condition and its surroundings. Bacon, again, in one brief sentence tersely condenses a kind of philosophy of the relative terms Cause and Law, thus: "Natura enim non nisi parendo vincitur; et quod in contemplatione instar causæ est, id in operatione instar regulæ est."

Such writing belongs, too clearly, to another order of mind than Mr. Mill's. If every reader is conscious that Bacon states truths sublimely and with transparent simplicity; and if Cuvier lays it before us logically, Mr. Mill's strange stumbling in definition is beyond all that could have been expected by any one who had thought of him either as a worthy opponent or a respectable ally.

12. We are warned, as we now proceed, to look back, and note how our author's "definitions" are alternately used and neglected, even as though he had not grasped their significance himself. He is now about to neglect them again. His *à priori* dogmatism, indeed, never forsakes him; in Mr. Mill's confusion of his own definitions.

that he is consistent ; but in expressing that, he seems unconscious or forgets that his theories are irreconcilable.

This is nowhere more conspicuous than here. He has occasion, (as "Religion" was his general subject), to introduce the Human or "conscious" agency somewhere among the factors of his universe. No ingenuity, however, can rationally interpret the statement, that Nature, (having been defined as the "aggregate" of *all* the unexamined forces and phenomena of the Universe), may still be philosophically regarded as a whole, after certain "conscious" forces are eliminated. But there is not even an attempt to grapple with this difficulty.

His definition had established that Nature is not really "the abstract idea of Nature" *without* the "conscious" beings ; and, after that, he excuses the presence of those "conscious beings" so far as to make of them another "Nature," apart from that whole to which they were declared to be essential, and without which they could do nothing. He declares, "the phenomena produced by Human agency depend on the properties of the elementary forces, or of the elementary substances, and their compounds" (p. 7). But this, which no one wholly denies, does not protect materialism. Yet then he adds, "*we* take advantage, for *our* purposes, of the properties which *we* find"! What was here surely required was some explanation of the "we," the "our purposes," in a word the "conscious agent," who acts upon and in the midst of the unconscious universe, and uses it. Surely we needed some frank distinction such as Aristotle confesses, ἀλλη τις φύσις τῆς ψυχῆς, ἄλογος, κ.τ.λ., or what Plato, (to whom Mr. Mill graciously defers), so plainly owns, τὸ δὲ καθ' αὐτὸ καὶ ἡ οὐσία πρότερον τῆ φύσει.

13. We do not wish, in this matter, to be requiring with our Essayist—yet we want the truth. Of course for convenience sake, and for any temporary occasion, a part of universal Nature may be mentally separated off, and regarded *per se* for its own sake. We are not finding fault with that. No logical blame can be imputed to such division. It simply reminds us of old Aldrich and his *particula* "non." But that is not the case here. It was as far as possible too from the scope and intention of Mr. Mill's Essay ever to contemplate "Man," apart from "Nature" as a distinct whole. His definitions set out with evidently making "Nature to be such as we either must,—or else ought not and cannot,—follow ; and nothing, probably, but the felt impossibility of treating conscious and unconscious being on one level throughout his "Essays on Religion," now introduced a division into the definition of "abstract Nature." Hence alone this recognition of Man, as apart from Nature—a recognition defied or neglected, of course, in his later argument.

His double definition seems forced upon him by the facts.

But there is a still further complication of definition, as he writer advances towards his object. Enlarging on the "ambiguity" of the term Nature, (as if that might be a constant shield for looseness of definitions), Mr. Mill finds easy occasion to modify, or seem to modify, what he had so confidently laid down.

14. "The two senses of the word Nature in the abstract" (p. 12), which had been supposed, "agreed in referring only to what is,"—in contradistinction from what *ought* to be! In the first of these meanings, as Mr. Mill now repeats, "Nature is a *collective name* for every thing which is. In the second, it is a name for every thing which is of itself, without *Voluntary human* intervention." "But," he continues, "the employment of the word Nature as a term of ethics seems to disclose a third meaning, in which Nature does not stand for what is, but for what ought to be; or for the rule or standard of what ought to be." But what is this "ought to be"? He remarks,—that after all is not really a third meaning of the word. It is only intended by it, that "what is (p. 13), constitutes the rule and standard of what ought to be—the examination of this notion being the object of the Essay." He insists, however, that the definitions which have gone before are his mainstay, and, altogether are to be considered as the indispensable preliminaries to his work.

Without it Mr. Mill could not proceed to his object in this Essay.

15. How inconsistent with each other these really are, how incongruous and even self-contradictory, we have perhaps sufficiently seen; and how contrary also to the mind of all philosophy, and to the rules of logic. But we shall have to follow somewhat further their incoherencies; for the conclusions to be ultimately arrived at are now said to be that, (1) viewing Nature as a whole including Man, there is absolutely no meaning whatever in bidding him to "follow Nature"; and that (2) viewing Nature as a whole without including man, it is immoral as well as irrational to require him to "follow Nature."

The "*Sequi Naturam*" is denied by Mr. Mill.

And that in both his senses of "Nature."

As a comment on the "first view" of Nature, which we must first notice, Mr. Mill says, "to bid people conform to the laws of Nature, when they have *no power* but what the laws of Nature gave them—when it is a physical impossibility for them to do the smallest thing otherwise than through some law of Nature, is an absurdity" (p. 16).

16. Here the immediate inquiry might naturally be, Does Mr. Mill, in this somewhat guarded sentence, accept the position that man is not real cause? Or had he made up his mind as to which view he would adopt as the true hypothesis of "Nature"? We are anything but sure that he finally had done so. *Utrum horum?* Is

His further dilemma as to the two senses of "Nature."

the "conscious agent," with him, simply one part of fixed uniform universal Nature? or is he, as the second hypothesis supposes, a being essentially apart, a Cause of action, *sui generis*? If the former, the pretended alternative is unreal; if the latter, the assertion that there is absolutely no power to "do the smallest thing," even with the qualification accompanying it, is without meaning. We repeat—In the first sense of the word "Nature" we are assured that "no one can possibly help conforming to Nature" (p. 15). Then accepting the second sense, it is dimly said (p. 17) that "*we can* use one law of Nature to counteract another"; as though this "we" were not a necessary part of Nature, in both cases, or else a real Cause—*in se*.

17. It is hardly possible to exceed this logomachy. Which-ever horn of the dilemma Mr. Mill might choose, he is self-convicted, first as to both his definitions, and then as to his attempted use of them. He struggles hard to make the double definition serve him a little later; saying, "while human action cannot help conforming to Nature in the *one meaning of the term*, the very aim and object of *action* is to alter and improve Nature in the other" (p. 17). But what does he gain by this? Are not the "aim," the "action," the "altering," and "improving," already included in his term "Nature"? And if so, *why* this division into conscious and unconscious being? Why not be satisfied with the simple *dictum* that it is a physical impossibility for man to act except necessarily, and so as a part of the Natural whole? Of course these definitions within definitions may have been prepared to bring about Mr. Mill's conclusions, but the conclusions refuse to come. "The ways of Nature," he apologetically says, "are to be conquered, not obeyed"; but then, according to him, the "power" that "conquers" is a part of Nature; and though spoken of as if outside Nature, because in fact its "improver,"—yet it is no distinct power!

18. Surely one half of these lucubrations would have sufficed to crush any one who set up as a thinker, had he not a party pledged in some sense to his reputation, and eager followers wishing beforehand to find his conclusions true. It is with the equipment of these broken definitions, and sub-definitions, that our Essayist has the assurance to encounter Plato and Aristotle, Bacon and Cuvier, Berkeley and Butler—in a word, every student of Nature, every lover of Nature, who has ever revealed his thoughts and heart to his fellow-man.

It is not at all superfluous again, however, to reiterate, that in all Mr. Mill's attempted analysis of the doctrine implied in "Sequi Naturam" the alternate denial, and use, of the ideas of volition,

His two senses of Nature prove incoherent as hypotheses.

Yet he opposes them to all previous philosophy, in discussing "Sequi naturam."

and causation, and initiatory power are inevitable to him. Not once can he venture, however, to explain what he means by any of these terms which yet he employs. Are præ-phenomenal "powers," *e. g.*, or "causes" of any kind, reckoned in his vocabulary as "phenomena"? (and if so, we ask—"phenomena" to whom?—*Φαινόμενον* implies *ὃ φαίνεται*; and if not, what is it?) What is the place of the "phenomena" in reference to "Nature"? Are unseen "*powers of Nature*," *e. g.*, force, volition, intelligence, simply mechanical (p. 8) *parts of Nature*? Is this assumed, or is it proved? Certainly they are contained in the totality of being; but how? is the question. Mr. Mill says, "Nature is a *collective* name for all facts, actual and possible"; which, no doubt, is comprehensive enough. Does he mean by a "collective name," then, the same as he meant before by an "abstraction"?

19. Is Mr. Mill as a metaphysician committed to that? We shall see, perhaps, when we discuss his notice of the *à priori* in a future page. Meanwhile, we observe that the essayist seemed at this point again to suspect his own accuracy, for he adds as another modification, "To speak more accurately, Nature is a name for the *mode* partly known to us, and partly unknown, in which all things take place." This is our logician's notion of "*speaking more accurately*"! Only look at it. "Nature" was the "aggregate" of the Universe, including mind; then it was an aggregate excepting mind; now, it is a "mode." And this is said by way of being "accurate." And as to the very unmanageable quantity—"conscious" being, or "mind"—which troubles Mr. Mill at every turn, we may suppose, for the time, that it also is a "mode"!

Still further
modifications
of the defini-
tion of Nature.

But, it will be noted, some things in Nature have been admitted "as far as we are concerned, to be spontaneous" (p. 7); (does that mean "consciously"?)—and yet to be quite dependent on mere "elementary forces." So then it is not easy, at least, to say that the "spontaneous" conscious being is anything more than a "mode" dependent on forces. But a "mode" is an abstraction. Are we all of us, then, abstractions? Mr. Mill seems to admit man to be something, and then to resolve him into nearly nothing, depending on abstractions. Perhaps man is intended to come in under the category of agents "partly known and partly unknown"? Even "spontaneity," however, is not peculiar to man; for Mr. Mill attributes a figurative spontaneity to abstract Nature itself,—even though it seems to be spontaneity without "*spons.*" Nature, as a guide, is thus finally dismissed; and yet man as a conscious agent stands alone in her midst.

20. We may now, perhaps, taking our leave of the "definitions," best understand on the whole Mr. Mill's attitude

if we give his final indictment against "Nature" in his own words. How utterly he fails to perceive the great philosopher's *τὰ κατὰ φύσιν ὡς οἶον τε κάλλιστα* and "fol. low Nature." *ἔχειν* (*Eth.* i. 8) will thus fully appear.

"Fancied dictates," "supposed standard," "so-called law of Nature," are our Essayist's scornful terms. He rejects the thought that a man should be blamed for being "unnatural"; although even the poets of Atheism, Lucretius or Shelley, had amidst all their wreck of ethical feeling shrunk from this, and retained reverence for Nature, as parent and mother. Nay, barbarians (*Xenoph., Cyrop.*, viii.), themselves have not been untouched with affection to Nature as the source of so much happiness that most men at least desire to live. To defend the "unnatural" is for Mr. Mill only. Let any one who would fully see his position in the rejection of the "*sequi Naturam*," compare the sweet reverence for Nature's laws, (in itself a "religion," binding philosophers, saints, and psalmists to the order around), with the passage which we are about to quote. Let us think of those who have delighted in the beautiful, from Albert the school-philosopher down to Newton, Kepler, Faraday—and may we not include some greatest living names?—and then read the following ebullition of unnatural hatred:

21. "If," says Mr. Mill, "a tenth part of the pains which have been expended in finding beneficent adaptations in all Nature had been employed in collecting evidence to blacken the character of the Creator, what scope for comment would not have been found, in the *entire existence* of the lower animals, divided with scarcely any exception into devourers and devoured, and a prey to a thousand ills, from which they are denied the faculties for protecting themselves. If we are not obliged to believe the animal creation to be the work of a demon, it is because we need not suppose it to have been made by a Being of Infinite Power."

22. In this alternative, to my own mind very revolting in its terms, there is a kind of perverseness, too, like that of a wayward child crying for an impossibility. It reminds one, too, of the Brahmin whose untaught soul sickened at the microscopic revelations of "life preying on life" in the cup of water which he refused to drink; or the wrong-headed Manichee exposed by St. Augustin. But we have here, however unconsciously, an acknowledgment of Nature's having undergone injury of some kind, and a dim recognition of what, in the language of Christians, is called "Original Sin," the fearful catastrophe first wrought by a "demon" of evil.

Mr. Mill brings this indictment against Nature.

"the character of the Creator, what scope for comment would not have been found, in the *entire existence* of the lower animals, divided with scarcely any exception into devourers and devoured, and a

We may take this however as a new point of departure in our examination. In connection with it a few remarks follow, on some "attributes of the Divine Being," especially His Omnipotence and Benevolence; as to which Mr. Mill adds a needless chapter a little further on in the volume; the more needless, because he mistakes those ideas in the phenomenal for the Essence of the Præ-phenomenal, or absolute. Hitherto we have occupied ourselves chiefly with the logical incoherences of Mr. Mill's book; we will now deal specially with his subject.

He puts his point briefly (p. 37) in these words:—"If the Maker *can* do all that He wills, He wills misery." Again: "If the Creator of mankind willed that they should all be virtuous, His designs are as completely baffled as if He had willed that they should all be happy." In strange, and we could even say uncultured, sentences like these we perceive at once the origin of much perverse speculation. Now we have no intention at all of just asking our essayist, (as some do), to strike a balance in favour of the Divine benevolence in Nature. We must go to first principles.

He here *assumes* primarily in the First Cause some kind of Will as well as Power; but he does not hint what they are; and leaves out altogether the secondary conception of finite wills, and finite powers as "working together with God." An intelligent Creator and a mechanical Universe are the sum of his theory; and even conscious Happiness and Virtue in his universe, he speaks of as definite constructions—the result of a fiat of Omnipotence. He does not perceive that the kind of will and power attributed by him to the Supreme Himself *in limine* is a contradiction *in se*; nor that his own notion of virtue is distinct from volition. We might judge, indeed, from the common scope of his writing, that, except when he takes it as a part of fixed organization, he only conceives of "will" as what may be termed caprice, and quite apart from that relation to the Good, without which Will would not be even "thinkable" in the Perfect Being; nor does he conceive of Power except as phenomenal *potentiality*, and so apart from the Essential. All this is far too vital to be hastily passed by.

23. If, in contemplating the Will and Power of the Creator, we think of Him as the præ-phenomenal Essential Intelligence, existing in Himself, His Will would mean His "good pleasure," (as an apostle has phrased it), and His Power, essential activity according with that "good pleasure." The notion of merely capricious *capacity* for boundless phenomenal exertion is so great an outrage on thought as to be inconceivable of the Perfect Being.

Mr. Mill here confuses the Præ-phenomenal with the Phenomenal.

Mr. Mill, then, and writers of his views, never appear to place themselves in the mental attitude which at all contemplates the præ-phenomenal; and yet, undeniably, if for the mere working of the problem we hypothesize a Perfect Cause of the universe, He must be supremely præ-phenomenal. The materialist's notion of previous Omnipotence in the Self-existent having the phenomenal as basis is a contradiction; and so this sensualistic theory of "will" identified with "preference," (even as a hesitating balance of phenomena,) is a denial of that Perfect or Absolute Good, on the existence of which the co-existing phenomenals are depending. If, indeed, a created conscious being, gifted for an instant with phenomenal omnipotence and will, (a kind of contradiction), could be supposed, Mr. Mill's alternative might perhaps, be apprehended, and there might seem place for the difficulty as put by him; and, we must add, by materialists and predestinarian writers generally.

(Aquinas's treatise, if it may be so called, *de Potentiâ*, is an endeavour to state the impossibility of attributing to the Supreme that kind of *Potentia* which the Averröistic ontology perhaps required. The Schools generally expressed the Divine power as "pure act," and identify Will with the Good. The distinction has been observed in various ways by every philosophy from Parmenides to the *de Principiis* of Origen, and from him to Leibnitz and Berkeley.)

24. But this confusion of the absolute and the mechanical is less surprising in Mr. Mill than the Moral confusion which, of course, next ensues. "Nature" with him "is every thing," and so nothing is or can be "contrary to Nature"! Surely, it was needless, then, for a logician to have defended the "unnatural," for, according to this, it does not and cannot exist. The very definition of Nature as the totality of the Universe, precludes it. If Nature really meant "every thing that is"—both what Mr. Mill pleases to blame as "evil," or speculate on as "good"—it is plain that no one ever adopted the rule "*Sequi Naturam*," and Mr. Mill was simply, perhaps unawares, fighting a shadow. None among those who have regarded Nature as a guide, have conceived that we are to "follow *every thing that is*." Of course, had there been any one—which we cannot suppose—who accepted Mr. Mill's self-contradictions as definitions and premisses, he might perhaps be ready to endorse the conclusion, which no one else would do (p. 62), that conformity to Nature has no "connexion whatever with right and wrong." Moral philosophy speaks otherwise. The Christian hypothesis is, that Nature, or whatever God made, "He saw to be very Good" as He made it: וְהָיָה טוֹב מְאֹד

(Gen. i. 31). What Mr. Mill's hypothesis is seems, after all, hard to say.

25. It is with satisfaction we notice in this very sentence, however, that Mr. Mill cannot help conceiving of "right" and "wrong" as realities in themselves. His mind bears witness to the moral absolute, in spite of his argument. We all of us, when appealing to our fellow-men, appeal to their perception of the Right and the True. We expect them to compare what is said, by us or others, with reason, the "true-always"; nor is this supposing them to strike an average of opinion—though even that implies antecedent reason to guide them—but it is that we anticipate in many cases, and rightly, a much shorter process. And, little as he might have thought it, Mr. Mill exactly thus presupposes the *a priori*. Such a sentence, as we occasionally meet with in his pages, as—"Right action must mean something more and other than merely intelligent action"—discovers, as if by accident, an ethical conception which no mere utilitarian calculations could satisfy. If, then, the antecedent idea of right, or reason, or the Good, be thus in us by "Nature," as an "improving" rule, or a rectifying principle, it is a part of that "every thing that is" which Mr. Mill's definition includes; and it would follow from this that Mr. Mill's fierce assault on Nature has no real foundation even with him; for Nature, he says, is to be regarded as *a whole*. The very faculty which sits in judgment on the animal kingdom, where pain and evil and destruction are found so largely, is an active and indestructible part of Nature whose voice is against Evil, affirming that it *ought not* to be. Nature has in it a "reasonable" and "right," which is essential to it, and, as Mr. Mill himself feels, even demands supremacy.

26. Now, what is this but what Augustin says against the Manichees? "If in one and the same thing, or order of things, one finds something to praise and something to blame—take away what is blamed, and true Nature remains; while to take away what is praised as good, and to leave only what was blamed, is to destroy Nature, and introduce entire confusion. Join with me, then, in commending form, classification, arrangement, harmony and unity of forms, symmetry and correspondence of members, control by mind, acquiescence of body,"—and so on. *What hinders or deranges* must be the opposition, and not the Nature; "every nature, as nature, being a good." There is a passage in Butler in harmony with this, and enlarging the view in a moral direction: Not only "is general benevolence a pervading law of ethics," but indignation against vice and wickedness

Yet he is himself better than his argument.

Mr. Mill's unconscious admissions compared with St. Augustin against the Manicheans, c. xxxiii.

is natural, since "it is necessary to the very subsistence of the world that injury, injustice, and cruelty should be punished."

Had not Mr. Mill failed to examine then what he meant by "Goodness," (as well as Power), he would not have given his present account of "Nature"; for even if "Nature" is taken as a name for "every thing," "Goodness," is not a name for nothing. Mr. Mill saw that "every thing" is not now good; he owns, however, that "every thing" is not evil. If something is good, what is it? That question he did not consider.

27. Again:—Socrates, to whom, as we now know so well, Mr. Mill thought to appeal, never found fault with phenomena, mental or physical, generally approved by the human experience and understanding. But that kind of optimism which would exclude from the world all possibility of failure, or evil, would be automatism, unknown to Socrates and his method. His object always was to ascertain Nature. A universe of automata is perhaps conceivable; but it was the reverse of the hypothesis of Socrates. A machine is not regarded by the Socratic thinker as the ultimate perfection of being, even though the alternative of conscious action and volition must involve the possibility of moral failure. But it must be added, that possible injury is no peculiarity of moral life. All phenomenal being implies possible *change*, and therefore alternative results. The "absence of all possible collision or disaster" can hardly be reckoned as a scientific supposition, even if at all conceivable in physical life where evil may be physically irremediable, any more than it is in moral life where new moral causation may happily be found.

This again, most inconsistently, is recognized by Mr. Mill in such a passage as the following:—(p. 54), where he is once more a "backslider" from Materialism, and his previous principles. "The artificially-created, or at least artificially-perfected Nature of the best and noblest human beings is the only Nature that is commendable to follow"!—And so, after all, it is as Butler in his matchless *Three Sermons on Human Nature* says: "The perfection of Nature is 'Nature,'" or as Aristotle has it (*Eth.*, x.), the $\tau\acute{\alpha}\lambda\epsilon\iota\omicron\varsigma$ is the law of virtue. But then this is the entire meaning of the *Sequi Naturam* in Morals,—which Mr. Mill so mis-states.

28. The recognition in some way of the evils that afflict our world both physically and morally can be avoided by no one. It is Mr. Mill's peculiarity, as it was that of some Gnostic sects, to confound those evils with Nature itself; which we now see to be impossible. He was first misled in this by his own attempted definitions, in

Again, what is Mr. Mill's idea of goodness?

Compared with the ideas and method of Socrates.

All must recognize evil as a fact.

which, though he tried to make a place for human volition as originative, he, *at the same time*, treated man as part of a fixed organization called "Nature," and also as a "former of his own character" towards some *à priori* standard, which he called "noblest," "best," and "commendable,"—which is impossible; for he cannot be both. To be so inconsistent is indeed very honourable to Mr. Mill as a man; but as a "thinker," it shows him to have been unequal to his subject, which we might now dismiss, as intellectually disposed of; but that something further is to be done before we dispose of the task which belongs to us.

29. In dealing as we have dealt with Mr. Mill's ideas of Nature, and his thesis, that "Nature is not to be followed" because so evil that in one department it might even be regarded as the work of "a demon,"—we have for the most part confined ourselves to the exposure of his first principles, and so, we suppose, destroyed the entire ground of his assault. Some thoughts as to details may, however, be added; though details are passed over by us if we find them without argumentative value.

We should, of course, distinguish between those parts of the animal kingdom which are so constituted as to be capable of what Mr. Mill would simply call "suffering," or pain, and those which are not. The lower organizations *e.g.* have only slight inconvenience from accidents which to the higher would be painful,—in most cases only enough to suggest self-preservation. This is so commonly ordered as to be to them a good, a guard of life. As to the higher organizations, pain results from changes of state in some cases salutary, in others useful and more than countervailing the inconvenience. The first coming into being, the growth of consciousness, the progress to higher life,—all transitions involving separation from what went before,—imply unsettlement and a restless condition, having some analogy to pain, if not to evil. But all these which are births to a nobler future, though they be "a travailing in pain together" as an apostle said, are frequently welcomed by the advancing nature of man. And this thought opens to us a train of moral reflections much unperceived, we suppose, by Mr. Mill. The transforming and elevating power of Enduring, in the loftier conscious agent, reveals to us the dignity of suffering, and shows that pain is not to be dissociated from its moral influence. The evil or the good of any condition is gauged by the individual consciousness. To St. Paul Death itself was a grand movement to immortal life; not only *Κέρδος*, but *στέφανος, τιμή*; the conscious being's mightiest action here.

It will not be supposed then that we accept even in the least Mr. Mill's inflated account of the evils which afflict the "animal creation." Physical suffering, to which alone he refers, is limited and utilized by sensation and consciousness; and even

death is, as a rule, physically painless. But the Christian philosophy, while eliminating Evil from Nature as constituted by God, (as indeed all philosophy and all science must, because, to suppose it as an aboriginal fact, is to suppose a destructive contradiction), perceives also, as Mr. Mill does not, that evil is under control, is transitional, and is not the end.

That evil could be, is the very hypothesis of the existence of variable Force, Potentiality, or Moral agency itself, as morality and Christianity conceive it. But we do not stop there, as materialism does and must. We conceive a future implied even in potentiality itself. If on

How the Christian philosophy recognizes it.

the one hand we could suppose an unconscious mechanical universe; on the other hand we see and own conscious being capable of originating thought and action, and in thought and action freely conforming, or else refusing to conform, to the Eternal ideal of Good. It must be one or other. A universe of automata would *not* of course win praise as virtuous, or the opposite. A universe in which conscious agency, or alternative "force," *i.e.* power to choose action, (and not merely seem to do so, which is ridiculous), existed, *might* have virtuous agents and it might not. To be *capable* of so being a "force," and so *ab interno* capable of the good, and capable of declining the good, is all that our philosophy needs; and it is surely a very fanaticism of the mechanical that would assign "force," *i.e.* phenomenal power, to a molecule or an atom, and deny it to a man.

30. The uneducated and impatient many who inquire in a merely wilful way as to the "origin of evil" should ask themselves, whether they think the Supreme Being *could* originate free agents, or variable forces? Mr.

The theory of the uneducated unthinkable ultimately.

Spenser says that if there be any Will, there can be no psychology. Well, but does the world seem to exhibit, in manifold phenomena, finite agency having apparently in itself an inscrutable alternative power of choosing and refusing? Is it "scientific" to treat these phenomena, as well as the præ-phenomenal postulate, as unreal? To call upon us to manipulate the præ-phenomenal in the forms of post-phenomenal argument, is to mistake the first premiss. Any so-called "proof" could but push the *à priori* one step farther back. All that is possible for us is to gather *phenomena*, to come at length to the most primary, and perceive that there could not previously have been universal Nothing; and to be thus certain of the necessity of the præ-phenomenal. We may try to express that in the nearest suitable terms; but after all it *precedes us*. It is,—but it defies our forms.

The philosopher knows that he has not to construct Nature; he has with all humility to set to work to understand Nature.

What would be thought of some astronomer, or chemist, who found some untractable facts, and instead of sitting down steadily to ascertain their meaning, grew angry, and scolded the facts, and attributed them to a "demon"? Yet this is what Mr. Mill does, on account of his own hypothesis as to what is *best*; and as to what *Omnipotence* could have done, and *Goodness* should have done; giving no definition of his meaning, too, in any of those terms.

31. But that we may leave nothing untried, let us, to help any one's conviction, imagine, and concede for the moment, Mr. Mill's perfect world. It would seem Mr. Mill's world imagined. to be a world of organization purely mechanical, endowed from within or without with the gift, (which Science does not warrant), of never wearing out. If it had sensation, let it be an agreeable one, and so uniform as to be neither more nor less; no part of it capable of accidental collision—not even a fall which might displace or injure. Let any one try to work out this thought, and say, Whether on the whole it would be a higher kind of world than this in which we are? Then if he thought so, what we ask would he do with his theory, as a man of science? Would he not say, "This kind of world without possible variation is not the world I have to deal with now. I have to try to learn and understand the real world around me. If it prove to have evil in it, let me see what may be meant by it; and what is to be done with it ultimately."

32. The Christian is not the man to shrink from this. His is a philosophy as to "what is to be done with it." The Christian treatment of the facts. Surely, it is high time that this stupid *crux* as to the "origin of evil" should give place to the worthy and thoughtful inquiry as to the "end of evil." St. Paul, a very resolute thinker, said the "whole creation" was in its birth-throe to a higher future, not mechanical but a "glorious liberty of sons of God." From another point of view another, (and also once Calvinistic), thinker, of our own time, in his *Apologia* and elsewhere, gives a fearful picture of the present world, yet interprets its jarring conditions as implying a need of an "infallible" and perfect settlement. This may be intelligible; but Mr. Mill's hopeless talk of an *à priori* "demon" is irrational, as "un-thinkable," as it is irreverent. Here, as always, Nature's highest suggestion is that there must be a "Super-Natural" Supreme.

33. A great difficulty no doubt in the way of the Moral and Religious philosophy of the future lies in the fact, that the ground of inquiry as to Volition, Power, Force, and the like ideas, has been pre-occupied by the inert Difficulty of the moral science of the future. predestinarian preferences of the unelevated many, coinciding now with a sort of "materialism made easy." (See Note B.)

In Christendom for more than a thousand years, from Prosper to Bradwardine, from him to Calvin, Jansenius, and Jonathan Edwards, a fatalistic literature has greatly infected our Religious philosophy, supposed by its adherents to be "doing honour to God," and scarcely protested against except among the Jesuits. Once let us get men to grasp in thought, (as they are obliged to do in practical life), that the "Ego" is a force, and that "volition" is but a word that idealizes the going forth of that force, and then the first step to higher thinking is taken. We have not at the outset to formulate, important as it is, the præ-phenomenal—of which we have been obliged here to speak. The nearer fact is the "Ego" as a Conscious Force, and its latent sense of Responsibility. We know, if we know anything, that we are, in some things, the praiseworthy or blameworthy Originators of what we rightly call "our own acts," and we repudiate the acts of others as "not ours." Men may equivocate; but without this there is no Moral world at all, and they had better say so.*

34. This conscious force, "the Ego," is, we all know, a variable force, acting in the midst of a world of many unconscious forces, which may be invariable; and it voluntarily and from itself displays phenomena different in kind from the invariable, as being outward results of its own free inner being; for which results it is approved or disapproved by itself, and by beings of a common Nature and common Reason, and above all by the Supreme.

Such, we repeat, is the pervading fatalism of modern literature, that nothing but a philosophy beginning at the beginning will meet it. No pious-seeming theories must turn us aside, if our Christianity is to be upheld hereafter on moral grounds. To commence, (as Mr. Mill), with "attributes of God," when we have not, in our time, even attempted an Ontology or thought of the Præ-phenomenal, can only mislead. The γνώριμα ἡμῖν will no doubt introduce us to the γνώριμα ἀπλῶς, but slowly we learn the γνώριμα ἐξ ἐμπειρίας, because πλήθος δὲ χρόνου ποιῆ τὴν ἐμπειρίαν (*Eth.*, vi. 8).

When any are prepared again to maintain the popular and ever-attractive quasi-fatalism in Religion, they will find coadjutors like Mr. Mill, when they will least wish for them; and they will have to vindicate at last the position that, whatever be the appearances, God has not made free originators of Responsible action, and that finite conscious beings, freely choosing "good or evil," are probably *impossible in the nature of things!*—Let them prepare for that.

* See "The Analysis of Moral Responsibility," (Vol. IV. of the *Transactions of the Victoria Institute*); as to the "True-always."

Bad arguments for God—His prescience or His power—recoil at last on those who use them; and we conclude, warning all who use such arguments, that Mr. Mill's notions of "Nature" and Religion here exposed, have their roots in too many religio-fatalistic antecedents, for the existence of which ill-taught Christian teachers have to answer.

We now pass on.

§ 2.—*Utility of Religion.*

35. It is at first with a feeling of surprise, after discovering the entire repudiation of Religion, (even "Natural Religion"), that one reads the title of Mr. Mill's Second Essay, "UTILITY OF RELIGION." If he had really persuaded himself that Religion had no foundation at all in *truth*, (even as a part of "Nature," or as a suggestion in Nature that there might be something above Nature), he could hardly have thought of discussing the "Utility of Religion" at all. It may be, however, that the very zeal of his search for some rule of Right and Duty led him to say: "it is perfectly conceivable that Religion may be morally useful without yet being intellectually sustainable" (p. 74). He had, as we observed, begun his religious inquiries into "Nature," having nothing else to look to. Traditions he had none, to which sacredness or authority of any kind could be attached by him. He seemed almost the solitary specimen of a man, a "conscious being" as he says, who was in a position to begin from "mere Nature," and ascertain in his own way Nature's teachings. His conclusion, however, was that those teachings, as he observed them, morally fail. Yet it appears that the idea of Duty, the need of some rule or standard of right more than mere positive law, he could not but recognize, however indistinctly. *De facto* Nature, considered as a whole, with or without man, could not indeed, as we saw, give him the needed perfect law. To an ideal of Nature, as contemplated by the higher intellect, his mind narrowed by the philosophy of Utility could not rise. He drops the inquiry as to Nature, therefore, and asks—how indeed could he help it?—can the "Utility" of Religion, in any form, be so practically or empirically established, that a law of practical duty may be found by it,—suspending for the time the question of its ascertainable truth?

36. It is not uninteresting to observe how he propounds this strange inquiry. He says, "We propose to inquire whether the belief in Religion considered as a mere *persuasion*, apart from the question of its truth, is really indispensable ["advantageous" he should have said] to the

Essay II.
"Utility of
Religion."

How he
comes to dis-
cuss this.

The question
as stated by
Mr. Mill.

temporal welfare of mankind?" This he finally determines in the negative, only reserving a doubt in behalf of what he calls a "Religion of Humanity" (p. 108), which must be mechanical, and yet is love of country, developing into love of race, which he thinks is more than a morality, being *founded* on "large and wise views of the good of the whole, neither sacrificing the individual to the aggregate nor the aggregate to the individual."

He explains this possible Religion of Humanity best perhaps in the following sentences: "The essence of Religion is the strong and earliest direction of the emotions and desires towards an ideal object, recognized as of the highest excellence, and as rightfully paramount over all selfish objects of desire. This condition is fulfilled by the Religion of Humanity in as eminent a degree, and in as high a sense, as by the Supernatural Religions, even in their best manifestations" (p. 109). Again: "Apart from all dogmatic belief, there is *for those who need it* an ample domain in the region of the imagination, with possibilities, with hypotheses which cannot be known to be false" (p. 117). Of this scoffed-at Religion of Humanity which may or may not be "Natural," a future life is no part; nor even the being of God,—except possibly on some Manichæan hypothesis (p. 116). Is free volition in it?

37. In discussing his subject, Mr. Mill follows, as he says, very largely in the footsteps of Jeremy Bentham and Auguste Comte. He treats it briefly, both in its social and individual aspect. He acknowledges, at once, the deplorable condition to which men would be reduced if virtue were not taught and vice repressed, publicly and privately, by the praise and blame, reasonable or not, of mankind. But he observes that Religion receives too much of the credit of teaching all the morals of the world. AUTHORITY and tradition, he insists, even if not religious, are "all-powerful with the immense majority of mankind." He quotes, as good, the telling words of Novalis: "My belief has gained infinitely to me, from the moment when one other human being has begun to believe the same." Then education, he rightly adds, is a "tremendous power"; (and none, surely, could have more reason to urge both these considerations than our essayist). His words on early education, and the comparison of their powerful hold on us with the "investigations" of later life, have a solemn pathos, like an involuntarily uttered secret of the soul, which could not be restrained (p. 81).

38. He imagines, further, that the needful Authority, and an Educational tradition for the many might be attained eventually by the supposed "Religion of Humanity" gaining possession of the heart of "those who need it,"—of whom Mr. Mill does not profess to be one. It seems to him perhaps a weakness.

With a possible exception in favour of a "Religion of Humanity."

Bentham and Comte are followed.

But in support of the view that social morality is largely independent of professedly Divine Religion, Mr. Mill then refers to Greece as perhaps an historical instance.

We wholly demur to this, however, and a man's historical knowledge must, we think, be slender who accepts it. Any who may wish brief satisfaction on the subject, as matter of fact, may find it in the work of Professor Du Coulanges, of Strasbourg, entitled *La Cité Antique*, crowned by the French Academy. As a simple inductive proof that the primitive bond of all human society was Religion, it has a kind of completeness. There ever was a religious sacredness in all social "authority," little as Mr. Mill seems to recognize it, whether in the family, the tribe, the race, the city, or the state. Not only every city, but every society within a city, had its special "religion." To speculate now that men could have done without it, or that the ends of society were otherwise attainable, is useless, if the truth be that an association without, in some sense, its God is not to be found.

The social law of ancient Greece specially referred to, (or of ancient Rome also), was all founded as much on Religion as was that of Egypt itself. The Lacedæmonians even believed that their laws came not from Lycurgus, but from Apollo; the Cretans theirs, not from Minos, but from Jupiter; the Romans, not from Numa, but from the goddess Egeria; and so on. Mr. Mill must have forgotten the Homer and the Aristotle, which we are told he read in his very early childhood. (See Aristot., *Pol.*, iii. 14.) Lacedæmon is a peculiarly unfortunate allusion for Mr. Mill's case, for the Lacedæmonians committed to their kings the ordering of all the high concerns of the entire national Religion, as much as the Athenians did to the Archons, or the Romans to the Pontiff.

39. The facts of "Authority," "Tradition," "Education," or "Public Opinion," as alluded to by Mr. Mill and his two teachers, prove then to tell all against his hypothesis. If history is to be appealed to at all, it shows Religion to be so imbedded in the social consciousness that nothing could ever displace it.

To maintain this as historically certain is to destroy the ground of those who would uphold Religion, merely for the sake of its usefulness. A tacit admission of the untruth of Religion is at the bottom of their supposition; and this could not be concealed. And who can doubt that to discover a falsehood is to deprive it of its power? It must long since have died out.

Without question, the Utility of Religion to society, or to the individual, (*i. e.* the actual and subsequent utility,) is included in the idea of its anterior necessity, but it is no part of the argu-

Du Coulanges gives a complete refutation as to Mr. Mill's supposed facts.

Examples in opposition to Mr. Mill's suppositions.

The anterior necessity of Religion yet hinders not the subsequent utility, but supposes it.

ment for its necessity. If indeed we affirm, as we do, that society has always had Religion among its foundations, we imply that it is useful ; but more, it is vital. To talk simply of its utility is like speaking of the utility of vision or locomotion ; and in so insisting we do not lose sight of the individual any more than of society. For it is an irrational paradox, and doubly so if in the mouth of Utilitarianism, to say that the well-being of the social system, as a whole, could be our object, apart from that of the man himself. There is no motive for promoting the good of either apart from the other ultimately. The appeal to an imagined "unselfishness" and the deprecation of "reward" in either case is unworthy, because, as Mr. Mill confesses (p. 84), "social morality is the summary of the conduct which each one of the multitude, whether he observes it with any strictness or not, desires that others should observe towards him,"—a truth more tersely expressed by a far higher authority as the sum "of the law and the prophets." But is not this also "exceeding great Reward"?

40. But the "Utility" which pertains to Christianity, as the one true Religion, differs from that which is indeed generally inseparable from the Religious Institute, even in its corrupt forms. It consists in its promoting the well-being, to the highest ideal, both of the individual and the community. Christianity also, it should be remembered, develops many of the higher principles of human association, and the mingled result not unfrequently is practically a "great reward." Nor is this to be thought in any way derogatory to its theory, but the reverse. A true utilitarian philosophy is based also on the fact, which Mr. Mill ought to have weighed, that some things reward us, and some punish ; and that the former are to be chosen when rightly possible. We add this, because the objections in this essay to the Christian promises in the hereafter are all tinged with the same fallacy. The highest "reward" is never a mechanical addition to present effort ; it is in ourselves ; it is a conscious development, which even becomes a crown. The philosophy of Reward and of Utility will be found fundamentally in agreement.

41. The primary logical blot on this second Essay is that it uses the word "Religion" ambiguously, so that the idea is never properly grasped. Mr. Mill sees but indistinctly its two-fold meaning, for it expresses on the one hand the general sense of a community, or, on the other, the inward conviction of the individual, identified with his reason and his discernment of right throughout life and action. In the latter sense, perhaps, none

would venture to deny its "utility." But can the former be separated from the latter?

The intellectual condition of the majority of individuals is always such that an honest, if dim, acceptance of the best traditions of Duty and Right known in their community is all that can be had. Mr. Mill admits it. A minority will rise above that, but tradition, and not always a very good tradition, has to sustain and guide the conscience of the generality. The more thoughtful and ever-reforming few have the task of elevating the "public opinion," or tradition, towards external "reason"; and thus, as Coleridge said, the metaphysics of the present age may become the common sense or tradition of the next. One of the greatest Scottish writers now living has quaintly expressed the incapacity of the multitude as yet for thinking justly and fully on the higher subjects, in his odd sentence, "there be many millions of people in the world—maistly fules": of course this meant "mostly unequal to independent thinking." This is more widely true in philosophy than in morals; but Religion touches both morals and philosophy, and it seems scarcely intelligible to question its "utility" in either, if in fact it be inseparable from them. At least it can be only of the lower Religious traditions that Mr. Mill can be supposed to be doubting the "use"; and not the "utility" of truth and righteousness, which every capable conscious being must desire for himself.

Religion in the individual, and the community.

As familiar illustrations of the place and Utility of traditional Religion and morals in the general conscience of a community, Judaism, Christianity, or Paganism might be equally referred to. The very definite Religion of the Jews, with its social life, and its literature, no doubt was a training for many an individual conscience; but, much more than this, it was of the highest utility, as it created a better civilization, in the midst of which a higher law of Right, the Christian law, came in the "fulness of time." So the Christianity of the Roman Empire was a civilization for the peoples, making possible to many that higher life which first became accessible only to the Jew. That new public opinion under which Christendom was henceforth formed is not denied by us, of course, to have been "useful"; yet it is not to be confounded with the personal knowledge and goodness which are the essential life of Religion. The civilization of the Christianized nations is the exoteric, the life of sanctity the esoteric form of our Religion.

Something analogous has been found in all ages, as far back as history can reach,—as in Egypt, Greece, Persia, and India. A superficial tradition for the majority, and a thoughtful life venerated in some. Mr. Mill entirely fails to use this plain fact, and

generalizes, as though the "religious element" in human nature were not really allied with the right, the noble, and the true, both in thought and action. The bearing of these considerations on individual Responsibility, and on social and political duty, cannot of course be here examined, though it is not to be unnoticed.

We now have omitted nothing of the nature of argument in this intermediate essay of Mr. Mill. It really concerns us but little. We only again remark, that the unexplained use and misuse of terms, now implying and now refusing the moral freedom of man, pervades this essay as much as the last, and would of itself mar the whole attempted reasoning. With this we will proceed to the Third Essay, the largest and most important of the three, and at least intended as the chief work of the volume.

§ 3.—*Theism.*

42. The Third Essay is entitled "THEISM." The subject is so laid out in a kind of syllabus as to seem at first

Essay III.
"Theism."

sight to cover the ground of the usual controversies.

This prospect is delusive; and what has been already said as to the præ-phenomenal, in examining the former essays, supplies almost all that is needed for the reply to this. We must, however, go over the course, though it is unnecessary to tarry long on any part of it, as there is but little that is new in point of thinking though the tone is somewhat different.

We detect a worthy consciousness of the responsibility of making

The tone of
this Essay.

a final decision on some of the issues in this Essay.

While not owning it in terms, the writer seems to feel that it is he himself, and not a "reasoning machine," as some had called him, who was making his conclusion. For this is free agency in action—the putting forth the awful inner power of saying "Yes" or "No" to truth and goodness. There is something overawing, too, in the reflection that this inner power at times, and perhaps not unfrequently, exhausts its freshness in some one effort or act; so that a choice really made for evil or for good, leaves the agent not exactly what he was before.

The motions of a mind like Mr. Mill's are worth watching for their own sake; and his conclusions of avowed—even if reluctant—Atheism, or non-Theism, are not common utterances. They have a harmony, too, far more than Strauss's, with the spirit of our times. If they reach Strauss's conclusions, it is not by the same way. Strauss once professed Christianity; Mr. Mill, we believe, had not done so. The "unique" majesty of

Christ Himself had a charm for Mr. Mill; Strauss, at length, seemed blind to it.

There is a painful account, if we remember rightly, in the Letters of Byron, or in the notes, about Shelley's having had the conviction that, to get rid of the alleged ineradicable tendency of man to Theism, it would be desirable to form an artificial community from which the very name and thought of God should be rigorously shut out, and the children be brought up entirely without the tradition of a Deity in any form. It is said that Shelley purchased an island in the Ægean, with a view of carrying out this barbarous project. It might, by excluding all literature, have been possible, in this unnatural way of determining our nature, (as Coleridge would say), to "hunt men out of their humanity"; but the plan was abortive through the unhappy poet's death. The vessel in which he put forth to go to his island foundered, and he was lost. We had thought the theory had been lost too.

Anecdote of Shelley.

In truth, such idea of excluding the thought of God from the nature and mind of man resembles that of the king in Herodotus, who shut up a child in order to ascertain, by excluding him from definite knowledge of human speech, what would be the first sounds he might produce,—as if he might so determine what were the aboriginal elements of "natural" language. Such treatment might possibly produce imbecility, if attempted on any child, or elicit entirely unhealthy development even in the strong.

Story in Herodotus.

43. But we can hardly help being thus reminded of Mr. Mill's own training, excluded from the ways of men. It may explain so much of his apparent inability to deal with the natural, and his misapprehension of tradition, and especially also of the *à priori*. Shut out too much from common homes and habits, he seemed scarcely one of his kind. There is a gentle self-contemplation in his life which touches the reader at times profoundly, as it gives us glimpses of what he might have been. Our feeling concerning him is deepened by the fact that he really wrestled with the ruinous predestinarian philosophy, and only succumbed to it as a materialist for want of the *à priori*, which had withered in him from his earliest hours. It was with him, then, no mere theory to be "without God."

Mr. Mill's account of his own training.

The Essay is in Five Parts: the First of them, in its miscellaneous subdivisions, contains the germs of what follows. "Theism," and its "Evidences," "Causation," the "*Consensus omnium*," "Consciousness," and "Design," pass rapidly before us; and afterwards, in Parts

Arrangement of the Essay.

2, 3, 4, and 5, God's "Attributes," man's "Immortality," and supernatural "Revelation" are briefly reviewed. We shall have need, for the argument, chiefly to notice Part 1, and its several points; the remaining Parts will follow the fate of the main position of our author.

44. (i.) The quietude of Mr. Mill's manner in approaching his subject (p. 126) has a grace and truthfulness about it which contrasts, as we intimated, with the common tones of unbelief; and his refinement in this respect is broken, though rarely, by a note of hollow despair, coming as if from the bottom of a fatally-wounded heart. He speaks as if believing in nothing,—not even his own arguments, or his own self. If he refers to hope as a possibility for some, it is still quite evident that he has it not. One would think that as he mused at any time of the birth of children into such a world as this, he might almost adopt Dante's motto for the entrance to a lower region—"no *hope*" for those who come here! Were it discovered, universally, that all Religious faith had ceased

Its introduction and calmness of tone.

But it is not hopeful.

from the earth, and if a cry of terror then went up from all who thus far had sustained themselves by some Religion,—even infidels standing awestruck,—it would seem as if Mr. Mill would be more than resigned. In such a spirit as this to approach the subject of Theism is, even to lookers-on, distressing. There is a languor as of coming death in every line that is written; a reaction from the very suspicion of a "Religion of Humanity" for him. Perhaps, too, a little reaction here and there against the domineering "canons of scientific evidence" may be felt; but he must, as of necessity, come to the consideration of the existence and attributes of God as to a "scientific theorem only." He says (p. 134):—

45. "Looking at the problem as it is our duty to do, merely as a scientific inquiry, it resolves itself into two questions; first, is the theory which refers the origin of all the phenomena of nature to the will of a Creator, consistent or not with the results of science?" And he calmly replies that, at all events, "the conception of a God governing the world by variable acts of *Will* is inconsistent with the most general truths made known to us by scientific investigation" (p. 135). Of course, if this be the case, *cadit quæstio*. But had not the supposition of such Will been previously used by him? And is not physical science itself in need of something to begin either molecular or atomic motion?

First inquiry whether the idea of the will of a Creator contradicts science.

Before we go any further then, we must know what "governing the world" means in this case. To speak of "governing," without will in the governor, is to deny all intentional "governing" while admitting the term. What "governing" can be, we perceive

not, if "invariable law" so works of itself as to be untouched by any distinct "governing" power, even at first. If a power or force can only act in a previously fixed way, (and yet there is nothing "previous"), in what sense, we repeat, can it be said to "govern"? If science really obliged us to think thus, science would not, (as Mr. Mill does), speak of a "governing Power" at all. But our most advanced men, whether in thought or science, quite refusè to decide in this peremptory way, that anterior governing Power is inconsistent with the known results of science; as we shall see.

46. Professor Tyndall, in his latest utterance, that in the Free Trades' Hall at Manchester, (*See Note C*), informs us that the question of the present day is, "*how far* does this wondrous display of molecular force extend?" And he directly declines to forestall the answer of science; and rather retorts on those who charge him with scepticism, that probably they are really greater "sceptics" than himself. Mr. Morley, in his discussion on Voltaire, speaks, of course, with more openness than Professor Tyndall, and expresses himself with that clearness which distinguishes him.—"*There is an unknown element,*" he says, "*at the bottom of the varieties of creation, whether we agree to call that element a Volition of a Superior Being, or an undiscovered set of facts in embryology.*"

Professor Tyndall and Mr. Morley oppose Mr. Mill's dogma.

So the testimony of philosophy, as well as science, as thus offered, is alike against Mr. Mill. It is suggested by those, like Professors Tyndall and Huxley, and Mr. Morley, men whom we take to be looking honestly at facts, that as far as we yet know, "invariable law" does *not* account for everything. A "Governing" volition of a Superior Being may, at one point at least, be quite consistent "with science"; and is, with scientific men, a suggestion warranted at present by the state of our knowledge.

Competent physicists recognize of course the distinction between vital and other force. Abiogenesis is as yet a dream; life not being known to arise without previous life. We need not dwell further here on Mr. Mill's "science."

47. We may pass then, with some reason, to Mr. Mill's second inquiry, (though its hypothesis now is like the Irish second plea of "justification,"—after the first plea of "not guilty").

Second inquiry. What is the evidence for a will governing Nature?

"Supposing a Superior Being's Volition to be consistent with our scientific results, can this existence be scientifically tested?" Of what nature is the "evidence" for it?—He does not seem to know that it is, as previous Force, a postulate of Science itself.

But under the impression that the *a priori* is not only unscientific, but condemned by science, he has no need of axioms or

postulates. Unaware that science suggests some *precedentia* of existing results,—and that the *à priori* has done good service to science heretofore—(if *e.g.* Kepler first hypothesized his “Laws,” and subsequently found them scientifically true)—he begins by an illogical demand of “evidence” for the *præ*-evidential. If, as we have shown, science itself as yet stands on some *à priori*, the scientific “tests” could have no immediate place. They might even be irrational, as applying to the *præ*-phenomenal, what pertains only to the phenomenal. Just as Leibnitz, in a passage referred to by Mr. Mill (p. 136), repudiated as unworthy of God, the idea of perpetual subsequent interference with His own laws as such; so, equally, the competent Theist might be forgiven, if he recoiled from the thought of an Eternal subjected to the interference of scientific manipulation, as if He were but the logical conclusion of phenomenal premisses. It seems as if Mr. Mill could not, as we have pointed out, so far realize what is even meant by the *à priori* as to state it. He further betrays this, perhaps, in saying, “that *à priori* arguments are frequently *à posteriori* arguments in disguise.”

The *à priori* is always postulated.

Mr. Mill's *ignoratio elenchi*.

48. (ii.) In discussing, as he now would half attempt, the *à priori* “evidence” or argument of Theism, the essayist, as it is his wont, subdivides once more; and not perhaps without propriety. He distinguishes the permanent from the changeable in Nature; and thus would limit the argument for a “First Cause,” making account only of the changes of the present phenomena of the universe, and not its Beginning from Permanent Being. But here it is immediately apparent that being unable to approach the abstract and the *à priori* in its higher region, Mr. Mill is at once the victim of his crude attempt to use abstractions in their lower and popular form, in which they are little more than collective terms. Nature as an unknown whole he assumes is Permanent, (with all its “Evil” in it!) and he will only deal with it in the details of known, varying phenomena. This assumption stands instead of *à priori* with Mr. Mill. It is not argument. We will follow, as he puts it, this part of his essay, as to the “changeable” phenomena; and we shall have to note that a “change” does not produce change, and is only the occasion of it: that which effects the change being really the “element,” or cause.

A mistake in stating the proposition.

“Changes in nature (he says) are always the effects of previous changes.” Now if he had said, as before, (p. 143), of some “element” which had produced a previous change, he would have perceived his position to be ambiguous, and therefore logically useless, as well as in other respects delusive. “Change,” simply

as an abstract idea, misled him. A "changeable element," (or, as we said, "variable cause"), is that, (he allows), which "begins the existence" of an object (p. 143); but it should surely be also termed a "change-making element," and then the logical fallacy would be plainer; but to call it "change," simply, is of course inaccurate in the highest degree. Again, no one supposes all so-called "causes" to be, or to affect, what Mr. Mill calls "permanent elements" in Nature itself. A cause in nature itself may be so far "permanent" as to move the changes in one particular way; yet it may be interfered with. But of course, where Volition, which is variable, exists in a cause, (and experience does not forbid the hypothesis), the action of that "cause" may vary very largely. The same reflections must guide us, when we deal with "permanent elements" of Nature—if their assumption be not frequently a *petitio principii*. A permanent or invariable acting element is not an abstraction.

49. The same mistake, of taking an abstract idea for a distinct individual being, is of constant occurrence in Mr. Mill; as when, a little farther on, he adds Further inaccurate use of abstraction. (p. 145), "The First Cause *can be no other than* FORCE." If he had not printed "force" with a capital letter, and had said, what alone his sentence could mean, "the First Cause can be no other than *that* which first forces," he would have seen that he was not telling us much. It is simply $A = A$. It is the more surprising that he should have thus written, because in the very next paragraph (p. 146) he acknowledges a "possible Cause of force," strangely forgetting that if, according to his statement, "the First Cause could be no other than force," he is thus suggesting a "possible cause of the First Cause,"—which is absurd; and surrendering his distinction of the permanent Nature, and the changeable.

The self-contradiction of Mr. Mill is, however, still more complete even than this. "Volition," he says, (apparently without conceiving the idea), "does not answer to the idea of a first cause, since force must in every instance be *assumed* as prior to it"; force "being evolved" Self-contradiction of the argument. in certain "processes" of the phenomena! And yet, his "First cause is no other than Force," and "Force has all the attributes of a thing eternal and uncreated."—What are we to say to such writing? Some respect for the memory of a great name seems to forbid further comment. The essayist, evidently, had not thought of volition, except as of some "agent in the material universe," and he is hopelessly puzzled in mere "Abstractions," ("Causation," "Volition," "Force"),—which he alternately takes up and lays down, as we foretold.

50. (iii.) Mr. Mill considers in the next place the "*Consensus omnium*" argument, which he regards as the "main strength of natural Theism." Viewed as an "argument," he shows, of course, that it has no *logical* completeness; which none indeed suppose. But it is by no means an appeal to the judgment of multitudes of individuals, but to that, whatever it be, which is at the foundation of their concurrence. He takes it for granted that it rests on the not unreasonable ground, that He who gave the human intelligence could not have so "made it" that it would be universally deluded in such a matter. But may not the authority of the many, in the past or now, thus rest also on previous Reason? Does the Universe rest on no Reason? He does not deal with the *fact itself*, so as even to attempt to account for its ineradicable character. No explanations that he offers at all touch the difficulty which the anti-theist, or non-theist has, not simply in covering the fact by *explanations*, but getting rid of it from the consciousness of man. It is not an historical or a theoretical difficulty that he has, but to some extent a psychological difficulty. Remove it if you will from the domain of logic, still the fact remains; and science, theological or physical, builds on facts.

He does not meet the difficulty of the fact.

51. (iv.) The argument from "Consciousness" comes next, and about five pages are devoted to it. We cannot regret it: though it lies also beyond the range of our essayist. Once or twice he goes so far as to imply that the existence of God is "eminently desirable" on some *à priori* therefore. Here he briefly, according to his conception of it, states the argument of Descartes, but he avoids the grounds of that argument. These prolegomena we in some degree supply. (Something positive may, we hope, be a relief amidst a series of criticisms which have chiefly been of a destructive kind.) What we have briefly to say may be of use in considering at a future time the arguments of Anselm, (to which Mr. Mill gives no attention), and the theory of Kant, which he rightly finds unsatisfactory, and which he speaks of as an "optimism prior to," as Leibnitz's was subsequent to, "a belief in God." Our suggestions are these:—

52. During every movement of our own reason, (*See* § 25) we idealize some other consenting reason, (to which we defer as higher, if not supreme), external to us, and necessarily yet for our own satisfaction, sought by us. We treat it as **ABSOLUTE**. We know that it is not our own self-created standard, for if it were, it would not have a universal, or even general, character or pattern. Let any one look

Grounds of the *à priori*, implied in the Cartesian argument.

into himself, and he will find that every serious thought implies a comparison of our thinking with something beyond itself, the informal and true always. We might even stake the argument for the *à priori* on this. This is the Cartesian ground.

In this comparison of our particular reason with what we may describe (*ad hoc*) as the "Absolute," our reason is (1) conscious of itself, and then (2) commits itself to that external or absolute Reason, which also knows and is known as Reason; otherwise it would not be Reason, but only "fitness," which is phenomenal. The Self-consciousness of our reason is superior to, though inseparable from, our reason. It could not defer to the "unconscious," for that would not *be* reason. We defer to that absolute which, in reason, reality, and consciousness, is out of us, and immediately supreme, and felt by our mind to be so.

And when we speak of Mind, we speak of all that mind implies. Intellectual movement, or our individual comparison of the particular conscious reason with the absolute conscious reason, is not intellectual only. For we feel it to be *right* and *wise*; and since it could not be resisted without a sense in us that we were wrong, our intellectual movement is therefore moral. An "idea" thus proves to be more than an individual fancy when Descartes uses the word.

Moral character of thought as right or wrong.

The necessary attributes of conscious and reasoning being should all be thought out from this beginning, if we would be thorough in our treatment. The intellectual power of any one may, (if this be established,) be graduated by its moral readiness to conform to the Absolute; so that reason at its highest condition is evidently moral. Intellectual freedom, too, which pertains to true intellectual power, is marked by readiness to compare at all times with the Absolute, in whatever way, (and there are many ways), it may be truly perceived. We slowly learn, more and more clearly, to subject our "particulars" to our "universals," and our own universals to the ABSOLUTE. It is in this the Cartesian argument needs fuller statement.

53. There is often imagined to be a wider divergence than really exists between Plato and Aristotle on this whole subject. According to Plato, Noësis is prior to the simplest intellectual operation, as well as to the most perfect dialectic process. Essential Being, Reason, Consciousness, Good, are all anterior to the discursive reason of man. Aristotle *assumes* the Absolute, while he denies that our reason raises us to its perfect sphere—which, indeed, Plato never affirmed, nor could have affirmed. But we bow to it.

Views of Plato and Aristotle.

54. If *præ*-phenomenal being be thus an absolute necessity of thought, then there is sure ground, however difficult, for that *à priori* argument, which may ultimately take a far more perfect

form than Anselm, or Descartes, or Kant gave it. They all argued from mind to that which mind *implies*.—But this subject cannot of course be exhausted in analyzing these paragraphs of Mr. Mill.

It may be returned to probably in the larger examination of “Religious Responsibility,” which has been so long promised to this Institution.

It is sufficient moreover for the present to say, that on the *à priori*, as a metaphysical inquiry, Mr. Mill’s volume cannot be said to profess to enter. That which one would have been glad primarily to press on him, had it been possible, would have been, that the human mind itself anterior to any kind of syllogistic process, is a reality, a force, a power; and then, that it always compares itself and its work with an ideal. Granting freely, that the sense or consciousness of the *à priori* is far from being distinct, and in much-enfeebled intellects is, as Locke acknowledges, very dim; yet without it there could be no clear rationality. Its indistinctness may be a true ground indeed for humility, but never of denial. It becomes more distinct when we stir from lethargy, and use our mind, as few will take the trouble to do though many pretend to it.

Reasoning not unfrequently elicits latent truth, and more fully displays the sense of the *à priori*, in the capable; and this is the line of the Cartesian argument,—that a human idea relates to reality; which is not, (as Mr. Mill supposes, p. 139.) the same as saying that the idea “forms an *objective fact*,” for that may be but phenomenal.

55. (v.) The argument from “*Marks of Design in Nature*” stands for consideration last in order. This, Mr. Mill says, is an “argument of a really scientific character,” but certainly he does not shine in it. We should have been glad if this popular and applauded argument had been of any use in leading Mr. Mill to Theism. But it seems to have failed; nor are we surprised. Mr. Mill simply opposes to it Mr. Darwin’s hypothesis of the “Survival of the fittest.” If wisely stated, full of subsidiary interest indeed in Theology is the “Argument from Design,”—it is like a Bible, if in the hands of the Church; but as standing alone it is bare, and liable as a mere argument, (as Lord Bacon implied,) to much perversion—as an *à posteriori* without *à priori*. We cannot but think, too, that it is most unhappily expounded, (*e.g.*, in a passage of Paley’s *Natural Theology*, in which his hypothesis represents some creation as almost beneath the Supreme, or as if committed to a Demiurge,) whenever it is wrested from its true

The subject is at first metaphysical, and as such is not treated by Mr. Mill.

Argument from design.

Paley’s statement of it, *Nat. Th.*, c. iii.

position, as St. Paul used it in conjunction with the *à priori*. The argument from Design is even painfully pressed against us by some writers, who take advantage of its ambiguity.

56. Quoting from Paley, Mr. Morley gives us this :—" God prescribes limits to His power that He may let in the exercise, and thereby exhibit demonstrations of His wisdom. . . . It is as though one being should have fixed certain rules, and, if we may so speak, provided certain materials; and afterwards have committed to another being, out of those materials and in subordination to those rules, the task of drawing forth a creation; a supposition which evidently leaves room and induces, indeed, a necessity for *contrivance*. Nay, there may be many such agents, and many ranks of these. We do not advance this as a doctrine, either of philosophy or of religion, but we say, the subject may be safely represented under this view, because the Deity, acting Himself by general laws, will have the same consequences, upon our reasoning, *as if He had presented those laws to another*. It has been said that the problem of CREATION was, attraction and matter being given, to make a world out of them, &c."

We feel bound to say—" *Non tali auxilio*." It may be old Gnosticism in modern phrase. We hope the "Argument from Design" does not mean this. A better ontology than Paley's would have saved it. Mr. Morley's difficulty, if briefly put, is this—Would not the Highest Agent attain His end, without that kind of incubation, which a rough statement of "contrivance," or design, would imply? He rightly thinks that a sort of contrivance which derogates from the Divine perfection and absoluteness, can never be admitted. The "fitness of things" is the best ultimate form of the *à posteriori* argument; and to this the philosopher or man of science has no certain or comprehensive reply, so far as we can see. The argument has a *pro tanto* value then, and is not exposed to the danger latent in all analogies. (See further, the "*Whole Doctrine of Final Causes*," &c.)

57. We feel that we have no further need to prolong our examination of Mr. Mill. His view of the "Attributes of the Supreme" or, as we have said, Præ-phenomenal Being, has already been replied to as inconsistent with philosophy. (Secs. 22, 23.) We may be spared the necessity of watching him while, balancing the "probabilities" of Immortality,—that possibility the very thought of which might hereafter, he supposes, be a burden to us! The fact, *à priori*, of our Nature having the hope in us, as truly as it has "a reaching out after God," remains, and will remain.

This book is one that has a kind of sobering influence, as we draw to a close. We had made a higher estimate of the writer—

Recent objection to design.

Conclusion.

formed from his *Essay on Liberty*, his best achievement by far.

The Book. But he seems feeblest here, as a logician without an *à priori*. We are not untouched by his qualified decisions, therefore, on the ultimate problems of being, approached by him, (as by some others), from only one side. The failure seems as if it struck Mr. Mill himself—a failure, always certain beforehand, of every attempt from that side, to bear down the truth of God. Here it really is conspicuous, and good may come of it. Mr. Mill, as the supposed best spokesman of his school, had to bring out his forces for the battle, and the result is equivalent to a total discomfiture of Atheism in the field it had chosen; and yet nothing else in mere Nature is left for the reasoner to fall back on. The baffled logic of Natural Theism can do nothing without Revelation. Revelation stands first.

Yes; God has revealed Himself. The *à priori* is God's Revelation of His image in our nature. The *à posteriori*, brings His Phenomenal Revelation at length in the Incarnate.

The deep foundations of our Religion are in the "unseen and eternal." It rises out of the Præ-phenomenal, and is "ever-true." God first shines out of darkness, and then gives us the knowledge of Himself, "in the face of Jesus Christ."

58. It is with no feeling but that of forbearance or of hope that we take leave of this distressing, and to a logician even humiliating, volume. Any other spirit would be unbecomingly

The writer. the contemplation of this last work of such a man as Mr. Mill. Had he lived longer, the possibilities which he began to see of God and Christ, and immortal Life, might have ripened for him into realities, though not arguments. In reading some almost relenting words of his, we are as if standing by the couch of the departed, while his final echo dies away,—incoherently indeed at last, and yet very solemnly listened to.—Was he indeed then "feeling after God, if haply he might find Him"? There are, none can deny it, sentences here and there to make us hope this.—Was he really fascinated by the unique form and beauty of Christ our Lord,—the only Personage in all man's past history that holds now for Himself, after eighteen centuries, the earnest love of countless human hearts?—Yes, Mr. Mill spoke of Christ as, to his mind, "unique"; and in one place he did so, as if there strangely stirred within him even the love of the Son of Man.—Was this long homeless spirit beginning to be led to "the Father," in that last closing sentence, when he dimly wrote of "Supernatural hopes" as not impossible yet?—Might it mean, "LORD, shew us the Father, and it sufficeth us"?

Certainly, though there is no strong reasoning in this book—

for there could not be, with the first link missing—there is here and there this softened tone, even though it be too often a voice of deepest abandonment as to an inexorable fate, or even but—

“the gurgling cry
“Of some strong swimmer in his agony.”

59. In watching, as we have now done, the downward struggle from “Nature” to “Theism,” from Theism to Atheism, and seen the individual loneliness and helplessness that remain—a despair as to existence itself—we have pursued the course of Mr. Mill’s book. We have seen that he refuses to “follow Nature,” finding no certain “Religion” there; yet he hints a “Religion of Humanity” for those who may wish it, as unconcernedly as if he had not just before considered “Humanity” a part of Nature. We see him, then, sitting in judgment on Nature, of which he had called himself a necessary part; thus revealing how the *à priori* in his whole intelligent being was yet feeling for higher truth than mere argument could reach. Yet he goes on to deny political “Utility,” and social advantage, to “Religion,” or even to a “belief in God,” and so gives us at the close of his work an entire and acknowledged blank,—on the surface of which, nevertheless, is projected the sacred form of Jesus Christ, dimly attracting his mind and heart!

Here we must leave both the author and his work. Our task with them is done. As a logician, or even as an analyst, Mr. Mill has no place. But what is more important by far in the controversy is, that his *method* is convicted of every fallacy. It may discover, perhaps, to some that a thorough inquiry as to the *à priori* is the need of the logic of the future, since an attempted “argument” without an *à priori* is but a wrangle without a beginning, conducting to no clear rational end.

60. Mr. Spencer, for example, might reason more subtly than Mr. Mill, but he really has nothing else to say. He argues in better form, and with closer analysis. His admissions are more full and distinct; his sentiment and feeling being more refined do not so mislead him as to interfere with his logic. He sees that while he keeps to the phenomenal he is, however wrong, controversially safe. His position can only be approached from higher ground; and he is clearly aware of it. Could he not answer his own arguments?

The battle of “Atheism”—(may we not add the battle of Revelation entirely?) must be fought out, with unbeliever or with misbeliever, on the field of the *à priori*, as occupied *de facto*, and as received historically, by the Reason and Faith of Human Nature itself, in every department of its knowledge.

The possessor of Revealed Truth may take no lower ground than—"we know." It may be expressed in better words than ours:—"That which may be known of God (τὸ γνωστόν) plain in men's very selves (φανερόν ἐν αὐτοῖς). God made it plain. His unseen things (ἀόρατα), His Potentiality and Deity," (the præ-phenomenal), "are so seen of the mind as to leave men without excuse if, with knowledge so possessed, they become weakly entangled by their arguments (διαλογισμοῖς), and calling themselves philosophers lose their common understanding in total darkness." (Rom. i. 19-23.)—It is a solemn picture drawn by an apostle's hand.

NOTE * A (§ 5, *præc.*)

As to the Meaning of the terms "Nature," "Natural," &c., as ascertained by "Socratic Inquiry." (See Mill, pp. 3, 4.)

If we examine the common use of the word "Nature," and its compounds and correlatives, we can have no difficulty in arriving at its meaning; for the meaning of any word is that which men mean by it; not simply its etymological origin, though that is of literary interest.

In ordinary speech, we describe the "Nature" of a thing by selecting some distinctive feature which it has either in itself, or in common with other things which are therefore said to be of like "Nature." Every one would understand us supposing we said, "it is the *Nature* of certain vegetables to grow, if planted in the earth." We should not mean that that was a full account of them, but a distinction common to a class to which they belonged. Again, if we said, "it is the *Nature* of certain beings that they have power of locomotion"; and of others that "they remain on the same spot"; or, once more, if we spoke of it as "the *Nature* of some creatures to know their young," or "to select their proper food," and of others, (as men), "to be conscious of themselves, or know themselves," we should be very well understood. In all these instances the word "Nature" belongs not to one object exclusively, but to many.

If any particular object stood apart from all others in some determining characteristic, we might describe that characteristic as its "Nature," in order to explain its peculiarity in that respect; but even in so exceptional a case we should probably recognize that there was, in other respects, a common "Nature" associating that object with others, and we should not usually call any peculiarity the "Nature" of an object, unless it

* This and the following Notes are taken from the author's volume "The Church of all Ages," (*Hayes*), in which also will be found the substance of the Reply to Mill, with other discussions.

pertained to it so originally as to have come forth in it and of it, and not *ab extra*.

Such, unquestionably, is the use of the word, as elicited by any inductive inquiry ; so that by "Nature" we mean "that constitution of any beings which they have in themselves originally, and as distinguished," (says Cuvier), "from that which may be grafted on them artificially."

By this constitution they are distinguished from other beings who have a different "Nature."

When the word "Nature" is used scientifically, we may even recognize various "Natures" in the same object—various distinctions, *i.e.*, allying them with various other beings ;—as when we speak of "Human Nature," "Animal Nature," "intelligent" or "non-intelligent Natures," and the like. These distinctions may be beyond precise definition, but they are fully felt and recognized, as will readily be seen.

You observe a child of undeveloped or injured powers. Do you deny that it has human "Nature"? Surely not. Is it blind? Is it mutilated? Is it deaf? Is it dumb? Is it even defective in intellect? It may be so. But do you refuse to say that it is our human kin? Has it not still "Human Nature"? Well, then, the perfection of any individual, or the possession of certain gifts and faculties, or capacities, would not be included in the "Nature," though possibly necessary to the development, or at times to the perfection of Nature.

There is also a still more subtle use of the term "Nature," implying an ideal.

A man who has intense sympathy with his fellow-man, or with the highest efforts of the mind or skill of others, is contrasted at times with the unsympathetic and dull. They both have "human Nature," but that "Nature" is elevated towards perfection in the one and is depressed in the other, so much so at times that it absolutely degenerates. Yet, probably, the one cannot really rise above, so as to cease to be, man, nor the other sink below, so as *entirely* to lose human Nature in animal degradation.

The common, the scientific, and the philosophical uses of the term "Nature" thus are fundamentally the same ; and the mind passes from the one to the other without any strain. Qualities, capacities, potentiality, are not words that are interchangeable with the term "Nature," which describes the *sort of being* we speak of, and marks us off so far, at least ideally, from other sorts.

Nor do we confound "Nature" with "Individuality," nor with Personality. "Human Nature" is that by virtue of which we are constituted Human ; "animal Nature" is that by which we are animal. Such "Nature" in either case links us immediately with others who are in the same order. "Animal Nature" is distinguished, again, into many Individualities, each a unit, bearing that common "Nature." "Human Nature" is distinguished into many Personalities, each defined in its own Consciousness. Man treats

himself and each fellow-man as an animal "Unit," and as a conscious "Person," and as bearing a common "Nature"; and this latter in several senses.

It is certain that any other use of the word "Nature" than that which is elicited from its *ordinary* use, would mislead us, and be frequently unintelligible. All writers, both sacred and secular, in all ages, use the word thus. If they enlarge its meaning from the specific to the generic, and then speak of "Universal Nature," they do but further idealize the same truth, viz., that the Universe not only contains orders of beings, but is as a whole a great order of being.

An order of Being, whether specific, or general, or universal, has its reason and purpose included in it. "It is—because it is," and for its own end. An infraction of its order is a disarrangement as to its purpose. The "Goodness" of any "Nature" is, in the judgment of all men, its fitness for its end; its disorder is Evil, for it thwarts the end.

It is thus Cicero says, "Jus in Natura positum est" (*De Leg.*): thus "seeds of Virtue" are called "lumina Naturæ." Thus, Law is the highest Reason implanted "in Nature." Hence also the whole "Lex Naturæ," as examined by the Jurists, and thus Aristotle, ἡ φυσικὴ ἀρετὴ πρὸς τὴν κυρίαν. (*Eth.*, vi. 13.)

If again we cross examine the use of Christian writers of all ages, it is the same. St. Paul speaks of some things as "contrary to *Nature*," (meaning man's), and indentifies "Nature" in its better estate with Divine Law (Rom. i. 26; ii. 14.) St. Chrysostom contrasts the φύσιν ἀγγέλου and φύσιν ἀνθρώπου (ad Heb. ii.). St. James had contrasted the "Nature" of men, with that of wild beasts and birds (S. James iii. 7). Later on, among the Scholastics, we have "Nature" analyzed, as either "natura Naturans," (which describes the process of becoming), and "Natura naturata," (as that which is perfected); reminding us of Cicero's saying, that we may rise, "a primis inchoatisque Naturis, ad ultimas perfectasque." (*De Nat. Deo.*)

"To act according to Nature," *sequi Naturam*, if Nature be the "order of things" with its Reason in it, is the highest wisdom within our natural reach, whenever Nature itself has not been injured, or depraved. That in which all things rightly consist must be the law of the individual being everywhere. The conscious finite Being aims at this, freely.

"Goodness" being thus recognized in every "Nature" as its "fitness" to its End, it follows that there will be diversities in forms of goodness, according to various Natures, conscious or unconscious, involuntary or not, and their various ends. If indeed, we rise above the phenomenal, we have then to consider the Nature, and Goodness, of the Absolute, and Unconditioned, and Infinite; rising as our poet says, to the

"First True, first Perfect, and first Fair."

This would lead us to contemplation of the *a priori*, which cannot here be

much enlarged, though it is indispensable to the Theistic defence. The points of the inquiry must be, as to

1. The Self-existent "Being,"—as He exists in Himself; the Eternal, the Præphenomenal, the Absolute and Unconditioned, yet Ever-conscious Being.

2. The "Nature" of that Being in His relation with the Phenomenal.

3. The "Personality" of that Being, as essential Consciousness, and Life.

4. The *κωνωρία* of Consciousness and Reason in the Infinite, and in the finite.

5. The SUPERNATURAL in relation with the Natural. (See the Bampton Lectures of 1870, "On Christianity as taught by St. Paul," pp. 150-160.)

NOTE B.

On the Controversy as to VOLITION, as a CAUSE in the "Unseen."

(§ 33.)

THE Predestinarian controversialists of the last century inherited the intellectual position bequeathed by ages of speculation, and neither re-examined the data, nor carried on their argument to its ultimate conclusions. In this they were even less disposed to be philosophical and logical than the materialists who to a certain extent felt with them.

With some, the argument began with the assumption of the Divine knowledge, as essential to the Governor of the Universe, who could not be thought to rule supremely without knowledge of His Universal Dominion.

As the phenomenal Universe was not supposed to be co-eternal with its Creator—for that would be a contradiction—it was concluded that the Divine knowledge was Fore-knowledge. It preceded all phenomenal being; and as all phenomenal being was originated by the Supreme, He first determined what He would originate. His choice preceded His creative act, and was equivalent to predestination.

With other reasoners, Predestination was put as the first thought of the Supreme Governor, and Fore-knowledge as the consequence of the Eternal Design as to the future of the Universe. There were a few more subtle thinkers who declined to acknowledge either "before or after" in the Eternal mind. These were dazzled by the old Eleatic ontology, and without thinking thoroughly to the end of the old theory that the Eternal has no continuity, were content with the apparent sublimity of the old philosophy of the Absolute; and they soon subsided into the use of the common terminology of Predestination and Fore-knowledge. All the subdivisions of the party of "Divine decrees" conceived that the honour of God was concerned in the vindication of the certainty beforehand of all the phenomenal future; and they all popularly spoke of it as "ordered" and governed by a fixed plan from Eternity.

None would face the fact, that if the so-called "predestining" had always been, and so had been co-eternal in the mind of the Eternal—never

had a beginning, then it was no voluntary decision or act of God, but was equivalent to the fate of the Stoics. It was useless to call it a choice, if it had been always settled. To extend this kind of Destiny to the Universe was to displace all Theism, and affirm Pantheism. God was no First Agent in any free sense ; His action was necessity. If His first acting, so also His subsequent acting. His "governing" the phenomenal Universe was but nominal—merely a mode of speech equivalent to saying that everything happens according to Eternal plan. The plan was His because co-existent with Himself—so that He never conceived it *de novo*, never originated it, but only worked in it as the involuntary centre of an Eternal mechanism.

Another line of thought seemed for a moment to be possible to a few. God having always the design of the phenomenal future of the Universe, in every detail, unalterably within Him, created by necessity all the phenomena, together with certain necessary sub-causes, limiting Himself to the direction or sustaining of those causes, and in that sense "governing" the world. But this will not vindicate any really personal action for the Deity, since all His direction of the created sub-causes must, according to the predestining scheme, be fixed beforehand.

The object of the Religious predestinarians was to get rid of the idea of "Contingency" and "Will" from the human mind as arrogant and even profane.

"Contingency I leave to infidels," was the earnest disclaimer of one of the best and most eloquent of the deniers of "Free-will" ; not perceiving that free election or choice was thus denied to God as well as man ; nor seeing that there really is no alternative but Contingency or Pantheism. It was seen by such writers as Dr. Priestley that "Philosophical Necessity," as he termed it, stretching back into the eternal past, and onward into the everlasting future, was Materialism in another form.

The Predestinarians failed, however, in another way to think out their subject. They used the words "Eternal" and "Everlasting" as at times the same ; yet applying the former rather to the past and the latter to the future. God alone was "Eternal," but the creatures formed by Him, or some of them, were to be "everlasting." There was no co-eternal creature, but there was a co-everlasting. New confusions of thought were here involved. To conceive that Being *before* Time might not be "continuous Being," was not possible ; and to conceive of Being *after* Time as "lasting" was to assign "before and after" to the Creator as well as creature, and to conceive Him as "continuous" in the future, if not in the past, thus changing the unchangeable. Then new distinctions as to "Existence" and "Duration" were revived, and the controversy seemed on the way back to the schools, and the old philosophy ; when it came to an abrupt close, for want of an Ontology which should distinguish the absolute from the conditioned, the *à priori* from the phenomenal. (See the Bampton Lectures of 1870, pp. 168, &c.)

No one, of course, attributed immutability to the Phenomenal Universe; it was in many ways at all times changing. But the phenomenal past still exists, the predestinarian would say, in the mind of God; the phenomenal future is also, in some other way, in the Divine mind. "It could not be otherwise"; the phenomenal present holding a middle and transitory position. But past, present, and future, it was said, are equally real, and only differ to man's limited consciousness. This, however, almost anticipated the view of modern Materialism. It is a doctrine of Philosophical "Conservation" of Being, which amounts to the Eternity of the Universe, or the conditioning of the absolute with a necessity of phenomenal creation.

We have thus sketched the intellectual side of the Predestinarian philosophy of the last three centuries,—a philosophy bound to the Phenomenal and essentially Materialist. Making Predestination Eternal, it made God a necessary Agent, and the Phenomenal Universe bound to Him, in the past in one mode, in the present in another mode, in the future in another mode, or possibly many others. To affirm the certainty of all things in the Phenomenal Universe, and ground that on the very nature of God who is eternal, is a kind of Pantheism. It is a doctrine of a God without free action, and a future (phenomenal or not) latent in Him as a certainty to work itself out.

To conclude this part of our examination.

We have seen the Argument which professed to magnify God as our Divine "Ruler" ending in a denial of God; and we can but conclude that that Argument has been all wrong throughout. It even becomes a *reductio ad absurdum*, from the Theistical point of view. The real problem is, that which it was the one mighty aim of the schools to grapple with; viz., What is the relation of the Phenomenal to the Præ-phenomenal or Absolute? It is in this form only that this ancient controversy can be rationally disposed of.

It remains that we briefly indicate the principle of the Solution.

1. Every Conscious being compares his own reflections with Reason, more or less distinctly discerned, as *more than himself*; and the more he persists in "thinking reasonably," and so satisfying *himself*, the more does he recognize an external Reason which he expects other men also to recognize in dealing with him. (Secs. 25, 52.)

2. This external Reason is not ultimately disputable; it lies, therefore, beyond the region of open debate or argument. But the perception of it is unequal in different conscious beings, and at different times. Even in detailed application or use it may vary at times,—the conscious agent being imperfect, or the phenomenal conditions distracting; but it is reached after, and only satisfied by the recognition of other conscious agents. It may be, and ought to be, called by every one his own opinion, reason, or judgment; but it is held as Right *in se*, by all who would be right.

3. This external Reason, Right, or Good, is what is meant, (though not all that is meant), by the Absolute, the Præ-phenomenal. Just as there are

certain numerical proportions pervading (as Kepler saw, and all now see) the physical Universe, so, in the sphere of conscious agency, there is a ground and substance for thought, antecedent to our thought; not a method laid down as by command, but a reality which is to be directly discerned by us.

4. This previous Reason, or *à priori*, is found in relation with all conscious agency. We cannot put ourselves out of willing relation with it without self-disquiet, and at times a sense that we are wrong. We are conscious that we *ought* to be in relation with the previous Reason of things. All conscious agents should be, and tend to be; and they judge one another accordingly. We feel that if there were a Supreme Conscious being as Judge of all, He too would "judge according to right."

5. The Phenomenal Universe points to Præ-phenomenal Being and Life,—

"SPRINGS of life, and thought, and motion,
Here are mysteries all unread;—
Even passion's dark commotion
Has some secret FOUNTAIN-HEAD."

Consciousness points also, as a kind of LIFE, to præ-phenomenal Consciousness; still in Relation with Reason. Many kinds of LIFE, however, seem to be indicated as præ-phenomenal; but they are variously limited in their direction and operation, and are sometimes unconscious. The highest kinds of Life, even conscious Life, require preceding conscious Life.

6. THE ETERNAL LIFE—the Ever-Living One—is the præ-phenomenal Being in whom is previous Consciousness in relation with Absolute Reason only, and distinct altogether from the Phenomena. His knowledge, essentially considered, is not phenomenal, but absolute and preceding the Universe, and essentially beyond relation to the Universe. His knowledge in Himself is absolute, and that in its essentiality is beyond our knowledge as a formal conception. When He places us in relation with Himself by an act prior to the knowledge of finite consciousness, we know Him as far as He is pleased to reveal Himself. When He works in the sphere of the phenomenal, He makes conscious finite agents subworkers with Him, freely tending towards præ-phenomenal Reason and Good. He fixes some things, leaves others unfixed, but is never made part of His own phenomena, in the past, present, or future, as Predestinarianism, Materialism, and Fatalism alike *would make HIM*. Much of the error latent in the Eleatic philosophy is traceable also to a confusion of the Phenomenal and the Absolute. (See the *Analysis of Human Responsibility*, § 60, Vol. IV. of the *Transactions of the Victoria Institute*.)

7. The same confusion pervades the modern views advocated by Mr. Spencer, and is only to be cleared by the analysis above suggested. Mr. Spencer seems at present to be endeavouring to bring himself to maintain that the *à priori*, being of course anterior to the argumentative processes of the conscious agent is "unthinkable" and "unknowable."

Dean Mansel's somewhat unhappy nomenclature in his discussion of what he termed "regulative truth," encouraged a similar way of speaking. This is assuming that the "conditioned" is all, and the unconditioned is no object of thought or knowledge, because it is not like the phenomenal subject to demonstration. It is pure *petitio*, that the knowable and the phenomenal are co-extensive. The process of argument, on the contrary, always implies impersonal reason, (except in the case of a man who would convince another of his own opinion, because it is *his own opinion*, and not because it is reasonable or right *per se*): and if impersonal reason, as an abstraction, ultimately implies personal consciousness of Reason, there is an end to the ambiguous assertion as to the "unknowable," and the double sense of the term "unthinkable"; some *à priori* being indispensable to the entire Reasoning process, which no metaphysician could suppose to be carried on simply by means of "collective terms," bringing the phenomena into ideal relation—(as Mr. Mill seemed to say, § 19, &c.).

To speak of the Eternal, and the First Cause, as "unknowable," while admitting His being, as Cause and Reason, as Mr. Spencer, and indeed his kind of "science" seems to do, (and speak even some *Religio* towards Him), is in the name of knowledge to deny the very ground and *sine quâ non* of all knowledge. It is one thing to say "that we could not by searching find out God" through mere argument; and to say that we do not "know" the Essential ONE, in whom alone we live and move and think. To say the latter is a contradiction in terms; but we must not confound all knowledge" with formal conceptions.*

NOTE C (§ 46).

On Life; and Professor Tyndall's Views of the Origin of Motion and Organization.

PROFESSOR TYNDALL'S views, like Mr. Mill's, are a kind of Reaction from imperfect Christian Philosophy. The tendency of Calvinistic Puritanism in all its forms—whether as found in the ancestry of Mr. Mill or Professor Tyndall, is to Rationalism; as the more thoughtful of the "Evangelical" leaders fully recognize. This may account in some degree for his sensitiveness under the rebukes administered to him in the name of Science at times, and in the name of Philosophy and Religion yet more frequently. But a thorough inquirer ought not to shrink from thoroughness on the part of those who differ from him. To conduct people to the edge of the precipice of Atheism and prepare for the last leap, and then complain that some start back and say that it is a precipice, is scarcely fair; but to complain of being persecuted,—"begrimed" and "spattered," as he calls it, is somewhat worse.

* See *Collegii Sancti Thomæ Complutensis in octo Libros Physicorum Aristotelis Questiones*, 1719; and comp. *S. Thomæ Compendium Theologicæ*.

In the Sixth Series of the *Science Lectures for the People* (No. I. p. 12), Professor Tyndall indicates what he calls "the positions of the opposing hosts" in the following terms:—

"From the processes of Crystallization you pass by almost imperceptible gradations to the lowest vegetable organisms, and from these, through higher ones, up to the highest. . . . One class of thinkers regard the observed advance from the Crystalline through the Vegetable and Animal worlds as an unbroken process of natural growth, thus grasping the world inorganic and organic as one vast and indissolubly connected whole; the other class suppose that the passage from the inorganic to the organic required a distinct creative act," &c.

It will be noticed in this representation of the position of the "two opposing hosts," that the former is said to be one of "*regarding an observed advance*," and the other a "*supposing a creative act*." The very reverse is the true state of the case. The Christian philosopher and man of science "observe" that in no known instance is there "an advance" from pure "Crystalline" to the "Vegetable," nor an advance of the Vegetable into the Animal; but only that they stand in order, each above the other, and *not* each procreating the other. No instance of such "advance," in this active sense has been observed. The followers of Professor Tyndall "suppose" that there is, or may be. Theirs is the pure "supposition." Ours is the simple "observation" of the facts. Theirs is the imagining of a "vast and indissolubly connected whole," and to say the least it is premature. Ours, as yet, is the ground of "science."

But surely the *animus* of such a sentence as this, calling his own "supposition" by the name of "observation," and our "observation" by the name of "supposition," is very discreditable on the part of a writer who was professing truthfully to state the case and position of two opposing sides. Truthfulness is the primary virtue of philosophy; and so-called science cannot do well without it.

Professor Tyndall begins, in the passage above quoted, with Crystallization. But even here his "Push" and "Pull" will not suffice. To complete our view at all, however, let us look a little farther back.

At present, the ultimate particles of matter are called "atoms." These differ in their capacity of combination:—one atom of chlorine combines with one of hydrogen; one atom of oxygen with two of hydrogen; one atom of nitrogen with three of hydrogen; one atom of carbon with four of hydrogen. Whether the term "capacity" is the best term to express the facts, depends on its being taken passively, and in connection with that *affinity* of atoms which assists their chemical combination. Whether this capacity, or this affinity, are to be considered aboriginal in the atom, or subsequent conditions, would need to be determined: the molecule being a kind of aggregate of atoms. The atoms forming each molecule in a gaseous state are of the same nature. When atoms pass from the gaseous to the fluid state, or from fluid to solid, they arrange

themselves symmetrically, more or less perfectly, as what we call crystals; and, as Mr. Mitchell says, in his admirable paper (Vol. II. of the *Transactions of the Victoria Institute*, p. 381), these, when ultimately reduced, may be grouped in six distinct classes or systems, with innumerable possible "combinations of different species of these forms which may take place in any individual crystal."

The "crystalline phenomena" thus indicate a series of previous changes and occult causations hitherto but imperfectly explored; and other phenomena present themselves, evidently in accordance with fixed laws. We cannot begin with Crystalline forms as though we knew all about them, as our starting-point. We touch not the cause in any case, but only, in some degree, the mode.

Now the problem for "both sides" is this,—How to think of the real causation? "Mechanical causes" can be only instruments, some way fitted for their purpose;—but how?

An inferior kind of "life" may be conceived to act mechanically; but then it must be subordinate to *higher* direction of some kind. That higher direction or guidance may be greatly diversified. There seems to be no more reason against various kinds of "Life" than against various kinds of atoms.* The Theist needs not the supposition of the direct action of Deity wherever life begins to move. There may have been a variety of sub-causes of an unconscious kind, each gifted to do its one work; and a variety of other causes of higher kinds, with graduated conscious energy; and of these originators, or conscious energies, the highest would be the Conscious Agent capable of acting or abstaining—willing or not willing.

On the other hand, the Eternal Life, or First of all Causes, Whose Eternal CONSCIOUSNESS is His Personality, may be believed with equal reasonableness to concentrate His consciousness or personality at any point of His Phenomenal Universe (Psalm xxxiv. 18, and cxlv. 18); as, according to the poet's words, there is,

"To Him no high, no low, no great, no small,
He fills, He bounds, sustains, and orders all."

In the discussion which ensued, the following took part:—the Rev. Sir T. M. Lushington Tilson, Bart.; Messrs. J. E. Howard, F.R.S., H. Coleman, LL.D., W. Melmoth Walters, E. Charlesworth, E. H. Pickersgill, and the Chairman. The Rev. Dr. Irons having replied,

The meeting was then adjourned.

(* See *Victoria Transactions*, especially Vol. VI. p. 296, &c., and VII. p. 137 and 162, in reply to Darwin *On Life* and Tyndall *On Science*, &c.)