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JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.
—
VOL. XXI.

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JOURNAL OF
THE TRANSACTIONS

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

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

VOL. XXI.



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OBJECTS AND CONTENTS OF ALL THE VOLUMES OF THE JOURNAL.

*** The Institute's object being to investigate, it must not be held to endorse the various views expressed at its Meetings.*

PREFACE.

THE Twenty-first Volume of the *Journal of the Transactions* of the VICTORIA INSTITUTE is now issued. It contains papers by the following authors:—The Rev. H. J. CLARKE, on “Evolution.” The Rev. RICHARD COLLINS, M.A., on “Krishna, and Solar Myths,” the paper being a careful investigation as to the historical character of the story of Krishna, and an inquiry into the truth of the view advanced by certain modern writers,—that the narrative of Christ’s life had a connexion with and was, at least in a measure, derived from the story of Krishna, and that the latter had influenced Christianity. The Institute is indebted to those who took part in considering this subject, and specially to Professor F. MAX MÜLLER, and to Professors E. B. COWELL, M.A. (Professor of Sanscrit at Cambridge), R. K. DOUGLAS, M.A., A. EDERSHEIM, D.D., TERRIEN DE LACOUPERIE, M.A., and Doctor G. W. LEITNER, Principal of the Oriental College: some important remarks by Sir MONIER MONIER-WILLIAMS, K.C.I.E., have been added in the Appendix to the Volume. This whole subject has now been so thoroughly sifted as to have entirely disposed of the question. The Right Honourable Lord GRIMTHORPE contributes a paper on “The Beauty of Nature,” to which the Rev. WILLIAM ARTHUR, M.A., has added some remarks of high value. Professor T. MCKENNY HUGHES, M.A. (Woodwardian Professor of Geology at Cambridge), gives a paper on “Caves,” which is followed by remarks by Sir WARINGTON W. SMYTH, F.R.S., and

others; and a communication from Sir J. WILLIAM DAWSON, K.C.M.G., F.R.S. Professor E. HULL, LL.D., F.R.S. (Director of the Geological Survey of Ireland), contributes two papers, one on "Some Results of a scientific Expedition to Arabia Petræa and Western Palestine," the other on "Petra, the Rock-hewn Capital of Idumæa." Mr. S. R. PATTISON, F.G.S., a paper on "The Pedigree of the Coral Reefs of England." The Rev. S. D. PEET, a paper on "The Religious Beliefs and Traditions of the Aborigines of North America," upon which subject it would be difficult to find one more competent to speak. The Rev. J. LESLIE PORTER, D.D., LL.D., President of Queen's College, Belfast, a paper on "The Connexion between Jewish, Phœnician, and Early Greek Art and Architecture"; to this is added a report upon the discoveries at Sidon. The Rev. Canon SAUMAREZ SMITH, B.D., a paper on "Practical Optimism." The Rev. F. A. WALKER, D.D., F.L.S., a paper on "Oriental Entomology." The Rev. W. WRIGHT, D.D., a paper on "The Empire of the Hittites," a subject which is peculiarly his own; this is followed by an interesting statement as to the Hittites, and a short description of "Canaan, Ancient and Modern," by the Rev. Canon H. B. TRISTRAM, D.D., F.R.S.

Some Notes of importance will be found in the Appendix.

To all who have added to the value of the present Volume, the best thanks of the Members and Associates are due.

During the past—Jubilee—year, the VICTORIA INSTITUTE presented to her Majesty the following Address:—

TO THE QUEEN'S MOST EXCELLENT MAJESTY.

MAY IT PLEASE YOUR MAJESTY,

We, your Majesty's most dutiful and loyal subjects, the President, Council, and Members of the Victoria Institute, gladly embrace the opportunity of once more approaching Your Majesty, and tendering our heartfelt congratulations on the completion of the Fiftieth year of Your Majesty's Reign over a free and loyal people.

We acknowledge, with thankfulness, that in the growth of the Empire abroad, in large measures of beneficent legislation at home, in literature, and in the investigation of the truths of Philosophy and Science (with which it is our privilege to be specially connected), Your Majesty's Reign may confidently challenge comparison with those of our greatest and most Illustrious

Sovereigns. But we particularly rejoice to believe that the humblest and the poorest classes in these dominions may identify Your Majesty's reign with a sensible diminution of ignorance, poverty, and suffering during the half-century that has elapsed since Your Majesty ascended the Throne, and that they may gratefully remember that every good and kindly movement for the improvement of your people, and the greater Glory of God, has received the gracious impulse of Your Majesty's sympathy and support.

We desire to assure Your Majesty of our dutiful and affectionate attachment to Your Majesty's person, and our loyalty to the Throne, and we earnestly pray that Your Majesty may be long spared to promote the happiness and receive the grateful homage of Your Majesty's subjects.

Signed on behalf of the Institute,

G. G. STOKES, P.R.S., *President.*

F. W. H. PETRIE, *Hon. Secretary.*

7, Adelphi Terrace, Charing Cross,
London, 16 July, 1887.

REPLY.

WHITEHALL,

20 July, 1887.

SIR,

I have had the honour to lay before the Queen the loyal and dutiful address of the President, Council, and Members of the Victoria Institute, on the occasion of her Majesty attaining the Fiftieth year of her Reign, and I have to inform you that Her Majesty was pleased to receive the same very graciously.

I have the honour to be, Sir,

Your obedient Servant,

HENRY MATTHEWS.

The President of The Victoria Institute,
7, Adelphi Terrace, Charing Cross.

The 20th Volume of the *Journal of Transactions* was also laid before Her Majesty by Sir Henry Ponsonby.

The want of a true appreciation of the actual results of scientific inquiry has often led men to urge that there is an opposition between Science and Revelation; and of late some have specially done so in regard to the record of the Creation, with reference to which the following words were recently uttered by a Member of the Institute, Professor J. D. DANA, F.R.S., they but echo the views expressed by many another scientific leader, and are worthy of record:—"To me the 1st Chapter of Genesis is greatly illuminated by the revelations which Science has made. I see nothing in modern

developments to shake my faith in its inspired announcements, or in any of the essential truths taught in the Bible.”

It is impossible to conclude without giving expression to a feeling of regret that Eastern Exploration continues to be at a standstill both in Babylonia and Palestine, by reason of the Porte still withholding the *firmans* once accorded to the English Government, and under which such important discoveries have already been made.

FRANCIS W. H. PETRIE, *Capt.*,
Hon. Sec. and Editor.

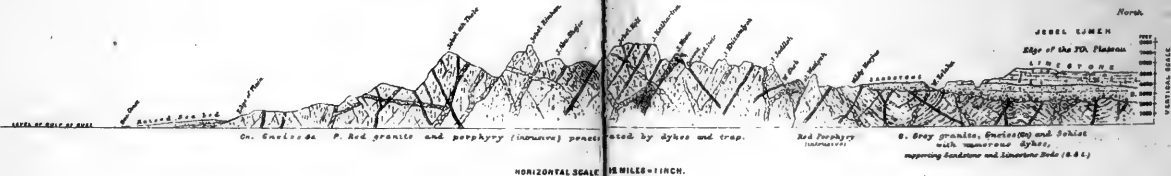
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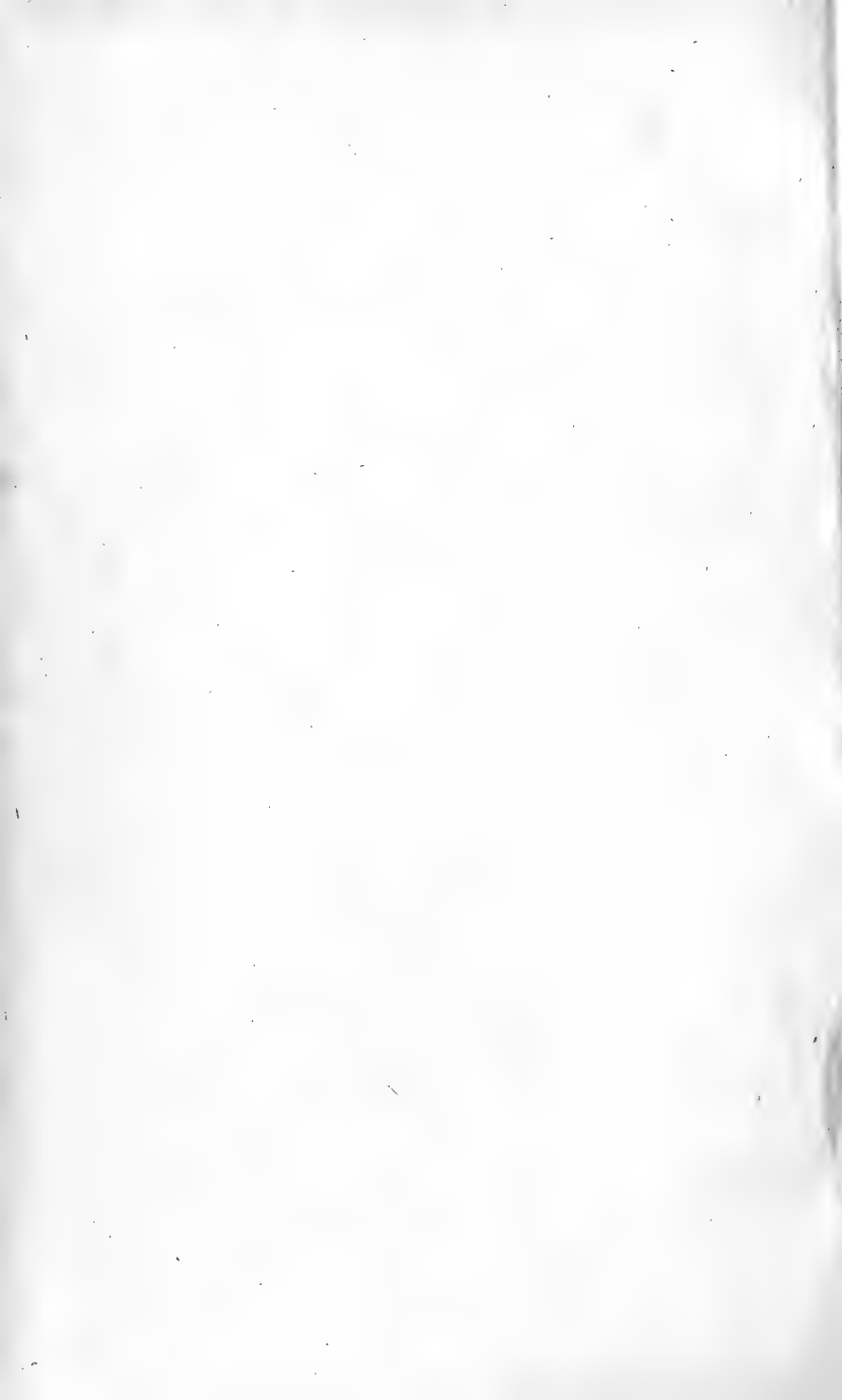


SECTION No 2. FROM THE TABLE-LAND OF S. JUDAEA TO THE PLAINS OF MOAB S.W. OF KERAK BY JEBEL USDUM.



SECTION No 7 FROM GULF OF SUEZ NEAR TORONTO TO THE MOUNTAINS OF SINAI TO THE PLATEAU OF THE T.H.





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,

FRIDAY, MAY 28, 1886.

SIR HENRY BARKLY, K.C.B., G.C.M.G., VICE-PRESIDENT,
IN THE CHAIR.

CAPTAIN FRANCIS PETRIE, Hon. Sec., read the following Report:—

Progress of the Institute.

1. IN presenting the TWENTIETH ANNUAL REPORT, the Council desires to state that the progress of the Institute during the past year has been encouraging, aided and maintained as it has been by the steady support accorded by the Members and Associates, both at home and abroad: without this *steady* support, not only would all progress have been arrested, but much ground already gained must have been lost.

An increasing number of home and foreign Members and friends now contribute to enhance the value of the Institute's philosophical and scientific investigations, and to enable the Institute to fill the position that its aims demand; and it must afford no small satisfaction to the Members generally to see that their individual and collective efforts to make the

Society what it should be, have caused many of the foremost men of Science to support it, either by joining its ranks, or by lending active aid in carrying on its investigations, and especially in regard to the theories which have been advanced in opposition to Religious Belief. What has been accomplished has advantaged Religion as well as Science, and has brought about a truer appreciation of the results of Scientific inquiry.

3. It is gratifying to see the increase in the number of Scientific Societies and other Public Bodies exchanging or purchasing the Transactions.

4. The Library of Reference is becoming larger, but its value to Members renders it desirable that the fund for the purchase of books should be augmented.

5. The following is the new list of the Vice-Presidents and Council:—

President.

Professor G. G. STOKES, M.A., D.C.L., President of the Royal Society.

Vice-Presidents.

Sir H. BARKLY, G.C.M.G., K.C.B., F.R.S.

Sir RISDON BENNETT, M.D., F.R.S.

W. FORSYTH, Esq., Q.C., LL.D.

Rev. ROBINSON THORNTON, D.D.

Sir JOSEPH FAYRER, K.C.S.I., F.R.S.

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

A. McARTHUR, Esq., M.P.

Hon. Auditors.—G. CRAWFURD HARRISON, Esq.; J. ALLEN, Esq.

Hon. Treasurer.—W. NOWELL WEST, Esq.

Hon. Sec.—Capt. FRANCIS W. H. PETRIE, F.G.S., &c.

Hon. For. Sec.—E. J. MORSHEAD, Esq., H.M.C.S.

Trustees.

Sir ROBERT N. FOWLER, Bart., M.P.; R. BAXTER, Esq.

Council.

ALFRED V. NEWTON, Esq.

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

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

A. J. WOODHOUSE, Esq., M.R.I.,
F.R.M.S.

Rev. Principal RIGG, D.D.

Rev. Prebendary C. A. ROW, M.A.

H. CADMAN JONES, Esq., M.A.

Rev. W. ARTHUR.

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

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

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

D. HOWARD, Esq., V.P.C.S.

Professor H. A. NICHOLSON, M.D.

F. B. HAWKINS, M.D., F.R.S.

J. F. LA TROBE BATEMAN, Esq.,
F.R.S., F.R.S.E.

The BISHOP of BEDFORD.

Rev. F. W. TREMLETT, D.C.L.

Surg.-Gen. GORDON, C.B., M.D.

R. H. GUNNING, Esq., M.D., F.R.S.E.

HORMUZD RASSAM, Esq.

Principal WACE, D.D.

Rev. J. J. LIAS, M.A.

General G. S. HALLOWES.

Rev. A. I. McCAUL, M.A.

6. In recording the names of those whose support has been lost to the Institute through death, the first must be that of Anthony Ashley Cooper, K.G., seventh Earl of Shaftesbury. In him the Institute loses one whom it is impossible adequately to replace: the one under whose auspices it was planned and founded, he accepted the position of President, and continued to discharge its duties as no one else could:

with a name a household word in every land, his presidency was a strength to the Institute wherever it sought adherents, and the interest he took in its welfare encouraged and aided many a worker in its cause. The Institute has also to regret the decease of the following valued supporters:—

Sir G. W. Allen, K.C.M.G., *M.*; J. N. Arnold, Esq., *A.*; The Ven. Archdeacon Carey, M.A., *A.*; Dr. T. Colan, M.D., Inspector-General of Fleets, *F.A.*; Rev. F. S. C. Chalmers, D.D., *A.*; Rt. Rev. Bishop Cotterill, D.D., *A.*, of the value of whose contributions to the Transactions it is impossible to speak too highly; Rev. T. N. Farthing, M.A., *A.*; Rev. J. Fisher, D.D., *A.*; S. W. Francis, Esq., A.M., M.D., *M.*; James A. Fraser, Esq., M.D. Inspector-General of Hospitals, *F.M.*, a most untiring member of Council, to whose valuable services the Institute has long been much indebted. Miss Victoria Gibb, *A.*; Rev. Sir G. Glyn, Bart., *F.M.*; Rev. J. Hotham, *A.*; W. P. James, Esq., F.L.S., *M.*, who took special interest in the Institute's work and did much to enhance the value of its Journal; Right Rev. Bishop Poole, D.D., *A.*; Rev. Canon J. Simpson, LL.D., *A.*; Rt. Hon. Lord Teignmouth, F.R.S., *M.*; J. Hornsby Wright, Esq., *F.L.M.*

* * *M.* Member; *A.* Associate; *F.M.* Foundation Member; *L.* Life.

7. The following is a statement of the changes which have occurred:—

	Life		Annual	
	Members.	Associates.	Members.	Associates.
Numbers on 11th June, 1885*	48	36	316	622
Deduct Deaths	- 2		8	11
„ Retirements, &c.			11	19
	46		19	30
			297	592
Joined between June 11th, 1885, and May 17th, 1886	+ 4	2	13	65
	50	38	310	657
	88		967	
Total.....	1055			

Hon. Correspondents number 99. Total..... 1154

Finance.

8. The Treasurer's Balance Sheet for the year ending December 31, 1885, audited by two specially-qualified unofficial Members, shows a balance in hand of £13. 13s. 8d., after the payment of the liabilities for the year. The amount invested in New Three per Cent. Annuities is £1,365. 18s. 9d.

* 3 Members and 10 Associates struck off.

9. THE EARLY PAYMENT OF THE YEAR'S SUBSCRIPTIONS CONTRIBUTES SO MUCH TO THE SUCCESS OF THE YEAR'S WORK that no subscriptions should remain unpaid after the first quarter in the year (*see also Rules*).

10. The arrears of subscription are as follow :—

	1879.	1880.	1882.	1883.	1884.	1885.
Members ...	1	2	3	5	11	10
Associates ...	...	1	9	4	20	30
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	1	3	12	9	31	40

11. Meetings.

- MONDAY, DECEMBER 7.—“The Unreasonableness of Agnosticism.” By J. HASSELL, Esq.
- MONDAY, JANUARY 4.—“On the Historical Evidences of the Migration of Abram.” With readings from newly-deciphered Inscriptions. By W. ST. CHAD BOSCAWEN, F.R. Hist.S. Numerous Notes and additional matter by Professor SAYCE, and comments by Professor CHEYNE, Mr. E. A. W. BUDGE, M.A., and others. (*Meeting held at the Society of Arts' House.*)
- MONDAY, JANUARY 18.—“The Samoan Traditions of the Creation and the Deluge.” By Rev. T. POWELL, F.L.S.
- MONDAY, FEBRUARY 1.—“Agnosticism.” By Rev. H. J. CLARKE.
- MONDAY, FEBRUARY 15.—“Final Cause.” By Professor DABNEY.
“On the Hittite Monuments.” By the Rev. Canon ISAAC TAYLOR, D.D. (*Postponed on account of the Author's illness.*)
- MONDAY, MARCH 1.—“Miracles.” By the Rev. H. C. M. WATSON, M.A.
- MONDAY, MARCH 15.—Lecture on “The Negroid Races.” By Rev. H. A. ALLEN, M.A.
- MONDAY, APRIL 5.—“The Accounts of Creation among Nations.” By (the late) W. P. JAMES, F.L.S., with remarks by W. ST. C. BOSCAWEN, Esq., and others.
- MONDAY, APRIL 19.—“The Meteorology of Syria and Palestine.” By Prof. G. E. POST, M.A., M.D., F.L.S., &c.; and a Paper by W. ST. C. BOSCAWEN, Esq.
- MONDAY, MAY 3.—“On the Geographical Names of the list of Thothmes III., which may be referred to Galilee.” By Professor G. MASPERO, with remarks by Sir Charles WILSON, R.E., C.M.G., F.R.S., and Captain CLAUDE REIGNIER CONDER, R.E.
- MONDAY, MAY 17.—“On the Connection between Jewish, Phœnician and Early Greek Arts and Architecture.” By the Rev. J. LESLIE PORTER, D.D., LL.D., *President of Queen's College, Belfast*. Comments by TRELAWNEY SAUNDERS, Esq., J. D. CRACE, Esq., and others.
- FRIDAY, MAY 28.—*The Annual Address.* “Notes on some of the results arrived at by members of the Expedition to Arabia Petrea and Western Palestine.” By EDWARD HULL, LL.D., F.R.S., *Director of the Geological Survey of Ireland.* (*Meeting held at the Society of Arts' House.*)

Publications.

12. The nineteenth volume of the Journal of Transactions has been issued, and, judging from the opinions already passed upon it, is certainly not regarded as inferior to those that have preceded it. It may be added that among the most satisfactory portion of the large home, foreign and colonial correspondence of the Institute is that in which the writers speak of the very great value of the Journal to Members and others; such letters come from the United States, Canada, Australia, India, Japan, South Africa, and wherever the Institute has made its way.

Lectures.

13. In delivering lectures, the Members of the Institute, both at home and abroad, make increasing use of the Journal (every paper in which is printed under the superintendence of its own author); they also find the library of reference of much use.

Translations.

14. Portions of the Journal are now translated into many foreign languages. Members abroad may do much to help the Institute's aims by encouraging the translation of useful papers in their respective localities.

The Special Fund.

15. The Special Fund is used—I. To extend the library of reference—useful to Members of the Institute, and for lending to Members preparing lectures, &c.—II. To make the Institute more widely known.—III. To publish summaries of the Institute's important work throughout the world.—IV. For organising the publication of the People's Edition at home and abroad.

The twelve papers in the People's Edition are now on sale throughout the United States, Australia, and New Zealand; in the South African Colonies, and Canada. As regards India, increased support to the Special Fund is necessary to make efficient action possible.

Conclusion.

16. All must feel thankful for the Institute's progress hitherto. Its high objects and the manner in which these are sought to be carried out, have earned it the support of numbers in every part of the world, and, in the United States, have resulted in an offshoot being founded. But it has become necessary that such a Society, with so widely-spread a constituency, should be stronger in numbers, both at home and abroad. Were each Member and Associate to seek to add to the number of its adherents in his own locality, not only would the Institute's power for usefulness be increased, but the extent of that usefulness would be more widely felt. No higher incentive could be found to impel to so needed a work, than that expressed in the words of its Motto.

SPECIAL FUND IN 1885,

For the People's Edition, &c., see Sec. 15.

	<i>£.</i>	<i>s.</i>	<i>d.</i>
G. Harries, Esq.....	40	0	0
S. Morley, Esq.....	20	0	0
F. B. Hawkins, Esq., M.D., F.R.S.....	5	0	0
Mrs. J. E. Howard	2	2	0
A. Woodhouse, Esq., F.R.M.S.	2	2	0
Hastings C. Dent, Esq., C.E., F.L.S.....	1	1	0
Miss G. Harrison	0	10	0
Rev. E. Male, M.A.	0	9	0
	<hr/>		
	£71	4	0
	<hr/>		

The following Balance-Sheet was then read :—

TWENTIETH ANNUAL BALANCE-SHEET, from 1st January to 31st December, 1885.

RECEIPTS.		£.	s.	d.	EXPENDITURE.		£.	s.	d.	
Subscriptions:—										
4 Life Members (less £1)	...	83	0	0	Balance, Dr.	...	...	3	12	9
2 Life Associates	21	0	0	Printing	...	...	374	0	9
					Binding	...	...	17	9	2
					Reporting	...	...	32	10	0
1 Member, 1882	...	2	2	0	Stationery	...	...	49	18	0
4 Members, 1883	...	8	8	0	Postage and Parcels (Home and Foreign)	...	...	145	13	9
12 "	...	25	4	0	Advertising	...	...	33	15	3
216 "	...	453	12	0	Expenses of Meetings	...	...	42	16	0
11 "	...	23	2	0	Rent to Christmas, 1885	...	...	160	0	0
19 Entrance-fees	19	19	0	Salaries for Year	...	...	71	8	2
1 Associate, 1880	...	1	1	0	Housekeeper	...	...	23	10	0
4 Associates, 1882	...	4	4	0	Travelling Expenses	...	...	11	15	11
8 "	...	8	8	0	Coals	...	...	3	12	0
34 "	...	35	14	0	Gas and Oil	...	...	6	6	8
450 "	...	472	10	0	Water Rate	...	...	3	0	0
18 "	...	18	18	0	Insurance	...	...	0	12	0
					Sundry Office Expenses	...	...	3	10	6
Dividends on £1,302. 18s. 9d. New 3 p. c. Ann.	1,073	2	0	Library, Books, Repairs, &c.	...	...	12	4	2
Donations to Special Fund	Management	...	...	315	0	0
Sale of Journals, &c.	Bankers' Charges	...	...	0	18	2
					Investments	...	...	63	0	0
					Balance Cr.	...	...	13	13	8
								£1,388	6	11

We have examined the Balance-Sheet with the Books and Vouchers, and find a Balance in hand of £13. 13s. 8d.

G. CRAWFURD HARRISON, }
 JOHN ALLEN, }
Auditors.

W. N. WEST, *Hon. Treas.*

* For Investment in 1886.

[Captain F. PETRIE (Hon. Sec.), having read several letters from distinguished members who were unable to be present, briefly read the report, proof copies of which were in the hands of those present, and referred to the large correspondence which reached the Institute from every quarter of the globe, showing a wide and lively interest in the work of the Society, and the great importance of its being as widely and as largely supported as possible.]

The Very Reverend the Dean of LICHFIELD, in rising to move, "That the Report be received and the thanks of the Members and Associates be presented to the Council, Honorary Officers, and Auditors for their efficient conduct of the business of the Victoria Institute during the year," said:—Mr. Chairman, ladies, and gentlemen, I have found myself somewhat unexpectedly in the position of being called on to move the adoption of the Report just read by the Honorary Secretary. I am sure that every one who has heard the Report must be quite convinced that the Officers of this Society have discharged their duties with great advantage to the cause which this Institute was designed to promote. I assume that the great object which the Victoria Institute has at heart is the advance of truth upon the lines indicated in the Report; and I think that, in looking back over the last twenty years, we may truly say that this Institute has not been founded in vain. What I conceive to be specially wanted at the present day is, information of a really solid character. I am convinced that a vast deal of the ignorance and infidelity among us is due to a want of proper knowledge on the subjects taken up by this Institute; and those who have studied these questions to any extent, as I myself have done, so far as my other duties would permit, must, I think, feel, as I most assuredly do, that there cannot be any possible inconsistency between the discoveries of science and the revelation of God. If there be any such inconsistency, it is simply owing to the imperfection of the human faculty; and it is the business of this Institute to try and improve the human faculty by aiding in the circulation of really sound knowledge on those questions which concern the hopes and destinies of mankind, not only in this world, but in the world to come. I may here refer to the fact that we have sustained a serious loss during the past year in the death of a very eminent man. I allude to the late President of this Society, the Earl of Shaftesbury. I believe that from one end of this kingdom—I might almost say from one end of this empire—to the other, but certainly throughout our own country, the name of Lord Shaftesbury will ever be held in reverence, respect, and affection by all who have had the pleasure of knowing him, and who were acquainted with his many sterling qualities. I cannot do otherwise than cordially congratulate the Institute on the accession to the Office vacated by Lord Shaftesbury of so eminent a man as Professor Stokes. I am perfectly sure that the election of Professor Stokes to that distinguished position will be a source of great advantage to the Institute, and will help it in every way. We, who have the honour of belonging to the University of Cambridge, know what Professor Stokes is, as a philosopher and a Christian, and may express our gratitude to him at finding that, in addition to the

laborious duties which devolve upon him in connexion with that University, he has been so kind as to accept the position of President of this Institute. I heartily concur in the vote of thanks which this Resolution proposes to accord to all the members of the Council and the Officers of the Institute for their efficient and conscientious discharge of the duties imposed upon them, and I now have pleasure in presenting the Resolution for your acceptance.

Mr. GIBBS CRAWFURD HARRISON.—I have great pleasure in seconding the resolution, and in doing so I beg most heartily to endorse everything that has fallen from the very Rev. the Dean of Lichfield.

The resolution was then put and carried unanimously.

Mr. D. HOWARD (V.-Pres. Chem. Soc.).—On behalf of the Council I beg to return their hearty thanks for the resolution you have just voted in recognition of their efforts in carrying out the objects of this Institute. I can only say it has been a labour of love to the members of the Council, some of whom have worked very assiduously, and, having done their best, they now feel that they are entitled to ask for thanks of a more substantial kind than the resolution just passed, in the shape of the help which all of you, more or less, can give to such a Society. There are a great many people who say in their heart of hearts, "Why don't you leave things alone? why not let religion and science each go their own way?" We know by the best of all means—experience—that there is no contradiction between faith and science to those whose minds are attuned aright in the honest desire to get at the truth, and who are not endeavouring to find out differences where none exist—who, in fact, do not regard science as a useful weapon to fight with against religion, or, on the other hand, look upon science as the clumsy weapon we find it in unpractised hands for the defence of religion. I do not mean to say it would not be better if we could leave religion and science to themselves, but, unfortunately, there are many who understand so little of either, and who are so willing to be perpetually trying to find differences where they do not exist, that it is necessary to carefully and watchfully defend the truth, whether it be that of the revelation of God in His works or in His Word. It is easy to make mistakes in the attempt to do this, and I consequently appeal to all of you to give the Council of this Institute your help in the various forms that help is able to assume, whether it be by the contribution of papers for discussion at our meetings, or by taking office in the Council and working as one of its members, or, in other ways, generally promoting the objects of the society. All who care for the truth as a whole should assist by joining with those who are endeavouring to maintain the unity of Truth. Of course, the whole tendency of modern thought is rather against this. Science is so wide, that those who have to work are severally content to dig a small allotment in some corner of the great field, and even there very often they find they have undertaken too much. There is a danger of thinking one's own thoughts, and allowing at the same time the wider unities to pass by—a danger which affects those who know nothing about science, as well as those who are inclined to a too exclusive study of it. I thank you most heartily for the vote you have just accorded to the

Council, and especially for your recognition of the anxious task they have had in finding a President to occupy the place of the late Lord Shaftesbury, and I must also express our thanks to Professor Stokes for concurring in the selection we made.

The CHAIRMAN (Sir H. BARKLY, K.C.B., G.C.M.G., F.R.S.).—By the vote just agreed to, the election of Professor Stokes as President of this Institute has been confirmed by the Society, and it therefore becomes my duty to vacate this chair in order that it may be taken by our new President. I think it a great honour to the Society that its presidency should be accepted by so distinguished a man as Professor Stokes, the President of the Royal Society of Great Britain. This is not only an honour to the Victoria Institute, but may also be regarded as a triumph to the divine cause of truth and science throughout the world—a cause which we believe to be one and indissoluble.

Professor STOKES (President of the Royal Society) having, amid general applause, taken the chair, said :—Ladies and gentlemen, in taking this chair as President of the Victoria Institute, I cannot but feel how unworthy a successor I am to that great and good nobleman who has been lost to us in the course of the past year. I need say nothing about his virtues, for they were familiar to you all. You know, also, the great interest he took, from the very first, in the prosperity of this Institute. I regret to say that hitherto, although you were so good as to make me an honorary member, I have but seldom attended the meetings of the Council or the anniversaries of the Society ; but I hope in future to be able to attend more frequently. At the same time, I should state that I have duties in connexion with the University of Cambridge, and that I also have other duties in London in connexion with the post I occupy in the Royal Society. The statutes under which I live make it necessary for me to reside, to a considerable extent, at Cambridge, as I have duties to perform in relation to the professorship I there hold ; nevertheless, I hope from time to time—I trust I may say not very infrequently—to be among you, so that I may endeavour to carry out, to the best of my ability, the objects for which this Institute has been founded. If experience should show that I cannot properly discharge the duties of the post in consequence of my other engagements, and I should be led to request you to appoint some one who has more leisure to be your President, I hope you will not consider that that is out of any want of respect on my part towards this Institute. I sympathise very strongly with the ends it has in view, for I believe that truth from one quarter will not contradict truth from another. I can sympathise with those who have at heart those truths which the human mind alone could not have found out for itself, and in which we believe our whole race is deeply concerned, and I also sympathise with those who eagerly pursue science in a truth-loving spirit, as I believe pretty nearly the whole of the workers in science do. Therefore, I think I can truly say that I am in sympathy with the main objects which I understand it to be the desire of this Institute to promote, by affording, as the Dean of Lichfield has said, fuller information that may enable us to remove the apparent discrepancies between the two great

branches of human knowledge and belief. I will not detain you longer, because you have yet to hear an interesting address from Professor Hull, whom I now call upon.

The following Address was then read by the author :—

NOTES ON SOME OF THE RESULTS ARRIVED AT BY MEMBERS OF THE EXPEDITION SENT OUT BY THE COMMITTEE OF THE PALESTINE EXPLORATION FUND IN 1883-84 TO ARABIA PETRÆA AND WESTERN PALESTINE. By EDWARD HULL, LL.D., F.R.S., &c., Director of the Geological Survey of Ireland.

I HAVE much pleasure in complying with the invitation of the Council of the Victoria Institute to bring before them some of the results and conclusions arrived at by the members of the expedition, sent out in 1883-84, by the Committee of the Palestine Exploration Fund, for the purpose of making a geological *reconnaissance* through Arabia Petræa and Western Palestine. Referring for fuller details to the narrative of the Expedition,* and to the memoir on the physical geology of the region traversed,† I shall endeavour in this communication to give a short account of the leading physical features and geological structure of this remarkable section of our globe; nor will it, I should hope, be considered out of place if I make occasional reference to some of the great historical events connected with special localities, and their bearing on Biblical literature.

The region to which my observations will be directed is bounded by clearly-defined limits, having the Mediterranean Sea, and the Isthmus and Gulf of Suez on the west; the Red Sea on the south; and the great Arabian and Syrian deserts on the east. It includes the remarkable depression of the Jordan-Arabah valley, which, commencing on the north at the western base of Mount Lebanon, in Cœle Syria, ranges southward along the line of the Jordan; and, being continued to the south of the Dead Sea through the Wâdy el Arabah, passes at Akabah into the Gulf of that name—a total length of 400 miles if we include the Gulf itself. It was one of the special

* *Mount Seir, Sinai, and Western Palestine; being a Narrative of a Scientific Expedition, 1883-84.* (Bentley & Son, London. 1885).

† *Memoir on the Physical Geology and Geography of Arabia Petræa, Palestine, and adjoining districts* (1886).

objects of the Expedition to determine the nature and mode of formation of this long line of depression, which, at the borders of the Dead Sea, descends to a depth of 1,292 feet, below the surface of the Mediterranean, as determined by the officers of the Ordnance Survey of Palestine.*

The route taken by the Expedition may be briefly described as follows. On leaving Egypt, we entered the "Desert of Etham," and took a southerly course from "Moses' Wells" (Ayun Musa) by the Wady Gharandel (probably Elim of the Exodus), after which we turned towards the eastward by the valleys Suwig, Nasb, Kamileh, and others, and finally camped by the Wâdy es Sheikh, near the base of Mount Sinai (Jebel Mûsa). Having ascended the Mount (from the summit of which, 7,373 feet above the sea-level, Colonel Kitchener made a series of triangulations), we recommenced our journey by the Wadies Zelegah and El Ain to Akabah (the Elim or Elath of the Bible†). Here we parted with our escort, the Arabs of the Towâra tribe, and entered into a contract with the head sheikh of the Alowîns for an escort and camels to conduct us along the Arabah valley to the southern shore of the Dead Sead (Bahr Lût). On our way we had an opportunity of visiting the ancient city of Petra, and of ascending Mount Hor (Jebel Haroun), the altitude and geological structure of which we determined. After an encampment of eleven days at Es Safieh, on the southern shore of the Dead Sea, and having made excursions into the Moabite mountains, we traversed southern Palestine, by Beersheba, to the coast at Gaza, where we had to undergo quarantine for five days. Then continuing our journey to Jaffa by the coast road, we proceeded to Jerusalem, from which we made expeditions to the Jordan Valley, Bethlehem and Solomon's pools, and the gorge of the Kedron at Mar Saba. Finally we took ship at Jaffa, and returned home by Beyrût, Cyprus, Smyrna, Constantinople, and the Danube route. The actual survey occupied a period of about nine weeks, of which six were done on camels, the remainder on horseback.

Physical Features.—The region now described naturally separates itself into five districts, each contrasting with those adjoining in its features and geological structure.

1. The first is the maritime district, stretching from the

* Russegger made the level 1,341 feet, a very close approximation. The fact that the level of the Dead Sea is so far below that of the Mediterranean was first ascertained by H. von Schubert and Prof. Roth, in 1836.

† Deut. ii. 8. Ezion Geber probably stood near the head of the Gulf opposite Elath.

Isthmus of Suez along the coast to the base of Mount Carmel.

2. The second includes the table-land of Western Palestine and the Desert of the Tih (Badiet-et-Tih).

3. The third is the line of depression of the Jordan-Arabah valley already referred to.

4. The fourth is the elevated table-land of Edom (Mount Seir) and Moab, stretching eastwards into the Syrian and Arabian Deserts.

5. The fifth is the Peninsula of Sinai, lying between the Gulfs of Akabah and Suez, and to the south of the table-land of Badiet-et-Tih.

(1.) The maritime district is in some measure a continuation of the plain of Lower Egypt. It has an average elevation of about 200 feet, and is largely formed of sands and gravels, with shells now living in the Mediterranean waters adjoining. These and other deposits evince that the land has been upraised to an extent of over 200 to 300 feet within very recent times, commencing with the Pliocene and coming down to the post-Pliocene epochs. A remarkable coast-line—first discovered by Oscar Fraas amongst the Mokattam hills near Cairo, at a level of 220 feet above the Gulf of Suez—has been recognised also in several places by the members of the Expedition in the Arabah Valley and Southern Palestine, and is also represented in the coast districts of Syria and Cyprus. In consideration of the recent period of this partial submergence, I have suggested that at the time of "the Exodus" the land had not fully regained its present level; and that, consequently, the waters of the Gulf of Suez extended as far north as the Great Bitter Lake, forming an arm of the sea, across which the Israelitish host had to make their passage in the miraculous manner recorded in the Bible. Such a view is in accordance with the evidences of submergence to be found all along the line of the Great Canal.

At the period of greatest depression—which Dr. Schweinfurth, Sir J. W. Dawson, and the author concur in considering to be that of the Pliocene—Africa became an island, and the plain of Lower Egypt was covered by the waters of the sea, which sent an arm up the Nile valley as far as the First Cataract. In the geological memoir already referred to the author has given a sketch map representing the relations of land and sea during this period.*

Along this maritime tract runs the high road between

* *Supra cit.* Sketch Map, page 72, showing the position of land and sea during the Pluvial period.

Egypt, Palestine, and Syria, connecting the former country with Jerusalem, Damascus, Jaffa, Tyre, Sidon, and the Lebanon. It has been trod by the iron heel of war from the days when Rameses II. led his hosts against the Hittites of Mount Lebanon, down to the end of the eighteenth century, when Napoleon retired, baffled and repulsed, from the walls of St. Jean d'Acre (December, 1799). The road generally lies inside a line of high sandhills, which are constantly advancing like a devastating wave on the land, with slow but certain steps. It is supposed that the Gaza of the time of Sampson is buried beneath the sands.

(2.) The tableland of Western Palestine rises somewhat abruptly from the maritime tract on the west, and generally terminates along the borders of the Jordan Arabah depression by ranges of bold cliffs, intersected by deep ravines. The tableland is formed of Cretaceo-nummulitic limestone, disposed in the form of an arch, the axis of which ranges in a general north to south direction, passing under the city of Jerusalem, and southwards by Hebron and Tell el Milh. Towards the south, and beyond the borders of Judah, the arched position of the limestone appears to alter, and the strata become spread out into low undulations, not yet properly determined, over the wide expanse of the Badiet-et-Tih, or "Desert of the Wanderings." This plateau is intersected by dry valleys, and breaks off along a line of escarpment, which, commencing east of the Bitter Lakes, ranges in a southerly direction for about 150 miles, and then, bending round towards the east at Jebel el Ejmeh, ultimately reaches the western margin of the Arabah valley near the head of the Gulf of Akabah.

The average elevation of the tableland of Western Palestine may be taken at 2,500 feet above the sea, but the hills rise to 3,000 feet and upwards. The elevation of the Temple area at Jerusalem is 2,593 English feet. A line of watershed runs along this tableland, dividing the streams which enter the Mediterranean from those which find their way into the Jordan valley. The greater depth of this latter outlet above that towards the western side causes the streams which enter the Jordan and Dead Sea to fall with remarkable rapidity. Thus the stream of the Wady el Aujah has an average fall of 280 feet per mile. The Kelt (supposed to be the brook Cherith) has a fall of 190 feet per mile, and the stream of the Wady el Nar (Kedron) a fall of 264 feet per mile. This rapid descent accounts for the great depth to which these streams have cut down their channels; as the force of the water, at a time when the channels were copiously supplied, must have been unusually powerful.

A very ancient road follows closely the line of the watershed, along which most of the towns and villages, such as Shechem (Nablous), Nain, Sychar, Bethel, Jerusalem, Bethlehem, and Hebron have been built. Such a line of communication, and such sites, were a physical necessity in a country where the central ridge is so deeply intersected by ravines penetrating from opposite directions. By this road the Patriarch Abraham journeyed southwards towards the Plain of Mamre,* on the border of which stands Hebron, except Damascus, the most ancient inhabited city in the world.

(3.) The line of the Jordan-Arabah depression has already been referred to, and has been so fully described by travellers that little need here be added regarding its physical features. The Ghor—or hollow—in which lies the Dead Sea is terminated along the south by cliffs of marl and gravel about 600 feet high; these beds form the floor of the Valley of the Arabah southwards as far as the Ain Abu Werideh—a distance of forty miles from their northern margin along the Ghor. The level of these marls at Ain Abu Werideh is a little over that of the Mediterranean; and, as there can be no doubt that they were formed over the floor of an inland lake which must have stood at this level, it is concluded that the waters of the great Jordan-Valley Lake once rose to, at least, 1,300 feet above its present surface, and occupied the whole valley from the Ain Abu Werideh to the Lake of Huleh (or Merom), a distance of 200 miles from north to south. The evidence thus adduced for the former great size of the Jordan-Valley Lake does not rest on observations made at the southern extremity only, but is borne out by similar phenomena observed at the northern extremity. Thus we find terraces on both sides of the Ghor (of which Jebel Usdum and the Lisan are fragments) at levels of 600 feet above the present surface; and near the margin of the Sea of Tiberias Dr. Lortet has recognised a terrace formed of gravel, with rolled pebbles, occupying a position south-east of Safed. This terrace is as nearly as possible at a level with that of the Mediterranean. Hence Dr. Lortet has inferred that the waters of the Sea of Tiberias formerly stood at that level. - This terrace near the northern margin corresponds with that of Ain Abu Werideh at the southern margin of the ancient lake, which has since shrunk back into three fragments connected by the stream of the Jordan.

The expedition succeeded in establishing by observation in

* Genesis xii. 8, and xiii. 18.

the Arabah Valley, what had been surmised by former observers, that the Jordan-Arabah depression is due primarily to a great fault, or fracture, of the strata, running generally along the base of the Moabite and Edomite hills, along which the strata have been displaced; those on the west having been relatively lowered with reference to those on the east, to the extent of 1,000 feet and upwards.* On this account it is that the Nubian sandstone formation appears along the eastern side of the Ghor, but never on the western, that side being formed of Cretaceous limestone; while, in the southern part of the Arabah Valley, the eastern side is formed of still more ancient crystalline rocks. The elevation of the low saddle or watershed which crosses the Arabah Valley from side to side was also determined to be about 700 feet at a distance of forty-five miles from the head of the Gulf of Akabah; and I came to the same conclusion as Professor Lartet, that the waters of the Jordan never flowed into that gulf, but that, on the contrary, ever since the land emerged from the ocean, there had been a continuous ridge separating the waters on either hand.†

I have endeavoured in the *Geological Memoir* to trace the succession of operations and events by which the Jordan-Arabah Valley has been formed, and must content myself here with stating that, as the whole region was under the bed of the sea down to the close of the Eocene period, the elevation of the land, together with the development of the main physical features, may be referred to the succeeding Miocene—a period remarkable for physical disturbances and great denudation of the strata over the Europasian continent, and the adjoining parts of Africa.

(4.) The formation of the table-land east of the Jordan-Arabah depression was a necessary result of the physical operations by which this depression itself was formed. The strata which were lowered on the west, were elevated on the east, side of the great fault, and have been converted into a high table-land with an average level of 5,000 feet

* This view has been advanced by Tristram, *Land of Israel*, and Lartet, *Géologie de la Mer Morte*, but the actual line of fracture had not previously been traced along the Wady el Arabah.

† In a recent review of the *Geological Memoir* in the *Saturday Review*, April 17, the writer advocates the view that a river originally poured its waters into the sea on the site of the present Gulf of Akabah, and that the depressions and ridges crossing the valley are due to movements of the crust which took place subsequently to the north and south faulting. This view has been deliberately rejected by both Dr. Lartet and myself, for reasons which I have fully explained in the July number of the *Quarterly Statement P. E. F.*

above the sea in the Edomite district, or 4,000 feet in that of Moab. The upper surface of this table-land is formed, throughout the greater extent, of Cretaceous limestone resting on Nubian sandstone, and this again on ancient crystalline rocks which form the basis of the whole region, and emerge from beneath the Nubian sandstone on approaching the head of the Gulf of Akabah from the north. The ancient city of Petra, whose temples, palaces, theatres, and tombs are hewn out of the solid sandstone rock, *in situ*, lies in the heart of the mountains of Edom, and was visited by the members of the Expedition. The summit of Mount Hor (Jebel Haroun) was also reached, and its elevation of 4,580 feet above the sea determined. This point, which commands a view of the Ghor, the hills of southern Palestine, and those of the Peninsula of Sinai, was made by Colonel Kitchener a principal trigonometrical station.

The Valley of the Arabah has been for ages the line of communication between Syria, Palestine, and the great Arabian Peninsula. Along this valley the Israelites, on being refused a passage through the territory of the King of Edom, retraced their steps from Kadesh Barnea and Mount Hor, and crossing the mountain range by the pass of the Wâdy el Ithm skirted Mount Seir on their progress northwards to the table-land of Moab. Along this line of march also, at a later period, the Queen of Sheba may be supposed to have journeyed from her territory at the head of the Persian Gulf, when she visited King Solomon, and, having crossed the Desert of Arabia, took the line of the valley from Elath northwards to Jerusalem. By the same line Solomon kept up his communication with the port of Ezion Geber,* which Leon de Laborde has, with every probability, identified with the Island of Jazirat Farûn—off the Ras el Musry—at the western side of the Gulf, opposite Akabah. The only existing remains on this island are considered to belong to the period of the Crusades.

(5.) The fifth and last physical district, the Peninsula of Sinai, is by far the most striking, from the grandeur and loftiness of its mountains, their sharpness of outline, and the depth of the colouration of the rocks, in which red and purple colours prevail. It thus presents a marked contrast to the table-land of Badiet-et-Tîh, and of Southern Palestine to the north, where the nearly horizontal beds of limestone give rise to terraces, with prevalent grey or yellow colours, except where clothed with herbage. The physical features of this region

* 1 Kings ix. 26.

have been so fully described, especially by the late Professor Palmer, Sir Charles Wilson, Oscar Fraas, De la Borde, Dean Stanley, and others, that little need be added here. From the summit of Mount Sinai Colonel Kitchener was able to take the bearings of numerous points with the theodolite, and thus to connect the triangulation of the Peninsula with that of Southern Palestine along the Arabah Valley. The magnificent survey of the Sinaitic Peninsula by the officers of the Ordnance Survey had left little to be desired. Where it terminated towards the Gulf of Akabah it was taken up by the members of our Expedition, and the result is an elaborate map of the Valley of the Arabah, from the head of the Gulf of Akabah to the shores of the Dead Sea. And in a reduced copy of this map (on a scale of six inches to the English mile) I have inserted the geological details with as much accuracy as our reconnaissance would permit.*

The rocks of the Sinaitic mountains, including Jebel Serbal, are formed chiefly of granite, gneiss, various schists, invaded by porphyry and other igneous rocks. It is probable that these represent the oldest formation of the globe, known to geologists as "Archæan." Traced westward beyond the shores of the Gulf of Suez, they form much of the mountainous tract between the Red Sea and the Valley of the Nile, where they reappear, rising from beneath the Nubian sandstone at Assouan.

In the Sinaitic Peninsula the crystalline rocks are overlain in certain directions by Carboniferous beds, originally discovered by Mr. Bauerman in the Wâdy Nasb, and visited by the members of the Expedition. These consist of red sandstone and conglomerate, overlain by limestone with numerous shells, crinoids, and corals, identical with, or allied to, those of the Carboniferous beds of Europe and the British Isles. Numerous specimens of these fossils were collected and brought home for determination, and have served to place beyond doubt the geological age of the strata in which they occur.†

Throughout the Sinaitic Peninsula, evidences of the former existence of lakes and chains of lakes were not infrequent in the occurrence of deposits of marl, beds of gravel and sand forming horizontal strata over some of the plains and valleys. It was also clear that at a former period the now waterless valleys had been occupied by large, and probably

* The preparation of this map was undertaken by Mr. Armstrong (formerly Sergeant-Major, R.E.), of the Ordnance Survey of Palestine.

† The determinations were made by Prof. Sollas, of Dublin University, and are given in the Memoir, p. 48.

perennial, streams, as old river terraces were found rising several feet above the present beds of the valleys. The presence of such terraces is not to be altogether accounted for from the occurrence of occasional thunderstorms (or "seils" of the Arabs), which in winter burst upon the mountains, and send down great torrents of water. In traversing the remarkable gorge of the Wâdy el Ain, we had occasion to observe the effects of such floods in piling up boulders, shingle, and drift-wood at the headings of the valley.

Recent changes in the climate of Arabia Petraea and Palestine.

—This brings me to the last point which it is necessary to refer to in this communication, namely, the evidence of a former climate more closely resembling that of central Europe and the British isles. Although part of this region is generally regarded as rainless, this is not exactly the case, as a little rain, generally accompanying thunderstorms, falls in the winter time, and the summits of the Sinaitic mountains, according to Sir Charles Wilson, have a capping of snow for a short period, from which the perennial springs are fed. But the climatic conditions must have been very different from the present only as far back as the Glacial epoch, when glaciers descended the valleys of Lebanon to a level of 4,000 feet above the sea. As Sir J. D. Hooker has shown, the grove of the venerable cedars decorates the surface of an ancient moraine which was thrown across the valley, and was formed at the end of a glacier which descended from the snowfields above. It may be supposed that at this epoch the annual mean temperature of Palestine and Syria was 25° Fahr. lower than at present, and that the rainfall was very considerably in excess of the present amount.

The melting of the snows on the Lebanon, and the large amount of rainfall may be considered as a sufficient reason for the high level at which the waters of the Jordan-Valley lake formerly stood, and for the size and depth of many of the old river valleys, such as those of the Zelegah and El Ain, in the Sinaitic Peninsula. I have also ventured to suggest the probability that during this epoch the volcanic fires of the Jaulan and Hauran were still in activity, the waters of the great lake, finding access through the faults and fissures of the Jordan Valley, having supplied the steam-power (so to speak) now generally recognised as a necessary agent in volcanic explosions. If this be correct, then we may further assume that with the drying up of the waters and their recession into their comparatively narrow bounds, such as they now occupy, the volcanic action concomitantly subsided, and ultimately

died out. Thus there may be said to have been a secondary connexion between meteoric and volcanic phenomena.

The effects of the humid climate must have remained for a long time after the humidity itself had diminished. These effects would appear in the luxuriousness of the vegetation, and in the presence of extensive forests, of which hints are afforded in passages in the Old Testament and in other writings.* The cutting down of the forests and neglect of planting have probably greatly contributed to the present dryness of the climate; while the soil has been washed down from off the hill-sides, which present a remarkably bare and rocky aspect over a large part of Central Palestine and Arabia Petræa. Planting and irrigation would undoubtedly go far to restore to Palestine its former character for fruitfulness.

The natural flora of Palestine and its borders is known to be remarkably varied; and, in consequence of its peculiar physical features,—the elevation of its hills and table-lands, and the depth of its valleys,—this country seems adapted for almost every kind of vegetable product. Tropical plants find a genial habitat in the Jordan Valley, while the hillsides offer a fitting climate for sub-tropical and temperate forms, and for the planting of forests. In Southern Judæa, thousands of acres of rich soil, adapted for the growth of wheat and other cereals, lie uncultivated and afford only pasture for the small flocks of sheep and goats of the Bedawin. When riding over these great expanses of pasture-land, once thickly populated, now almost without inhabitant, I often thought, What more favourable home for industrious colonists could be found in any part of the world?

[Professor HULL added that he had been asked whether the geology of the district affords grounds for believing that the river Jordan discharged its waters into the Gulf of Akabah prior to the formation of the depression alluded to in the address. He desired to say that the question was one on which he had a very strong opinion, and one which he had had to defend recently against a writer in the *Saturday Review*. He believed that from the time that region was elevated out of the sea the waters of the Jordan never flowed into the Gulf of Akabah. There was at the beginning, in his opinion, a lake which had its limits towards the south in the region of the Arabah Valley and the waters never flowed further, there being always an excess of evaporation beyond supply in that district.]

* Theophrastus, *De Hist. Plant.*, lib. ii. cap. 81; Pausanias, lib. ix. c. 19; Horatius, *Epist.* l. ii.; Pliny, lib. xxiii. c. 4, &c.

Sir H. BARKLY, G.C.M.G., K.C.B., F.R.S.—I rise for the purpose of proposing, "That our best thanks be presented to Professor Hull for the Annual Address now delivered, and to those who have read papers during the session." The recommendation of the first part of this resolution to the members of the Victoria Institute requires very few remarks from me. The learned director of the Geological Survey of Ireland has rendered his description of the country through which he has travelled in Arabia Petræa and Western Palestine so interesting and instructive, and has also added so greatly to the charm of his lecture by delivering his remarks extemporarily, and illustrating them by the diagrams he has put before us, that he has fairly riveted the attention of all his hearers from the beginning down to the very end of his Address. In fact, I am sure that many of us will not feel satisfied until we have heard a little more about the matter, and are in a position to read the published account of the scientific expedition to which he has referred us. With regard to the other gentlemen who have read papers during the year, I will only say that our thanks are justly due to them, and, considering the late hour at which we have arrived, I will now conclude by at once moving the resolution I have read.

Mr. SAMUEL SMITH, M.P.—I have great pleasure in seconding this resolution, and in doing so I must say that it has afforded me much gratification to listen to the Address just delivered. The scenes referred to by the learned Professor are familiar to myself; and I may add, that it is only two months since I passed through the Suez Canal, and discussed with the intelligent captain of the vessel in which I was, some of the topics to which the lecturer has referred. That officer had devoted a good portion of his life to surveying the district connected with the Exodus, and he seemed to have arrived at the same conclusion as the learned Professor—namely, that the point of the Red Sea at which the children of Israel crossed was not where the Gulf of Suez is now, but one further removed from the sea. According to the captain's theory, the Red Sea must then have filled up a considerable portion of the district now lying between it and the Mediterranean. I was very much interested in the remarks made by Professor Hull in regard to the extraordinary depression of the Jordan-Arabah Valley. The matter is one that has always excited wonder; but I think the explanation that has been given to-night is one that fully commends itself to one's common sense and judgment. It must have been the site of a great lake, which has gradually disappeared in consequence of the great physical changes to which reference has been made. When I was out in that part of the world, in the month of May, the heat surpassed in its intensity anything I have ever experienced in any other place. Nothing could exceed the sterility of the district—there being scarcely a vestige of vegetation—with the exception of a small belt of foliage along the banks of the Jordan; but, as we all know, there was a time when that district was the abode of a large population, although, through the changes alluded to, the climate has reached its present condition. I think I may truly say that we have all derived much informa-

tion from the interesting Address we have had the opportunity of listening to to-night.

The resolution was then agreed to, *nem con.*

Professor HULL, F.R.S.—On my own part and that of those who are also included in the vote of thanks just passed by the meeting, I have only to say that we are much obliged to Sir Henry Barkly for moving, and to Mr. Samuel Smith for seconding, as well as to the members present for accepting, this resolution. It has afforded me very great pleasure to offer the remarks I have put before so appreciative an audience.

Rev. A. I. M'CAUL, M.A.—I have now to move, "That the thanks of the meeting be presented to the President." We must all have felt much pleasure and gratification in hearing that our distinguished President will be with us as much as he is able, having regard to his other duties.

Mr. H. CADMAN JONES, M.A.—I have much pleasure in seconding the resolution. I am sure it is a source of great satisfaction to the Society that we have obtained so distinguished a successor to the late lamented nobleman who for so many years was our President. The Earl of Shaftesbury was very fond of saying, at our annual meetings, that he ought to give place to some one else, as he was not himself a scientific man. Nevertheless, I always felt that there was a peculiar fitness in his being our President, as he was one whose whole life was a proof that, when we are fighting for the truths of Revelation, we are not fighting for a mere bundle of ideas, but for that which is to regenerate the world. His religion led him to set the noblest example of self-denying exertion for the good of others, and he rightly filled the place he held at the head of this Institute. We have now the pleasure of welcoming to that position a man of high scientific reputation—one whose name is known, not only throughout Europe, but, I may say, all over the world, as a man of science; and his accepting the post is a proof that belief in Revelation is consistent with the highest scientific attainments. I welcome him the more heartily because we are old friends, having been at Cambridge together, and forty-five years ago, we were struggling to see which of the two should win the object of ambition most coveted by Cambridge men. I have much pleasure in thanking him for coming here and accepting the position of our President.

The resolution having been carried by acclamation,

The PRESIDENT said:—I rise to return thanks for the kind expressions that have been used towards me, and to say that I hope, notwithstanding my other engagements, I shall, at any rate, have some time to give to the affairs of this Institute. I will not detain you longer at this late hour.

The members and their friends then adjourned to the Museum, where refreshments were served.

ORDINARY MEETING, MAY 17, 1886.

D. HOWARD, ESQ., V.P.C.S., IN THE CHAIR.

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

LIFE MEMBER :—Rev. F. H. Baring, M.A., London.

ASSOCIATES :—H. Carr Smith, Esq., Reading ; J. K. Barton, Esq., M.D., T.C.D., F.R.C.S.I., Dublin.

The following paper was then read by Mr. H. CADMAN JONES, M.A., the author being unable to be present on account of his official duties.

ON THE CONNEXION BETWEEN JEWISH, PHŒNICIAN, AND EARLY GREEK ART AND ARCHITECTURE. By the REV. J. LESLIE PORTER, D.D., LL.D., President of Queen's College, Belfast.

A FEW years ago I had a favourable opportunity, when cruising in a yacht along the shores of the Mediterranean, of inspecting and exploring some of the ancient cities and temples whose ruins stud the coasts of Greece, Asia Minor, and Africa. I had previously visited, and examined with considerable care and minuteness, almost every spot of antiquarian and historic interest in Palestine, Phœnicia, Cyprus, and Northern Egypt. I had seen those remarkable relics of primeval art and luxury exhumed by Schliemann from the mounds of Troy and the tombs of Mycenæ. I had read, too, the graphic narrative of the researches of Di Cesnola, and his full description of the Phœnician and Greek sculptures and ornaments of gold and silver discovered by him in the temples, tombs, and subterranean chambers of Cyprus. I have since, as far as time and important official duties permitted, endeavoured to compare with each other the antiquarian remains of the several countries and cities I have named, with a view, if possible,

to trace the origin of art and architecture, and to ascertain to what race or nation we are mainly indebted for the first designs, and for the earliest principles, of art; and in what way, and by what agency, the knowledge was propagated and art developed. I had another object in view—to throw some additional light, if possible, upon the accounts given by the sacred writers of the building and decoration of Solomon's Temple and Palace in Jerusalem.

I must here confess that it is with extreme diffidence I venture to express my views on this subject before a London audience. In prosecuting my studies I have laboured under great disadvantages. Though I have visited so many of the ancient sites, and explored so many of the old ruins, I have not had any special training for such work. I was a mere amateur. And when in my library at home I have not had access to those vast and invaluable stores of antiquities laid up in the British Museum, nor have I enjoyed the incalculable advantage of intercourse with those *savants* in this great metropolis who have devoted their special attainments and learning to classical and Oriental archæology. I have simply investigated, read, and thought for myself. My aim now is to give the results in a short, popular form, and thus to try at least to direct the attention of others, better qualified than I can pretend to be, to matters which, in my opinion, are of no small importance, especially for Biblical students.

ARCHITECTURE.

During my wanderings over Bible lands and along the classic shores of the Levant, I was often struck with the close resemblance, in many respects, between the most ancient architectural remains of the Jews, the Phœnicians, and the Greeks, both in their own country and in their colonies in Asia Minor. I read with renewed interest and attention the accounts given by the sacred writers of the building of Solomon's Temple and Palace in Jerusalem—how the foundations and massive walls were built “of costly stones, even of hewn stone, according to measure, sawed with saws, within and without, even from the foundation unto the coping, and so on the outside unto the great court. And the foundation was of costly stones, even great stones, stones of ten cubits and stones of eight cubits” (1 Kings vii. 9, 10). Josephus makes the size of the stones greater still, some being forty cubits long (*Ant.*, xv. 11). Many of the stones of the encircling wall of the Temple platform are in their places. I

have measured several varying from twenty to thirty-eight feet in length by nearly six in thickness; and the wall itself rises in places to a height of one hundred and fifty feet. The huge platform, so constructed, is on the crown of Mount Moriah, and is about five hundred yards long by three hundred broad. Near its centre, standing on the natural rock, was the Temple itself,—the *ναός*, “shrine,” as distinguished from the *ἱερόν*, “sacred enclosure,”—a site now occupied by the great Mosque. I could not fail to admire the grandeur of the site and the magnificence of the masonry. I observed, as others have done, that many of the large stones had cut upon them masons’ marks,—Phœnician letters,—showing, as the sacred writers inform us, that the buildings were erected by Phœnician workmen. Solomon, in his letter to Hiram, King of Tyre, acknowledges that among the Jews there were no skilled workmen, and therefore asked men from Hiram, and when they arrived “they hewed out great stones, costly stones, to lay the foundation of the house with wrought stone. And Solomon’s builders, and Hiram’s builders, and the Gebalites did fashion them” (1 Kings v. 7, 17, 18).

Here is the first link of connexion between Jewish and Phœnician architecture, and it is a remarkable confirmation of the accuracy of the Bible record, that we can now see the marks of those Phœnician masons upon the great stones they laid in Solomon’s days. There is another noteworthy allusion in the passage I have quoted. The *Gebalites* are specially mentioned, for this is the true rendering of the Hebrew word translated “stone squarers” in our Authorised Version. They were the inhabitants of the old Phœnician city of Gebal, at the foot of Lebanon, north of Sidon; and I have seen in its own old ramparts colossal stones of the very same type as those in Jerusalem (Cf. Ezek. xxvii. 9). They occur also in the extant foundations of Sidon, Tyre, and Arvad; indeed, in most of the ruins along the Phœnician coast and on the neighbouring heights of Lebanon. Perhaps, however, the most remarkable is the stylobate, or platform, of the temples of Baalbek. The Phœnician architects appear to have had a special liking for colossal stones; and in Baalbek they surpassed all their other works in this respect. Three stones placed on a massive sustaining wall, at a height of twenty-five feet from the ground, measure in length, respectively, sixty feet, sixty-three feet, and sixty-four feet, by fourteen feet deep and fourteen broad. It is worthy of note, too, that this ancient site bears the name to this day of the Phœnician sun-god, *Baal*. *Baal-bek* signifies “City of Baal.” The Greeks called it in their own tongue,

Heliopolis, "City of the Sun." It was to Baal, her Sidonian deity, the infamous Jezebel, daughter of *Eth-Baal*, built a temple in Samaria (1 Kings xvi. 31-33). The worship of Baal was then introduced into Israel, and had a most degrading influence both upon the faith and morals of the nation.

TEMPLES.

The plan of Solomon's Temple was Phœnician—the spacious open court, the massive encircling wall, the commanding site, and the central shrine. We have the same plan at Baalbek; at Palmyra, that eastern outpost of Phœnician commerce; and, upon a much smaller scale, at Amrit, on the coast near Arvad. At the latter place the court is mostly excavated in the solid rock; and the shrine, in some respects resembling that of Jerusalem, is a portion of the natural rock, left standing, and moulded into a kind of throne. In Greece, we find the same general plan in the Acropolis of Athens; also, but not so definitely circumscribed, in the Acrocorinthus of Corinth; in the Larissa of Argos; in Tiryns, and in Mycenæ; also, apparently, in the *Cadmœia* of Thebes, which long retained the name of its Phœnician founder, Cadmus.

INTERNAL DECORATION.

The internal decorations and gorgeous fittings and furniture of Solomon's Temple are minutely described in the Bible. The entire walls, the floor, the ceiling, the pillars, the doors, the sacred ark, the altar were overlaid with pure gold, richly chased and carved with designs of fruit, palm-trees, and cherubim. The porch, too, was overlaid with gold. The sacred vessels were all of gold. The chief artist in this gorgeous work was a Phœnician. The King of Tyre thus introduced him to Solomon:—"I now have sent a cunning man endued with understanding, the son of a woman of the daughters of Dan, and his father was a man of Tyre, skilful to work in gold, and in silver, in brass, in iron, in stone, and in timber, in purple, in blue, and in fine linen, and in crimson; also to grave any manner of graving, and to find out every device" (2 Ch. ii. 13-14). We read that he was a lapidary as well, for "he garnished the house with precious stones for beauty" (iii. 6). His skill in carving and gold-beating must have been wonderful. "He made two cherubim of olive-wood, each ten cubits high. And five cubits was the one

wing of the cherub, and five the other wing, from the uttermost part of the one wing unto the uttermost part of the other were ten cubits; and the wings were stretched forth, so that the wing of the one cherub touched the one wall, and the wing of the other the other wall. . . . He made two doors of olive-wood, and carved upon them carvings of cherubim, and palm-trees, and open flowers, and overlaid them with gold, and he spread the gold upon the cherubim, and upon the palm-trees . . . fitted upon the graven work" (1 Kings vi. 23-33).

In front of the great gate of the Temple two brazen pillars were set up, each apparently thirty-five cubits in extreme height, and twelve in circumference (Cf. 2 Chron. iii. 15-17, and 1 Kings vii. 15-20). So far as I can gather, they seem to have had no structural connexion with the main building or the porch. They were isolated—one on each side of the gate; but their costly material and elaborate ornaments would appear to indicate some high mystic signification and purpose. Pillars, obelisks, and tall pyramids, generally of stone, have been found in front of Phœnician sanctuaries in various parts of the Levant; and they are not unfrequently figured on coins. Most of the great temples in Egypt had a pair of obelisks in front. Probably the nearest approach in form to Jachin and Boaz of Solomon's Temple are the pillars of Persepolis.

One of the grand adjuncts of the Temple was the brazen sea, or cistern, ten cubits in diameter. It was supported on twelve oxen, also of brass, three facing each of the cardinal points. Sculptured figures of lions, oxen, and cherubim surrounded the edge, and were linked together by pendent floral wreaths. Underneath were other elaborate ornaments, wrought in brass, of fruit, foliage, and flowers. In design and execution, this magnificent laver was probably unequalled in ancient times. The costliness of material employed in the decoration and fittings of the Temple, and in the other buildings constructed by Solomon, was no less remarkable than the artistic genius and skill of the workmen. The sacred vessels, lamps, cups, censers—in fact, all the utensils of whatever kind used by the priests in the sanctuary—were of pure gold. And, in addition to these, we are told that Solomon made, doubtless by the hands, or under the direction of the same Phœnician artist, "three hundred shields of beaten gold" and "two hundred targets of beaten gold," and put them in "the house of the forest of Lebanon." "Moreover, the king made a great throne of ivory, and overlaid it with the finest gold." Six steps led up to it, and at the end of each step were two lions (1 Kings x. 16-19). The correspondence between this display

of wealth, luxury, and art, and that of some of the ancient palaces and temples of Greece I shall show presently.

The building of the Temple occupied seven years, and when it was finished, Solomon built a palace for himself, and decorated it in a corresponding style of splendour. In this work thirteen years were spent. There were evidently several distinct courts in the palace, each having suites of apartments, just as we find in modern Oriental palaces. There was apparently one court containing the judgment-hall and public offices; another, the private apartments of the king and his male attendants; another, or perhaps several, for females. The House of the Forest of Lebanon was apparently the royal armoury. The recent excavations of Schliemann in the citadel of Tiryns, one of Greece's most ancient capitals, have brought to light the plan and foundations of a palace which resemble that described by the sacred writers. The architects were of the same nationality, for Tiryns was founded by Phœnicians (Schliemann, *Tiryns*, p. 28).

DIFFERENCES IN STYLE.

In comparing the sacred architecture and art of the Jews with other nations, the fundamental difference between their religious principles and forms of worship must be kept in mind. A purely spiritual faith forbade any visible representation of Deity. The Divine command was singularly clear:—"Thou shalt not make unto thee any graven image, or any likeness of anything that is in heaven above, or that is in the earth beneath. Thou shalt not bow down thyself to them nor serve them." The Fetichism of Egypt, Phœnicia, and Assyria, as well as its subsequent more intellectual development in Greece, was thus sweepingly prohibited. In the Jewish temple, however, we have the ark, with its mercy-seat and overshadowing cherubim, the altars of incense and burnt offering, and all the vessels and utensils connected therewith. No scope for the prurient fancy, no sphere for the materialistic tendencies of the human mind, and, above all, no opening for debasing and licentious symbolism, were here afforded in Jewish art. The grand truth that God is Spirit, and that those who worship Him aright must worship Him in Spirit, was enshrined from the very outset in the Jewish religion, and exhibited in the decorations and arrangements of the Temple. Under it no form of idolatry was, or could be, tolerated.

In Phœnicia, and indeed among all the aboriginal tribes

of Syria, the earliest sanctuaries were "high places," whence the rising and setting sun, the chief object of worship, could be seen. The name *Baal*, "Lord" or "Master," was given to the sun as the supposed ruler of the universe, and the source of life and energy. It would appear, however, that the close proximity of Phœnicia to Israel and the friendly relations of the two peoples—perhaps, also, to some extent the wisdom and counsel of Solomon—exercised more or less of a refining influence upon the religion of the Phœnicians, and instilled into the minds of some of their sages a faintly-rational idea of one supreme God, the Creator and Governor of the universe; and this idea the name Baal would be easily made to embody. It is a remarkable fact that the Jews and Phœnicians always dwelt together on friendly terms. With the other surrounding peoples the Jews were often at war; with the Phœnicians never. The Phœnicians were a practical people, devoted to manufacture, commerce, and colonisation. They had no taste, and, perhaps, little natural talent, for speculation, whether religious or philosophical. The Israelites took advantage of their manufacturing and nautical skill and enterprise, and were able thereby to collect wealth from all parts of the world. They built a fleet for Solomon at Ezion-geber, on the Red Sea; "and Hiram sent in the ships his servants, shipmen that had knowledge of the sea, with the servants of Solomon" (1 Kings ix. 26, 27). The Jews were thus brought, through the instrumentality of the Phœnicians, into mercantile relations with distant nations. We read that the ships of Solomon went to Tarshish with the servants of Hiram once every three years, bringing gold, silver, and ivory; and the kings of the earth sought the presence of Solomon to hear his wisdom; and they brought presents—vessels of silver and gold, and robes, and armour (2 Chron. ix. 21, *seq.*). Thus the art-treasures, as well as the wealth, of the East and West were carried to Jerusalem.

I have said that the earliest sanctuaries of the Phœnicians were "high places." Against the idolatrous worship subsequently practised on those the Israelites were repeatedly and sternly warned by the prophets, and not always with success. This mode of worship seems to have had a special attraction for the inhabitants of Syria and Palestine. At first it appears to have been simple nature-worship; but in time the sun came to be symbolised by an image placed in the temple, or on the rude cairn. I have seen several such images—the sun's face with its circle of rays. The idol-god, as a matter of course, changed in form and character, according to the ideas of the worshipper; and the religion of the people

gradually degenerated into a degrading Pantheism, which deified the whole hosts of heaven, and personified and worshipped with licentious rites the forces of nature. The homage paid by the Phœnicians to Astarte, the deity whom Jeremiah (xliv. 18) calls the "Queen of Heaven," beguiled the Hebrew women, and brought disgrace and misery upon them and their country. Its chief seat was on the brow of Lebanon, where the ruins of the temple now lie, beside the great fountain of the River Adonis, which issues from a cavern in the hillside. The well-known lines of Milton refer to the shameful rites:—

. . . . Thammuz came next behind,
Whose annual wound in Lebanon allured
The Syrian damsels to lament his fate
In amorous ditties all a summer day ;
While smooth Adonis from his native rock
Ran purple to the sea, supposed with blood
Of Thammuz, yearly wounded.

Astarte was supposed to represent the moon, and she is figured as a female with the crescent on her forehead. She was also supposed to symbolise the planet Venus, and she is therefore spoken of by Jewish commentators as the "Star of Heaven." It may be that the "Crescent and Star," the standard of Islam, is a relic of the old Syrian deity.

JEWISH AND PHENICIAN TOMBS.

Among the most remarkable and interesting of Jewish monuments are tombs, and in these also we find some striking points of resemblance to those of Phœnicia and Greece. From the earliest ages the Jews selected with much care, secured as far as possible from violation, and also to a considerable extent decorated, the abodes of their dead. The tombs were usually caves, sometimes natural, but often hewn in the rock at great expense. Here the bodies were laid in state, and, in the case of nobles and princes, gold and jewels were not unfrequently placed beside them. In the Book of Job, probably among the oldest in the Bible, this practice is referred to, where the Patriarch, speaking of his own mournful state, and his wish that he had died in infancy, says: "Now should I have lain down and been quiet . . . then had I been at rest, with kings and counsellors of the earth, which built desolate places [rock-tombs] for themselves, or with princes that had gold, who filled their houses with silver" (iii. 13-15). So, also, the prophet Isaiah was commissioned to denounce the pride of

the royal treasurer, Shebna, in these words: "What dost thou here, and whom hast thou here, that thou hast hewed thee out here a sepulchre? hewing him out a sepulchre on high, gravating an habitation for himself in the rock?" (xxii. 15, 16). Palestine abounds with rock-tombs; and the cliffs and hillsides around its old cities are often honeycombed with sepulchres. Abraham's first possession in the land was the cave of Machpelah, which he bought from the Hittites of Hebron as a tomb for Sarah. In it Abraham, Isaac, and Jacob were subsequently laid. At some period during the Israelitish monarchy the cave and rock were encircled by a massive wall, still standing, the masonry of which resembles that of the foundations of the Temple area, and may be the work of Phœnician masons. From the earliest times Machpelah has been guarded with religious care. Jews, Christians, and Mohammedans have in succession preserved it from violation; and it is not impossible that some remains of the patriarchs, especially of the embalmed body of Jacob, may still be there. Much older mummies have been exhumed from the tombs of Egypt.

The rock-tombs around Jerusalem are innumerable, and some of them, such as the tombs of the prophets on Olivet, the tombs of the judges, and the tombs of the kings (or of Helena) are of vast extent. The princes and nobles of Israel appear to have been as anxious to prepare for themselves splendid sepulchres, when dead, as palaces while living; and their architects and engineers displayed amazing ingenuity and skill in their arrangements to prevent access to the bodies and to the treasures that were generally entombed with them. Josephus gives a glowing account of the vast store of gold placed in the sepulchre of David, which was partly plundered by Hyrcanus, in order to buy off the besieging army of Antonine. Herod the Great afterwards tried to rob it; but it is affirmed that the sacrilegious act was prevented by supernatural interposition. The larger tombs had usually sculptured façades, hewn in the rock, at the entrance, with an open area, either excavated or levelled, in front. Occasionally, also, a pyramid or monument of some sort was built over them—the *σῆμα* of Homer—to mark the place beneath which the honoured dead lay. Several examples still stand in the Kidron Valley at Jerusalem—the so-called tombs of Absalom, Zacharia, Jehoshophat, St. James, &c. Of this kind probably was the pillar set up by Jacob on the grave of Rachel (Gen. xxxv. 20).

In nearly all these respects the customs of the Phœnicians resembled those of the Jews. Their tombs were generally caves. I have visited hundreds of them around the old cities

of Sidon, Tyre, Gebal, and Arvad, and along the adjoining slopes of Lebanon. Those in the cemetery of Arvad, at Amrit, are the most striking, with their pyramids and remarkable monuments. The tomb of Esmûnazar, discovered a few years ago at Sidon, attracted much attention, partly by the beauty of its Egyptian-shaped sarcophagus and partly by its long Phœnician inscription. The inscription appears to have been written by the monarch himself, and expresses the horror he entertained of having his body disturbed. The following is an extract:—"King Esmûnazar said thus:—I am carried away; the time of my non-existence has come; my spirit has disappeared. . . . I am lying in this coffin, in the place which I have built. . . . May no royal race and no man open my funeral bed, and may they not seek after treasures here. . . . Every man who shall open the covering, or who shall carry away the coffin, . . . shall have no couch with the Rephaim, . . . nor shall he be buried, nor shall he have son to succeed him, and the holy gods shall extirpate them." The sarcophagus was opened and removed by the French, and is now in the Museum of the Louvre.

The Greeks also have left famous tombs, both in their native country and in their colonies. Some are excavated in the rock, like those of Phœnicia and Palestine. Of these there are many examples in Cyprus (Di Cesnola, p. 203), in which were found ornaments in gold, vases in terra-cotta, and other specimens of early art. There are also Greek rock-tombs near Ephesus, in various parts of Asia Minor, and in the Morea. Some tombs are sunk in the ground, the sides built up with huge stones, and arched, or simply flagged, over; such as those of Mycenæ, which Schliemann opened, finding vases, cups, pateræ, and numerous ornaments in gold and silver, the repoussé work and carving on which closely resemble those described in Solomon's Temple. Perhaps the most remarkable treasures there found were the masks and coats of thin beaten gold which covered the faces and bodies of the dead. The gold was spread upon the dead, just as we read in the Bible that the Phœnician and Jewish artists "spread the gold upon the cherubim, and fitted it upon the graven work," in the Temple of Solomon. So artistically was the gold fitted on the bodies found in the tombs of Mycenæ that the forms and features of the dead were clearly and even minutely defined.

The great dome-shaped structures around Mycenæ were, in all probability, tombs. That of Atreus, so called, is fifty feet in diameter and fifty high. It was entirely subterranean, and is constructed of large, well-hewn stones in concentric layers,

gradually contracting to a point at the top. The holes in the masonry and fragments of broad-headed nails still remaining show that it was originally coated internally with plates of metal, most probably bronze; and in this respect it resembled the gold-covered shrine of Solomon's Temple. Plates of polished metal, as I shall presently show from some striking descriptions of Homer, were employed by the early Greeks to give splendour and dignity to their palaces and sanctuaries, just as they were employed by the Israelites during the reign of Solomon. Gold and silver, when they could be obtained, were lavishly used in interior decoration, and in the manufacture of household utensils. The enormous quantities found by Di Cesnola in a few tombs and subterranean chambers in Cyprus and the rich collection made by Schliemann in Mycenæ and Troy are proofs of these statements. The magnificent Mausoleum of Caria; the tombs found and described by Sir C. Fellows in Lycia, especially those along the Xanthus, many of which are cut out of the rock in the form of little temples; the long ranges of tombs which are being opened year after year in the road leading from the gate of Athens towards the Piræus, all testify to the importance attached by the ancient Greeks to their places of sepulture. They, though they sometimes burned their dead, were almost as lavish in their expenditure on the remains of departed worthies as the Phœnicians, Jews, and Egyptians. Their *στήλαι*, "tablets," and *κίονες*, "columns," outside the tombs were tasteful and attractive; while the statues and other works of art inside were often executed in the highest style.

I have thus shown that Phœnicia was the connecting link between Palestine and Greece, both in architecture and art. It was, in fact, the England of antiquity, uniting by means of its restless enterprise, its vast commerce, its manufactures, and its widespread colonies, all the countries of the known world. Phœnicia itself was but a narrow strip of land hemmed in by the Mediterranean and the mountain-range of Lebanon. The sea was its natural highway to the outer world, and how eagerly and successfully the people took advantage of it history tells. It speedily colonised Cyprus, various parts of Asia Minor, Greece, Crete, Malta, Sicily, Sardinia, Spain, and even distant Britain. Carthage, its most famous colony, for a time contended for the empire of the world with Rome itself. The influence of the Phœnicians upon the trade, commerce, art, letters, and general civilization of mankind can scarcely be over-estimated. How they extended, and in many places originated, literature is evident from historic records and from the inscriptions they have left behind them. The alpha-

betic characters, which they were among the first to use, were speedily disseminated over Europe and Northern Africa, and revolutionised all literature. Phœnician inscriptions, as a rule, throw light upon the customs and religion of those who wrote them. An inscription discovered in Malta tells us of the erection of three or four sanctuaries in the little island of Gozo—one to Sadam-Baal and another to Astarte, Phœnician deities; and the ruins of temples, perhaps those referred to, have been found in the island. The huge stones, some being twenty feet long, and the style in which they are dressed, remind one of the colossal substructions of the walls of Arvad, Gebal, Sidon, and the Temple of Jerusalem. Ruins of a similar kind, with huge monolithic jambs and lintels, exist in Malta, and among them have been found rude altars, images, ornaments, and especially the mystic cone, such as is met with so frequently in the ancient sanctuaries of Phœnicia (Perrot and Chipiez, *Art in Phœnicia and Cyprus*, i. 302, *seq.*). In Sicily, also, are some most interesting relics of Phœnician art and worship. At Marsala stood a temple of Ammon, and on its site there was recently discovered a tablet, having on its upper part the figure apparently of a priest in a flowing Oriental robe and pointed cap, worshipping the emblems of Phœnician idolatry—the candlestick, or incense-altar, and the sacred cone; while overhead is a triple pyramid surmounted by the crescent and star. Beneath is a Phœnician inscription recording the dedication of the tablet by a certain Hanno, son of *Adon-Baal*, that is, “Lord Baal.” Other votive tablets have also been found, bearing the names of *Baal-Shamayim*, “Baal of the Heavens”; Baal-Ammon, and *Astarte-Erek-Hayim*, “Astarte the Giver of Long Life” (*Id.* i. 319).

In every place where the Phœnicians settled they left behind them the marked characteristics of their art, their architecture, and of the symbols of their worship. While their temples are essentially Oriental in plan and style, they yet, as it seems to me, embody the germs of those more magnificent and elaborate structures subsequently reared up by the genius of the Greeks. The main feature of the temple was, as I have already said, its spacious open court, in the midst of which stood the comparatively small shrine. The image of the deity was usually insignificant in size and rude in form. It was such as could be easily made, and as easily moved from place to place in the track of commerce. The main object of the Phœnicians was to promote the material prosperity of their nation. They were artisans, handicraftsmen, rather than artists. They excelled in all

kinds of metal-work, and carving, and stone-work, but they never rose to those grand conceptions of strength, beauty, and intellectual life and power so marvellously realised and exhibited in the works of Greek sculptors. To trace a flower, or a leaf, or an animal, or a human figure, upon stone or metal was the highest aim of the Phœnician artist. To manufacture vases, cups, and ornaments of gold and silver, armour and arms of bronze, robes of fine texture and rich embroidery, and to supply the marts of the world with them, the Phœnicians laboured with surpassing skill, energy, and success. They thereby left the impress of their talent and industry in every land, from Babylonia to Britain. The decoration of Solomon's Temple and Palace was perhaps among the earliest of their great achievements, and served, doubtless, in no small degree, to spread abroad their fame; for we read that "Solomon exceeded all the kings of the earth in riches and in wisdom. And all the earth sought the presence of Solomon to hear his wisdom" (1 Kings x. 23).

Subsequent history and recent researches show how wonderfully graphic and accurate in detail is that sublime passage in which the prophet Ezekiel describes the wealth, the far-reaching commerce, and the lordly pride of Tyre, Phœnicia's great capital:—"O thou that dwellest in the entry of the sea, which art the merchant of the peoples unto many isles. . . . Thou hast said, I am perfect in beauty." Then he goes on to enumerate the various peoples employed by the Tyrians, each in the department of skilled work in which it excelled; and also the several countries and cities with which they had commercial dealings. Some of these deserve special notice here:—Fine linen with broided work from Egypt; carved and inlaid wood from the isles of Kittim (Cyprus); silver, iron, tin, and lead from Tarshish (Spain and Britain); in vessels of brass with Javan (Ion, Greece); ivory and ebony from the distant isles (India and Ceylon); with Syria (including Judæa) in purple, embroidery, fine linen, and precious stones. It is a wonderful and instructive catalogue, and serves to throw fresh light upon the decorations and furniture of Solomon's Temple and Palace.

PHŒNICIAN ART IN GREECE AND ITS COLONIES.

I shall now attempt to sketch the introduction of Phœnician art into Greece, and its development there under the inspiration and guidance of Greek genius. Probably the first contact of Phœnician and Greek—such contact, at least, as produced mutual action and culture,—was in Cyprus. The

Phœnicians occupied that island in prehistoric times, and I have seen there numerous traces of their language, art, and manufacturing skill in monuments, vases, cups, and personal ornaments. The names of their deities—Baal, Astaroth, and Melkart,—are found everywhere inscribed on tablets and vases. Astaroth is not unfrequently named *Melketh Hash-Shamayim*, “Queen of Heaven,” as in the writings of Jeremiah (vii. 18; xlv. 17, 18); and she was accepted by the Greeks as *Aphrodite*, the goddess of love. Her symbol was a cone, “such as stood in the adytum of her temple at Paphos” (Di Cesnola, *Cyprus*, p. 19). The oldest cities in Cyprus—Paphos, Amathus, and Citium—were founded by Phœnicians. The most ancient traditions affirm that Greek colonisation began with the return of the heroes from Troy. Salamis, it is said, was built by Teucer, and named after his native island. These traditions cannot be fully relied upon, for Homer mentions Cyprus as well known in his day. Ulysses celebrates the hospitality of Dmetor, “Cyprus’s haughty lord” (*Odyssey*, xvii. 525), and Menelaos says :—

For eight slow circling years by tempest toss’d,
From Cyprus to the fair Phœnician coast
(Sidon the capital), I stretch’d my toil
Through regions fatten’d with the flows of Nile.—*Od.* iv. 83.

It would seem, in fact, that so soon as the Greeks had settled in Asia Minor they crossed over to Cyprus, and established themselves along the whole northern and western coasts, founding Soli, and Cythrea, and Lapethus, and Curium, and other towns. It is evident that Phœnician and Greek dwelt together, and their artists and goldsmiths worked together in the manufacture of those ornaments of gold, silver, bronze, and terra-cotta, such large numbers of which have recently been brought to light by the researches of Di Cesnola and others (*Cyprus*).

It is interesting to note that *Citium*, the old Phœnician capital of Cyprus, whose remains now lie beneath and around the modern Larnaca, was the *Kittim* mentioned by Moses in Genesis x. 4, and the *Chittim* of Isaiah and the other Prophets (Isaiah xxiii. 1; Jeremiah ii. 10; Ezekiel xxvii. 6; Daniel xi. 30), with which the ships of Tyre were wont to trade. This mention of the close commercial relations between those two cities is strikingly illustrated by a coin of the fifth century B.C., on which is a Phœnician inscription to the following effect :—“Of the King of Kition and Tyre.” It thus appears that the two cities were then ruled by one monarch (De Luynes, *Numismatique des Satrapies*, 72).

From Cyprus the Phœnicians proceeded westward along the coast of Asia Minor to Rhodes, where they formed a settlement, and have left many traces of their presence. Their next station appears to have been in the little island of Thera, one of the Sporades, in which there is a good harbour. On the shore are tombs, fragments of colossal masonry, and Phœnician inscriptions. The letters of the inscriptions are almost identical with those of the Moabite stone, and of the tablet recently discovered on the side of the subterranean channel between the Fountain of the Virgin and the Pool of Siloam at Jerusalem. From Thera the voyage was short and easy to the Morea and other parts of Greece. In the ruins of the cities of Tiryns and Mycenæ, probably among the oldest in Greece, I observed the very marked characteristics of Phœnician masonry—colossal stones roughly hewn at the edges, monolithic jambs and lintels, rudely-dressed and irregularly-shaped blocks piled up without order. The masonry of the citadel of Tiryns, of the celebrated Lion Gate of Mycenæ, and of the subterranean tombs of Atreus and Agamemnon (so called), closely resemble that of the Phœnician temples in Malta and Gozo; of the wall of Eryx in Sicily, also Phœnician; and of the most ancient fragments in Arvad, Sidon, Baniyas, Jerusalem, and Hebron. We learn from the *Odyssey* that the word Cyclopean, as applied to masonry, was of Phœnician origin. In fact, wherever solid building is mentioned by Homer, it is attributed, directly or indirectly, to Phœnician workmen (see Gladstone, *Juventus Mundi*, 131; Schliemann, *Tiryns*, 20, 21). And the inscriptions found on the sites of several of the oldest cities of Greece—Athens among others (*History of Art in Phœnicia and Cyprus*, i. 249)—show that Phœnician enterprise and culture were introduced at a very early period.

It is, however, when we examine the ceramic and metallurgic art, and the gems, seals, coins, and intaglios of the Phœnicians, Israelites, and Greeks, that we see the close resemblance in design and execution. Fortunately, many precious specimens have come down to us, and minute descriptions are given of others by ancient writers. The Phœnicians, we know, executed the finest work for the Jews, and introduced the art into Greece. They carried their art with them to their colonies, and they supplied their most finished and costly products to such princes and peoples as were able to buy them. Mr. Gladstone, in his *Juventus Mundi*, says:—"With respect to fine art, it seems impossible to resist the clear and ample evidence of the Homeric text, to the effect—first, that works well deserving of that name in all essentials

existed in the time of Homer ; and, secondly, that they are exhibited to us as proceeding from a Phœnician source” (p. 133). Again he writes with greater fulness (p. 520) :—

“The Homeric poems give us a view substantially clear of the state of art in the time of the poet. They also contain conceptions of the principle of art, so vivid as perhaps never to have been surpassed. And, unless I am mistaken, they indicate to us the source from which the specific excellence of Greek art, in its highest form, proceeded. By the term art I understand the production of beauty in material forms palpable to the eye ; whether associated with industrial purposes or not. . . . There are many works of art mentioned in Homer ; but, in the whole of them, it is associated with some purpose of utility. The greatest of them all is the Shield of Achilles. Next, perhaps, the armour of Agamemnon, various bowls, the baldrick of Heracles, the golden clasp of the mantle of Odysseus. In all of them living form is represented. There are other objects belonging rather to mere decoration. Such are the necklace of gold and amber, carried by the Phoinikes (Phœnicians) to Suriè, the couch of Penelope, and the burnished sheets of copper in the palaces of Alkinoos and Menelaos. There are also works of simple mechanical skill, such as the airy net of metal worked by Hephaistos.”

Hephaistos was the Phœnician Vulcan to whom tradition attributes the invention of work in metals. He was like the Tubal Cain of the Pentateuch (Gen. iv. 22). And with his wonderful metal-work, here mentioned by Homer, may be compared the no less wonderful “nets of checker-work, and wreaths of chain-work,” made for the capitals of Jachin and Boaz (1 Kings vii. 17). Mr. Gladstone rightly adds, after a critical review of the whole subject, that “in most of the cases where a true work of art is mentioned”—by Homer—“it is referred directly to Sidon or the Phœnician.” The description of the works in gold, silver, and brass given by Homer throughout the *Iliad* and *Odyssey* remind one forcibly of the works of Hiram in the Temple and Palace of Solomon. One would almost imagine the Greek poet had the sacred and royal buildings of Jerusalem before his mind when he wrote these lines, which I give in the version of Pope :—

The front appear'd with radiant splendours gay,
 Bright as the lamps of night, or orb of day.
 The walls were massy brass ; the cornice high
 Blue metals crown'd in colours of the sky ;
 Rich plates of gold the folding doors incase ;
 The pillars silver, on a brazen base ;
 Silver the lintels deep-projecting o'er,
 And gold, the ringlets that command the door.

Two rows of stately dogs on either hand,
In sculptur'd gold and labour'd silver stand.

* * * * *

Fair thrones from space to space were raised,
Where various carpets and embroidery blazed.

Od. vii. 110.

The "fair thrones" remind one of the throne of Solomon, made of ivory, and "overlaid with the finest gold." There were six steps to the throne . . . and "twelve lions stood there on the one side and on the other upon the six steps" (1 Kings x. 18-20). Homer speaks of carpets "blazing with embroidery," and in another place of "rich tapestry, stiff with inwoven gold" (*Od.* iv. 406), which recall in style of workmanship and richness of material the veil of the Temple (2 Chron. iii. 14).

And at the present time we are not dependent on even the most graphic descriptions of poets or sacred writers for our knowledge of Phœnician and early Greek art and workmanship. The excavations of Di Cesnola in Cyprus and of Schliemann and others in Greece and Troy have brought to light some of the works themselves—cups, and vases, and necklets, and rings, and chains of gold; plates of beaten gold, almost as thin as tissue-paper, fitted on to the faces and persons of the dead, and also on carved wood and ornaments of every form. These illustrate the words of the sacred writers, who tell us that Hiram carved upon the doors of the Temple "cherubim, and palm-trees, and open flowers, and overlaid them with gold; and spread gold upon the cherubim and upon the palm-trees . . . and the whole house he overlaid with pure gold" (1 Kings vi. 32, *seq.*). The vessels and entire utensils of Solomon's Temple and Palace were gold, made by Hiram the Phœnician. In the *Iliad* (xxiii. 704, *seq.*), we read that Achilles offered as a race-prize, at the funeral of Patrocles, a silver goblet, unrivalled for beauty of workmanship, made by Sidonian artists. Another goblet, made by Hephaistos, was presented by the King of Sidon to Menelaos, as we read in the *Odyssey* :—

The silver bowl, whose costly margins shine,
Enchased with gold, this valued gift be thine;
To me this present of Vulcanian frame
From Sidon's hospitable monarch came.

But perhaps the most remarkable connecting link between early Greek, Phœnician, and Jewish art was discovered some few years ago. It is a fragment of a bronze cup, containing part of a Phœnician inscription of the oldest

type of letter, to the effect that the cup was dedicated to Baal-Lebanon by a certain Hiram. It is now in the French National Library. But who was this Hiram? Was he the artist who made the cup, or was he Solomon's friend, Hiram, King of Tyre? We cannot tell. The style of workmanship and the form of the letters are both archaic, and may be, probably are, of the age of Solomon. It is at least interesting to find on the fragment the familiar Scripture name, which is not a common one (see *History of Art in Phœnicia and Cyprus*, i. 90; ii. 340).

Another patera, or bowl, of beautiful workmanship, was discovered about ten years ago at Præneste, one of the oldest cities of Italy. It is of silver, overlaid with gold, and is covered with figures arranged in concentric circles—in the centre a group of men fighting, in the next circle horses, and in the outer horses and chariots, resembling those on Phœnician coins. A Phœnician inscription on the patera gives the name of the maker or owner. Numerous pateræ, similar in form and style of ornament, have been found by Di Cesnola in Cyprus, and are figured in his splendid book. One is able from them to see how the original designs of the Phœnicians, borrowed from both Egypt and Assyria, were gradually developed into the more bold, chaste, and artistic forms of the Greeks. The archaic style prevailed in the decoration of Solomon's buildings—modified, of course, so as to exclude everything opposed to the monotheistic principles and lofty moral feelings of the Jews. The Phœnicians had almost a monopoly of artistic work in metal, from the earliest historic period down to about the sixth century B.C. They attained to great skill and excellence; but more, perhaps, in the extreme minuteness and delicacy of their manipulation than in the excellence of their designs. In this respect they resembled the Persians, Indians, and Japanese of our own day. The Greeks at first adopted the Phœnician models, but their superior taste and artistic genius soon enabled them to excel to such an extent that competition became impossible. They studied mainly the various phases of human life, and their chief aim was to imitate them, transferring the visible symbol of every movement, act, and thought to marble or metal. Their range of artistic study was much wider and more instructive than that of either Jew or Phœnician. The beauty, grace, and majesty of the human face and form were the main inspiring objects of the Greek artist, who was able in his ideal conceptions to look beyond and beneath the mere outward mould, and to give expression to thought, passion, and intellectual power.

The researches of Schliemann and Di Cesnola have likewise served to throw some fresh light on those personal ornaments of which we read in the sacred writings—bracelets, rings, necklaces, anklets, head-tires, crescents, nose-jewels, amulets, gems, and other articles, for the profuse wearing of which the prophet Isaiah sternly rebukes the Jewish women (iii. 17-23). Of each and all of these the tombs of Greece and Cyprus have furnished admirable specimens, manufactured, too, in all probability, by the very artists and goldsmiths who supplied the maids and matrons of Israel. Bangles, bracelets, chatelaines, and even crosses were in those early days almost as fashionable as they are now in Constantinople harâm or London drawing-room.

I have, I fear, more than exhausted my space, and yet I have only just been able to touch the borders of an interesting and almost inexhaustible subject. The study of it has helped me at least to understand more fully many portions of Holy Scripture. It has given me a clearer conception than I might otherwise have had of the splendour, the artistic finish, and the wondrous richness in decoration and furniture of that Temple which Solomon and a devoted people reared up and dedicated to the service of the Living God. All the resources of his own kingdom, all the wealth he could gather from foreign nations, all the skill and talent he could obtain from the most celebrated architects and most accomplished artists then in the world were, with surpassing zeal and energy, concentrated in the grand effort to erect a house in some measure worthy of the JEHOVAH GOD of Israel. King David had said:—"The house that is to be builded for the Lord must be exceeding magnificent, of fame and of glory throughout all countries" (1 Chron. xxii. 5). His promise and most sanguine anticipations were fulfilled in the Temple of Solomon.

The CHAIRMAN (Mr. D. Howard, V. Pres. Chem. Soc.).—I have now to ask you to pass a vote of thanks to Mr. Cadman Jones for having read this paper in the absence of the author, Dr. Porter, who is obliged to be present at Queen's College, Belfast, of which he is president. It is a very interesting paper, and it has added to our pleasure to hear it so admirably read. We shall now be glad to hear any remarks which those present may desire to make. The subject is one which, as the writer of the paper says, opens up a vast sphere of inquiry. The interchange of ideas in early times on the subject of architecture and the true history of the artistic and technical knowledge displayed in the very early days here referred to are matters of peculiar interest. We are apt to suppose that the Greeks

invented almost everything that is excellent in the shape of artistic and architectural productions ; whereas it really appears that they were among the most successful of borrowers. We have been accustomed to suppose that the alphabet associated with his name was the invention of Cadmus ; but we now learn that it was only an adaptation of the older Phœnician, Egyptian, and other forms, the Phœnicians being successful borrowers from Egypt. Whether their marvellous series of structures were, in the early forms of art, invented by the Egyptians, or whether they only borrowed them from others, is at present a mystery. Mr. Trelawny Saunders being present, may I ask him to open the discussion ?

Mr. TRELAWNY SAUNDERS.—I feel somewhat taken aback at being called upon to commence this discussion, as I think it would have been more becoming in me to have taken a humbler share in to-night's proceedings. I am sure we must all deeply regret the absence of Dr. Porter on this occasion. The mere sight of that man would have been a matter of interest in itself. He is one who has contributed much to our knowledge, especially of the regions east of the Jordan, and of the Hauran and the Lebanon ; and he has also, from his profound knowledge of the Holy Land, been chosen as the latest editor of *Murray's Handbook of Palestine*. We regret not only his absence to-night, but also the distressing political circumstances that prevent his being here. I naturally feel some diffidence in taking up a subject that has been opened—and only opened—by so able a master ; because I cannot doubt that, had more time been afforded him, he would probably have expanded his lecture in the direction in which it will probably be led during this discussion. The paper, upon the whole, leads us to look upon the Phœnicians as if they were almost the prime movers in the civilisation of the world. Now, for my part,—although whatever I may think about the matter is of little importance,—I cannot help saying that this is not the view entertained by the greatest authorities among us. I may cite the opinion expressed in all sorts of ways by one whose name will certainly carry with it great, if not the greatest, weight,—I allude to Sir Henry Rawlinson, who says, in speaking of Babylonia, the Land of Shinar, that part of the earth's surface to which our attention is first directed after the Flood, that it is to Babylonia we must look for the real cradle of early civilisation. Those who have gone most deeply into the question of Egypt, which was at one time regarded from this point of view, have come to the conclusion, or at all events are drifting in the direction of such a conclusion, that Egypt derived her theology and religion, and her forms and ceremonies, from Assyria ; and, if I were disposed to move in any direction away from Assyria in regard to this point, it would certainly not be either westward or southward, but eastward. We have had great light thrown on all this class of subjects of late years by the Sacred Books of the East being translated and made accessible to those who have unfortunately limited their studies to the English language, and in that volume of those sacred books which relates to the Zoroastrian writings—the *Zend-Avesta*—there is a remarkable list of

the countries through which the migrations of man proceeded, prominence being given, in the first place, to the country eastward of the Land of Shinar. I think we may be the more inclined to look eastward, from the circumstance that the Bible itself, in speaking of the Land of Shinar, tells us that the people who came to occupy it came from the east. There are various points in the history of primitive peoples that tend in one direction. The early books of the Hindoos, which are among the oldest in the world, say that the people who settled in the country between the Sutlej and the Jumna came from the north-west. Here we have a very specific and distinct bearing, as distinct as the one relating to the Land of Shinar; and in the earliest of the Chinese books we are told that the people with whom we become acquainted for the first time on the banks of the Yellow River came from the west. Now, it is at least an understood matter that we should mark off on the globe these several bearings and see where they meet. It so happens that they meet exactly in that region pointed out by the *Zend-Avesta* as the first nest of mankind, from which man was driven by the snows. It is the Arianem Vaejo of the Vendidad, as distinguished from the Ariana of the present day. The Arianem Vaejo, or ancient Ariana, is the land of the Pamir which lies at the source of the Oxus, and where, at the present moment, the great races which divide the ancient world find their meeting-place. The Turanian and the Mongol, the Turk, the Hindoo, and the Iranian—all these people meet just at that great mountain-knot. But I find I am wandering off—as one finds it very difficult to refrain from doing when led away by so tempting a text as this. I will, therefore, endeavour to confine myself, as far as possible, to the remarks called for by this paper. We cannot fail to see that in tracing the origin of art and architecture we are, in fact, also tracing the origin of religion. The author of the paper says: "It is worthy of note that this ancient site"—speaking of Baal-bek—"bears the name to this day of the Phœnician sun-god, Baal. Baal-bek signifies 'City of Baal.'" Now, what does "Baal" signify? This, we are told a little further on, in page 7, signifies "Lord" or "Master," and we have to distinguish between "Baal" and "Bel"; and, although the latter word is frequently confused with the Assyrian deities, it signifies "to confound," and is identified with Kush, whose name is identical with "chaos," the father of Nimrod, who took a leading part in that confusion—that permanent and primitive confusion—the confusion of tongues, so that he may well be called "the confounder." Now, although Dr. Porter ascribes the plan of Solomon's Temple to the Phœnicians, nevertheless, when he seeks for examples with which he may compare the famous pillars, Jachin and Boaz, at the entrance to King Solomon's Temple, he draws the comparison, not with anything in Phœnicia, but with the pillars of the famous ruins of Persepolis, on the borders of Assyro-Babylonia. It is remarkable that no reference is made in this paper to the labours of a very distinguished man who has only recently gone to his account—Mr. James Fergusson. Mr. Fergusson drew a plan of Solomon's Temple, and he distinctly looks for the

primitive origin of the design to Assyria. The very word Cadmus, as is well known, has been referred to the East. It appears to me—in fact, I feel sure—that the great obstacle in the investigation of these ancient questions lies in the circumstance that we have to take the names from the Roman and Greek authorities, who were not content with the names as they found them, but who greatly complicated them by reducing them to forms appropriate to their own languages; so that, before we can really understand an Eastern or Oriental name found in Greek or Roman forms, we must first reduce it to its original form. There is little doubt that Cadmus really means Kedem—that is, the East. I may observe here that Dr. Porter differs from Mr. Ferguson with regard to the position of the great pillars, Jachin and Boaz, in King Solomon's Temple. Dr. Porter thinks they stood outside the porch, independently, whereas Mr. Ferguson made them the outer pillars of the porch itself. Another remark I should like to make is with reference to the great Brazen Sea or cistern, which was ten cubits in diameter, or not less than 17 ft. The Cup is a prominent feature in the religious mysteries of Assyria and of the East generally, and the nearer you approach Assyria the nearer do you approach the dominating religious influence which that country exercised over surrounding peoples. This cistern was of large dimensions; but there was another cistern of perhaps greater dimensions—the cistern of Semiramis—referred to by Pliny; and these cisterns are associated with the greatest mysteries of the religious systems of the East.* I believe they were connected with the mystery of regeneration—the mystery of baptism—the mystery of the new birth—the washing away of sin—and that this was the meaning of the great cistern which occupied so prominent a place in the temples of the Jews and in those of Babylonia. The allusion in the paper to “a purely spiritual faith” on the part of the Jews is, I think, scarcely supported by what the Bible tells us about that people. We are there told that the Jews were offered a purely spiritual faith, but they resolutely objected to it. I must not attempt to give you my interpretation of the passages in the Bible which I believe to reveal the origin of religion, nor must I attempt to take you through that book and show you how completely it unfolds very important steps in the degradations that have taken place in the history of religion from the time when Noah was in direct communion with God; when Abraham, going out of the land degraded by the religion set up by Nimrod, established no temple and no system of ministry in the land whither he went, but was brought again, like Noah, into direct communication with the representatives of the Almighty at the door of his tent. With the patriarchs Abraham, Isaac, and Jacob this condition of

* The use of the Laver in the Mosaic ritual is described in Exodus xxx. 18–21; xl. 30, 31. The figurative meaning of a cup in the Bible is denoted by Cruden in the complete editions of his Concordance. The symbolical significance of the *Cup* in the Chaldean, Greek, and Roman mysteries is elucidated by Hislop in his *Two Babylons*, 5th edition, pp. 77, 78, also pp. 7–10.

things terminated through the fickleness of Jacob, who gave up the land promised by his fathers for the material food which Egypt offered him, although that offer led him to abandon the substantial enjoyment of the soil he had held for three generations. I am sadly tempted to go on with this view of the subject, but I must proceed no further. I think, however we ought to understand that the Jews and the Phœnicians certainly belonged to different families of the human race. The Phœnicians, according to a variety of evidence—the early Christian Fathers among others—distinctly called themselves Canaanites, and they were Canaanites. Therefore they were not Shemites. There is a question as to Tarshish which I should like to touch upon ; but I have taken up a good deal of time, and the thing I would next deal with is the name and meaning of Astarte. [In the discussion I mentioned only one meaning of Astarte, but it will be more satisfactory to refer the reader for a fuller notice to Hislop's *Two Babylons*, Appendix, Note J, pp. 407-501. Partridge: London, 1873.] As to Phœnicia, I think we can speak of that country as the connecting link between Palestine and Greece, or between the East and West generally. I am not disposed to attribute to the Phœnicians any higher function than that of commerce. They were so engaged in commerce, shipping, and everything that belongs to money-making, that they had no consideration for anything of a higher character, and they appear to have been the greatest monopolists the world has ever known. I think there is great question as to Cyprus being the first place in which the Phœnicians and Greeks came into contact. That, however, is too large a subject to go into now. With regard to the reference made to Tiryns and Mycenæ, and the great Cyclopean buildings, I will give you the interpretation of the word "Cyclops," and how it carries the origin of the Cyclopean art of building back to Babylonia. The meaning of the word "Cyclops" is derived from "Khuk," signifying king, and "Lohb," signifying flame—which, together, mean King of the Fire-worshippers, or Nimrod (see Hislop, p. 374, note). There are other remarks I should have liked to add, but I feel that I have already taken up enough of your time, and will detain you no longer.

Captain FRANCIS PETRIE (Hon. Sec.).—Among the letters received from those unable to attend is one from Mr. E. A. W. Budge, of the British Museum, who kindly places at our service another translation of the inscription, alluded to in page 10;—a cast of the original inscription of King Eshmûnâzar II. may be seen in the Phœnician room in the Museum:—

"I am torn away before my time, a son of a few days, an orphan, the son of a widow. I lie in this chest in the grave which I have built. I adjure every royal person and man not to open this bed, and not to seek treasures, for there are no treasures here. Every royal person and man who shall open the chamber of this couch, or who shall carry away the chest of my couch, or who shall build over this bed, may they have no bed among the shades, may they not be buried in a grave, may they have neither son nor posterity to succeed them, and may the holy gods deliver them into the hands of a mighty king to rule over them."

Mr. W. ST. CHAD BOSCAWEN (F. R. Hist.-Soc.).—Dr. Porter's paper is an extremely interesting one. He has collected much matter on a subject of great importance, and he has very clearly set forth the position of the Phœnicians as having been the first missionaries of culture journeying from east to west, a people who not only bore art and art treasures to the occident, but who carried with them what is still more precious to us, namely, the alphabet we use at the present day. But I think the writer of the paper has hardly brought out with sufficient prominence the real position the Phœnicians occupied in the matters he has touched upon. They were the early intermediaries between east and west, and, in looking at the work they did, whether as shown in their inscriptions or their art productions, nothing is more remarkable than to realise how entirely void they were of the inventive faculty. Their works were mere adaptations. For example, let us take those beautiful bowls from Cyprus, and especially that from Præneste, to which the author refers. Any one studying Assyrian art will see that these bowls were very much like what he sees in so-called artistic products in this country, where you find a bit of Watteau with work of modern French art combined together. In fact, those works are simply a combination of the art of Egypt and Assyria joined together in the most bizarre manner. It is this wholesale borrowing that renders Phœnician art of so much value to us; and it is important to note that the place where this tendency is most strongly exhibited is the island of Cyprus, which occupied a very important position in the East in ancient times, and formed, as it were, a point of union between the three great human families—the three most constructive peoples of the human race, the Hamitic family in Egypt, the Semitic family in Assyria and Syria, and at later times the Greek, who mingled with the other two, each in touch with each and all, learning some new lessons of beauty and thought, which in after-time gave rise to that art which reached its zenith in the works of ancient Greece. There is a great difference between the art of the Phœnicians themselves and the art which they were the means of propagating. It is remarked by M. Perrot, in his excellent work on the art of Assyria, that its chief characteristic was bas-relief. The Assyrians, as we know, never attained to any degree of skill in sculpture in the round, and never even in their finest bas-reliefs represented the un-draped figure; and it was not until the art of Phœnicia was brought in contact with the art of Greece that the last remaining fragments of stone were cut away from the high reliefs which had gradually been coming more and more into prominence in the sculpture they produced. This may be said to be the principal factor which the Greeks in Cyprus contributed to the art which had been brought there by the Phœnicians and Egyptians. We have only to look at the Cyprus monuments in the British Museum, and at the collection which should be there but which is now in the Metropolitan Museum at New York, in order to see how the art of the three great empires of the East was mingled in the work produced in the island of Cyprus. Another point to which I would refer

is the connexion with and influence of the Phœnicians upon the Jewish people. I agree in much that Dr. Porter has said upon this subject, but there is a good deal as to which I differ from him. The Temple of Solomon was certainly of Phœnician architecture. There can be no doubt as to that. It was probably copied from existing Phœnician temples, but those temples were themselves merely copies of the temples of Chaldea. I may also state that the worship of Astoreth was likewise the worship of the Goddess Istar of Chaldea. In the construction of the Temple of Solomon we have an exactly similar arrangement to that of the oldest temples of Chaldea; and not only is the arrangement the same, but, as I pointed out a few weeks ago, the very names of the different parts of the temple are the same. The inner portion, or Holy of Holies, was called "Paraku," a word which finds an equivalent in the Hebrew פָּרֻקֶת, or the veiled portion.* So that, when we attribute the temple to Phœnician origin, we must remember that the Phœnicians and Assyrians themselves borrowed the design and arrangement from Chaldea. With regard to what is said about the gold work I will not go into that, because it would take up too much time, but I would refer to a point which Dr. Porter seems to have overlooked and that has reference to the two great pillars, Jachin and Boaz. I know that they have been subjects of considerable discussion, but I think their origin is clearly traceable in the stones or pillars we see standing in front of the Phœnician temples. I may here specially refer to the coins of Bylbus, where you see two pillars standing in front of the temple, and there is an inscription which Dr. Porter does not quote but which was discovered by M. Renan and published in his work on Phœnicia, and also, with careful corrections, in a later work on the inscriptions, wherein reference is made to the erection of columns in front of the temple and the making of a brazen altar. This is an inscription of much antiquity. I am not quite sure of the date, but I know it is older than the Eshmûnâzâr inscription, and is a most interesting commentary on the construction of the Temple of Solomon. Again, I cannot agree with Dr. Porter's explanation of the name of Baal-bek. We have no authority for saying that the word "Bek" means a city, and with regard to the word "Astarte," referred to by Mr. Saunders, I cannot quite accept his etymology. The word seems to have been clearly established by M. Ganneau, who has shown that in the old Semitic and Assyrian languages there was the root "satar," "to shine," from Istar, and Astarte, the Goddess of the night or the morning star, as they derived their names. With regard to the Phœnicians in Greece, that is a subject of great interest and one that has been greatly elucidated by the monuments discovered in Cyprus, and also by those of Mycenæ and Troy discovered by Dr. Schliemann. The monuments discovered at Troy are of great interest because of the negative evidence they may be said to give. I would refer you on this point to the discussion in the *Times* and other papers with regard to Dr. Schliemann's discoveries at

* פָּרֻקֶת, or veil.—J. L. P.

Troy and Mycenæ, there being in the latter case the clearest traces of Phœnician influence in the propagation of Grecian art, while we get no such traces at Troy. Any one looking at the gold plaques and cups, and especially at the remarkable seal discovered by Dr. Schliemann at Mycenæ, and comparing them with the ornamentation on the Assyrian robes and vases as well as with the Babylonian seals on which figures are cut with the same flounced dresses, represented in the same way as on the seal obtained by Dr. Schliemann, must feel convinced that they were the work of artists influenced by the art of Assyria, and are totally distinct from what some anonymous writer in the *Times* would have us suppose, namely, that they were the work of Celts from northern Europe. There is a similarity between these gold ornaments and the Chaldaic representations, and there is evidence that in both cases the designs are from the conventional forms derived from the great school of nature, to which all primitive artists turned for the means of decorating ornamental objects. If this be the case at Mycenæ, it is equally interesting to find that in the relics discovered at Troy there is hardly a trace of anything definitely Phœnician. This brings us to the writings of Homer, who speaks of Troy and of Phœnician art and of the Trojan intercourse with the Phœnicians. We know that Homer wrote probably about the tenth century B.C., after Troy had been destroyed, and he would seem to have gathered together the legends still current with regard to that city; but, although he does not appear to have been in Troy himself, he may have visited its site. If we turn to Cyprus and to Assyria, and look at the artistic remains which have come down to us of the early art of those places, we see exhibited on the bronze bowls from Nimroud, and on some of the objects discovered by Di Cesnola in Cyprus, as well as by Dr. Schliemann at Mycenæ, an art which ranged perhaps over a period of a century and a half—the art which Homer describes and which furnished him with the material for many of the graphic descriptions he gives of the works of Troy. Dr. Porter's paper, as will be generally admitted, is one which embraces a very wide area. It brings us in contact with Jewish history and with that of the great empires of the more distant East. There is one point which I think Dr. Porter might have mentioned in the beginning of his paper. He seems to have forgotten the very beautiful examples of Phœnician art we have in the tombs of Egypt, although he speaks of having visited them. Why, I ask, has he not made some reference to that remarkable procession of the Phœnicians in the time of Thotmes the Third, carrying various objects and works of art as presents to the King? We know, that so thoroughly had the Phœnicians settled themselves in Egypt, and become part and parcel of the people of Lower Egypt, that the district of the delta on which the Jewish people had dwelt during their captivity in Egypt was known by the name of *Keft aur*, or greater Phœnicia, while the land of Phœnicia itself, on the shores of the Mediterranean, was known by the name of *Kefti*; and it is in the contact which took place between these Phœnicians and the Jews in the regions of Zoan and in the land of Goshen that we may

trace the close connexion and brotherhood which always existed between the two. That brotherhood was, as has been very properly said, not a brotherhood of blood. The Phœnicians were certainly not a Semitic people; but, although their language and religion were Semitic, there certainly was a large Canaanitish element in their national life. These are but a few of the points on which I might touch in connexion with this paper. I repeat that I regard it as a most important paper, inasmuch as it has gathered together in a precise, simple, and straightforward manner all that Dr. Porter has been able to glean, and places before us in the form of an interesting *résumé* the main points in connexion with the subject. There is one other matter to which I would like to refer, and that is the translation he has given of the inscription on the sarcophagus of King Eshmonazer. He says, "King Eshmûnâzar said thus:—'I am carried away; the time of my non-existence has come; my spirit has disappeared,'" which is an expression of belief in the immortality of the soul; but this translation has been disputed, and by those who consider that the expression in question is not to be found upon the monument. The inscription was most carefully copied and published in a work by M. Renan, and has been very lately carefully examined by M. Ganneau and M. Renan, with the result that Eshmûnâzar said "he was the only son of his father." I think the paper is a great addition to the Transactions of the Society.

Mr. TRELAWNY SAUNDERS.—There is one correction which I think ought to be made in the paper. Dr. Porter says:—"It is a remarkable fact that the Jews and Phœnicians always dwelt together on friendly terms. With the other surrounding peoples the Jews were often at war; with the Phœnicians never." This is hardly the fact, for the Bible gives us a case in which the Jews and Phœnicians did quarrel. The narrative informs us that the tribe of Dan found themselves within limits that were too narrow for them, and they sent out an expedition to find some spot on which they could found a colony. The expedition came back, and reported that it had been as far as Laish, and found it occupied by the Zidonians, who dwelt carelessly, and the Danites sent six hundred men, who seized upon Laish and burnt it, and built on its site a city which they called the City of Dan (Judges xviii.).

Mr. J. D. CRACE.—I agree with Mr. Boscawen that the paper does summarise in a brief and interesting form a great deal of matter which not only affords room for further study, but which will be useful for reference from the way in which it brings together the various topics with which it deals. The field of discussion it opens up is so wide, that I have no doubt, if everybody belonging to the society and qualified to speak on the subject were present to-night, we might have a great variety of opinion, and probably some very interesting views differing from those already expressed. I beg very cordially to second the vote of thanks to Dr. Porter.

Dr. T. CHAPLIN.—I came here merely to listen and learn, and am hardly prepared to speak; and, as the hour is late, it would be unbecoming on my part to occupy much of your time. I would only, therefore, say, if I may

do so without any seeming want of respect to the author of the paper and those who have already spoken, that I think too little prominence has been given to the fact that the Temple at Jerusalem was in its general plan, as well as in its details, a copy or an enlargement of the Tabernacle in the Wilderness, and that the pattern of that Tabernacle was determined long before the Phœnicians were engaged in carrying out their work. I cannot help thinking that, if we put together the plan of an Egyptian temple and the plan of the Jewish Tabernacle in the Wilderness, or the Jewish Temple at Jerusalem, we shall discern a very close resemblance between them. In the first place, there was the large outer wall enclosing the sacred space, which corresponded in Jerusalem to what the Jews called "the Mountain of the House." Then, there was the entrance; and, leading up from that, a series of courts, more or less completely divided from each other, and increasing in sacredness as they proceeded, until at last the most sacred place of all was reached. There are many other matters in connexion with the paper on which it would be interesting to dilate; but I feel that it is too late to further occupy your attention.

Mr. CRACE.—May I say that, had I dwelt on the subject at all, I should have taken the same view as the last speaker. The point he has brought forward is precisely one of those that I had noted down as important and one not to be overlooked. There is no doubt that the Egyptian plan may be closely compared with the Temple plan, and it is to be noticed, not only that Solomon's Temple followed, to a great extent, the design of the Tabernacle in its original arrangement, but that it was a very natural thing that Solomon should have further followed the general plan of the Egyptian temple, inasmuch as his queen was the daughter of the King of Egypt. There can be little doubt that his contact with the Egyptians was constant, and of a kind likely to influence his architecture.

The CHAIRMAN.—In asking you to pass a vote of thanks to Dr. Porter for his interesting paper, I may say that the discussion has thrown great light on the suggestion that the Phœnicians were great borrowers themselves. It is also interesting to remember that there is nothing new under the sun, and that some of the greatest novelties are at least as old as the days of the Phœnicians.

The meeting was then adjourned.

THE AUTHOR'S REPLY.

I WISH here to express my thanks to Mr. Cadman Jones for his kindness in undertaking to read the foregoing paper in my unavoidable absence—an absence which I very much regretted. I have also to thank the speakers who were so good as to give their valuable criticisms, for the most part favourable. The able and learned remarks of Mr. Trelawny Saunders throw much additional light upon an interesting subject; and upon the whole I am glad now, after reading the discussion, to be able to say that one of my chief objects in writing has been served: it was, as I have stated, “to try to direct the attention of others, better qualified than I can pretend to be, to matters which, in my opinion, are of no small importance, especially for Biblical students.”

One or two of the points raised I wish very briefly to notice. Mr. Trelawny Saunders says: “The paper, upon the whole, leads us to look upon the Phœnicians as if they were almost the prime movers in the civilisation of the world.” This was not my idea. My purpose was to show that they were the propagators of the principles of ancient art and architecture. I have said that they were to a large extent devoid of the creative or inventive faculty (see p. 34). They adopted and improved upon what they saw. They borrowed freely “from both Egypt and Assyria” (p. 40), and then, by their wide commercial relations, they communicated what they had thus obtained to Greece and Europe.

I entirely agree with Mr. Trelawny Saunders that the original centre from which all real knowledge sprang was Chaldea, or Mesopotamia, and that from that centre it was carried eastward as well as westward. But the eastern development was, in my opinion, very different from the western. The former was largely speculative,—I might perhaps call it metaphysical,—as shown in the sacred books of India and China. The latter, on the other hand, was more practical, and this was propagated by the Phœnicians. It tended to develope architecture and art, more especially in their relation to what was useful and profitable.

When I say that the religion of the Jews was purely spiritual (p. 28), as distinguished from the gross materialism of heathen nations in general, I refer not to the popular religion of the Jews in old times, which was generally corrupt, but exclusively to the religion of the Bible, the pure Revelation of God, and I quote in proof the Divine command.

Mr. St. Chad Boscawen thinks it strange I did not refer to the examples of Phœnician art in the tombs of Egypt. My only reply is, my paper was a mere outline, from which I was compelled to exclude many other most

important details. For the same reason I did not mention the works of the late Mr. James Fergusson. His writings have been long known to me. After a very careful examination of his account of the Temple of Jerusalem on the spot, I was unable to agree with his views. But no man had a higher esteem for his learning, and what I might call his architectural genius, than I had.

The accuracy of my extract from the famous inscription upon the tomb of Eshmúnazar is questioned by Mr. Boscawen. I admit at once that the original Phœnician text was not before me when I wrote, but I copied the words inserted from the translation given by Dr. Julius Oppert in *Records of the Past*, vol. ix. p. 111; and he says: "Some forty different scholars have endeavoured to explain this important text. . . . Among the principal . . . we must mention Bargès, Munck, Schlottman, Schröder, and Kämpf." Then he adds: "The author has himself been the last to write upon and to explain some difficult passages." I thought myself justified in adopting his version.

In conclusion, I must say I feel deeply grateful for the additional hints and information I have received from a perusal of the discussion.

THE SEPULCHRAL CHAMBERS AND THE SARCOPHAGI OF SIDON.

THE account of the recent exploration of the above has most opportunely just come to hand (July, 1887), and its insertion here, following as it does Dr. Porter's paper on Jewish, Phœnician, and Early Greek art, seems very appropriate :—

“ The Committee of the Palestine Exploration Fund have received from Herr Gottlieb Schumacher, of Haifa, a brief and preliminary account of the examination held by his Excellency Hamdi Bey, Director of the Museum of Constantinople, of this magnificent find, most of which is now on its way to the Imperial Museum. Herr Schumacher (the *Times* says) was instructed to accompany and assist Hamdi Bey, but was, of course, unable to write any report upon the work so long as the outside world were not admitted to the works. The French missionaries of Sidon and others have, however, now been permitted to examine and describe the chambers and their contents, which have thus become, so to speak, public property. Herr Schumacher sends a printed description of the tombs by Père E. Nourrit, of Sidon, together with notes of his own, and he promises photographs and drawings at an early date. Until these arrive it is well to refrain from detailed descriptions at second-hand. Suffice it to say that the first letter on the subject from Dr. William Wright, of the Bible Society, published in the *Times* three months ago, glowing and full of promise though it seemed, is now shown to have fallen short of the actual reality. We have here a ‘find’ of Phœnician, Lycian, and Greek art which appears to be unequalled and unrivalled. The facts as put before the readers of the *Times* being confirmed by recent accounts, it is only necessary, pending the arrival of the photographs and drawings, to sum up the results of Hamdi Bey's examinations.

1. The chamber on the eastern side of the square excavation (which is truly orientated) contained two sarcophagi in white marble. One of these is perfectly plain, and the other is ornamented with sculptures of the richest and most beautiful kind. This is the chamber which is surrounded by an arcade adorned with eighteen mourning figures in relief, dressed in Greek costume, each in a different pose. It is not stated whether the arcade itself or any portion of it has been removed.

2. The south chamber had two sarcophagi, one in black marble, plain, and the other in white with splendid sculptures.

3. The western chamber had one sarcophagus in white, mummy-shaped. But this chamber proved to be the vestibule to another containing four sarcophagi, one of which was the richest and finest of all those found. The walls of this chamber also are richly decorated.

4. The chamber on the north has two plain mummy-shaped sarcophagi. On removing the *débris* which covered the ground two other chambers were found, one on each side, on a lower level. One of these contained a small tomb; the other, four white marble sarcophagi.

Under the eastern chamber also was found another containing a sarcophagus of black stone, in which were the teeth, bones, and hair of a woman.

All these tombs had been violated by breaking a corner of the coffin-lid. But in carrying out the works for the removal of the sarcophagi a chamber was found in which at first nothing was remarked but two fine bronze candelabra, each about five feet in height. The flooring of this chamber, however, on examination, proved to consist of a bed of great stones laid with the utmost care. Beneath these was a second bed of stones and then

a third, and under all, thus carefully covered up and hidden away, a great monolith covering an opening in the rock. In this deep chamber was found a splendid sarcophagus in black stone, resembling that of the King Eshmunazar, in the Louvre. It was also, which is more important, provided with an inscription in Phœnician, eight lines in length.

The inscription has not yet reached us. In the *Badeir* (published once a week at Beyrout in French and Arabic) a translation is proposed, which is copied for what it is worth. Probably considerable modifications will be made in it when the inscription is in the hands of scholars:—

‘I, Talnite, Priest of Astarte and King of Sidon, son of Eshmunazar, Priest of Astarte and King of Sidon, lying in this tomb, say: “Come not to open my tomb; there is here neither gold nor silver nor treasure. He who will open this tomb shall have no prosperity under the sun, and shall not find repose in the grave.’

There seems to have been little else of importance found in these chambers; some gold buttons, a coin or two, collars, rings, and bracelets, two bronze candelabra, and some terra-cotta lamps exhaust the list so far as can at present be learned. Something however will, doubtless, have to be added, and it is meanwhile interesting to note that his Excellency Hamdi Bey proposes to recommence operations in the early spring of next year.”

ORDINARY MEETING, JANUARY 3, 1887.

A. McARTHUR, ESQ., M.P., V.P., IN THE CHAIR.

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

MEMBERS:—His Excellency Sir F. A. Weld, G.C.M.G., Singapore; D. Biddle, Esq., M.R.C.S.E., England; J. B. Braithwaite, Esq., England; Rev. President A. W. Cowles, D.D., United States; Josias Howard, Esq., South Africa; Leslie A. Norman, Esq., New Zealand; Professor T. Otis Paine, LL.D., United States; Gerard Smith, Esq., M.R.C.S.E., London.

LIFE ASSOCIATE:—Rev. E. J. Penford, Kent.

ASSOCIATES:—The Right Rev. Bishop Thompson, D.D., United States; the Right Rev. Bishop Hare, D.D., Dakota; the Very Rev. Dean Gott, D.D., Worcester; E. Bourdillon, Esq., C.E., South Africa; Rev. H. Brancker, M.A. Oxon., Wimbledon; E. E. Cornaby, Esq., London; C. M. Cresson, Esq., LL.D., United States; Rev. S. W. Duffield, B.A. Yale, United States; Ven. Archdeacon P. P. Fogg, M.A. George, South Africa; Rev. G. Grenfell, Congo; Rev. J. A. Harris, D.D. Pen., United States; Rev. W. Harrison, Canada; Purl Lord, Esq., United States; Rev. Professor A. Mangum, A.M., D.D., United States; Rev. G. H. Muzy, New South Wales; Rev. Professor H. S. Osborn, LL.D., United States; Rev. C. J. Ridgeway, M.A. Camb., London; Rev. J. S. Shields, D.D., T.C.D., Blackheath; Rev. W. Tucker, D.D., United States; Professor J. N. Vail, United States; Rev. L. B. Wolff, India.

HONORARY CORRESPONDING MEMBER:—Rev. J. L. Challis, M.A., Stone, Aylesbury.

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

Proceedings of the Royal Society.	<i>From the same.</i>
” ” Dublin Society.	”
” Colonial Institute.	”
” Royal Institution.	”
” ” Geographical Society.	”
” ” United Service Institution.	”
” Geological Society.	”
” Royal Society of Canada.	”
” Canadian Institute.	”
” United States Geological Survey.	”
” ” Geographical Survey.	”
” American Geographical Society.	”
” ” Philosophical Society.	”
” Newport Natural History Society.	”

The Life of the Earl Shaftesbury.

American Antiquarian. Rev. Stephen D. Peet.

The following paper was then read by the author:—

THE EMPIRE OF THE HITTITES. By the REV. WILLIAM WRIGHT, D.D.

ONLY a few years ago the Ancient Empires of the world were all arranged in beautiful order. Like a piece of perfect mosaic, skilfully fitted and compactly welded together, they filled the whole historic area. The work was not the mere result of a fortuitous concurrence of historical atoms, but the deliberate finding of thousands of honest labourers who had explored alike the broad fields and byways of secular history. Historians differed as to detail, but they were generally agreed as to the existence and sequence, trend and bearing, of the world's ancient empires. Successive investigators added new facts, and re-set old facts in local colours. They followed, however, the established and recognised order of things, but their historical landscapes were brilliant restorations of the ancient masters. Ancient history, generally, was in a most satisfactory condition. The historians were a happy family, and the students of history, having learned their facts, knew exactly where they were. It would be an ungrateful work to unsettle this harmony and certainty, but this task has been unceremoniously accomplished by the Hittites. The Hittites were always disposed to hold their own, and by sudden forays over their borders saved themselves from the

social stigma of being ignored. They seem also to have been in the habit of making themselves known at the most inconvenient seasons. They pressed down on Egypt, when weak and distracted, and carried devastation throughout Assyria; but perhaps on no occasion was their presence so unwelcome, not even to the weary Syrians, who fled from the siege of Samaria when they heard that the Hittites were coming, as it was to the historians and students of Europe when they learned that the Hittites claimed a large and abiding place among the great monarchies and empires of the world.

It was exasperating to think that the historic mosaic, put together with such infinite labour, and touched into perfect consistency by so many artistic hands, should have to be broken up for a horde of barbarians who had no record in classic story. It was intolerable, too, when we thought we had left the schools and finished our education, to be told we must unlearn our history and begin again at the beginning.

Our historians had not overlooked any of the sources of secular history. The Phœnician records of Sanchoniathon handed down by Philo of Byblius, and Porphyrius, as well as the fragments of Manetho's Egyptian history, had been read in the pages of Eusebius. Scraps and fragments from Ctesias, regarding the Syrian monarchy, had been studied in Photius and Diodorus Siculus. Dion Cassius, Polybius, Josephus, Herodotus, and all the other secular chroniclers of the early past, had been searched and sifted, and every grain of fact had been separated from the chaff of tradition and surmise, and safely garnered.

In the patient and laborious collection of facts, with a view to the building up of history, the Bible was ignored. That unique volume, made up of the literature of a unique people, contained history, poetry, rhapsody, legislation, civil and ecclesiastic,—in fact, the national history of an ancient nation. The book professed to be divine, but it was very human. It mirrored the people of Israel, for whom it was written, in the common details of their lowly lives, and in their relation to the people who lay around them. It assumed to be true, and in its narration of facts the language bore the stamp of self-evidencing simplicity. It referred incidentally to a great people (התים or בני הת) called Hittites, who moved on parallel lines with Israel from the time of the patriarch Abraham till the final captivity.

When the Semitic tribe, with Abram at their head, migrated from Haran to Canaan, the Hittites inhabited the land (Genesis xv. 20), and fifty years later Abraham, a

stranger and a wandering Sheikh, purchased a grave for his wife from the Hittites, who were then in possession and power at Hebron. The completion of the bargain involved the earliest money transaction on record, and the earliest recognised form of sale and conveyancing (Genesis xxiii. 4). The magnanimous sentiments and polished courtesy, under cover of which the Hittites secured a high price for a useless cave in a useless field, as well as the use of "money current with the merchant," mark them as a mercantile community in an advanced state of civilisation.

The family of the patriarch and the Hittites continued to live side by side. The currents of their lives flowed in parallel channels, and Esau, the grandson of Abraham, chose for himself two Hittite wives, who "were a grief of mind unto Isaac and Rebekah" (Genesis xxvi. 35). Later the Hittites opposed Joshua as he entered the promised land, and the serried lines of Hittite chariots were scattered in confusion by the Israelites in the decisive battle of LAKE MEROM. Later still, Hittite captains marshalled and led the hosts of David and Solomon, and Hittite women were prominent in the harems of the same renowned monarchs. King David pushed his conquests and extended his border in the land of the Hittites, and Solomon supplied them with commodities from Egypt in their time of need, and in the time of Jehoram, Benhadad, of Damascus, fled headlong from Samaria with his Syrian hosts for fear of "the kings of the Hittites." Besides these and similar incidental references to the Hittites in the Bible, their geographical position generally was indicated in the time of Joshua as being—"From the wilderness and this Lebanon even unto the great river, the river Euphrates, all the land of the Hittites" (Joshua i. 4).

Had these references been found in any ancient secular book, even among the shreds and fragments of the shady Sanchoniathon, they would have been hailed as historical, and the empire of the Hittites would long since have occupied a recognised place among the great empires of antiquity.

The references, however, were worked into the texture of the Bible, and they were therefore ignored; not indeed altogether ignored, for while Biblical critics in Germany accounted for the most important of them on the theory of "interpolation," English Biblical Critics went further still, and pronounced them "unhistorical." To the thoughtful it seemed strange that an ancient people should interpolate unhistorical statements into their sacred books without sufficient cause, but to the critics it seemed scientific simply to say they had done so.

On this question the common spade has achieved signal

success. That rough, impartial instrument has turned up inscribed bricks of Babylon, and laid bare important hieroglyphics in Egypt, to stop the mouths of those who prated of the "interpolations" and "unhistorical" statements of the Bible. It is no longer necessary to deal with this subject in an *à priori* fashion, to urge the unlikelihood of the Israelites falsifying, out of pure wantonness, their holy writings, which they preserved with more than superstitious reverence, or to dwell on the superhuman act of genius implied in the invention, the creation, of the Bible story of the Hittites. Thanks to our trusty friend, the spade, we are now in a position to confront ingenious theories and bold assertions by hard concrete facts, and those "who believe not Moses and the prophets must be confounded by bricks and stones."

Assyriologists, including Rawlinson, Hinks, Oppert, Boscawen, Pinches, Sayce, and others, have read for us the Assyrian inscriptions; and these inscriptions reveal to us the Hittites as a warlike and aggressive people as early as the time of Abraham. They also inform us that the Israelites were carried into captivity in 721 B.C., and that the Hittites were completely crushed at Carchemish four years later (717 B.C.).

Egyptologists, among whom we might mention Birch, Renouf, Goodwin, Maspero, Mariette, and Brugsch, have deciphered for us the Egyptian hieroglyphics; and in their ancient records we find the kings of the Hittites rivals of the Pharaohs, in peace and war, from the twelfth to the twentieth dynasty. As soon as the key was found to the long silent records of Egypt and Assyria, the veil began to lift off dark continents of history, and the forgotten but mighty Hittite people began to emerge. They appeared chiefly as a martial people, in constant conflict with the great monarchies on their borders; but in almost every respect they correspond to the Hittites of the Bible. The explorer and the decipherer have been pressing on in their discoveries with marvellous energy, and the increasing light from Egypt and Assyria reveal to us, in broad outline and in incidental detail, a series of facts regarding the Hittites, in striking harmony with the narratives of the Bible.

In their existence in the south, and gradual withdrawal northward; in their manner of warfare and use of chariots; in their advance in civilisation and literary propensities; in the facts of their supplying wives to the Pharaohs of Egypt and the kings of Israel, and their reception of necessary supplies from the monarchs of both countries; in the use of the phrase "kings of the Hittites," common to the Hebrew Scriptures and the Assyrian inscriptions,—in these, and other

points which I have dealt with elsewhere, we see the inscriptions and the Bible in harmonious accord, not merely by fortuitous coincidence, but as faithful records of historic facts. So much is now admitted by all who are capable of appreciating the value of the evidence available on the subject. On one important point the spade has failed to support directly and fully the Bible narrative. It might have been supposed that an ancient document which was found in harmony with the inscriptions in ninety-nine cases might have received the credit of being historical in the hundredth case, where the inscriptions were partially silent. At least, accuracy in ninety-nine cases, capable of scientific statement, might be supposed to create a presumption in favour of the hundredth case, where there are few traces of evidence one way or another. The statement in question is the important transaction between Abraham and the Hittites, at Hebron, and the objections which were once directed against various passages are now concentrated on this one incident. It is satisfactory to find that the documents which tell us most about the Hittites are generally admitted to speak with historical accuracy in all their references to that people, with one exception. Let us look briefly at the reasons urged for withholding belief in the truthfulness of the narrative referred to.

It is urged that the Hittites could not have been settled in Southern Palestine because there are few direct references to their southern settlements in the inscriptions. To this I reply, that the absence of evidence is not evidence. The Egyptians marched up the coast of Syria, and turned inland to Megiddo and Kadesh, where they met the Hittites. The inscriptions are full of the doings of the Hittites at Megiddo and Kadesh, because the Egyptians went thither. They have nothing to say of the Hittites of Hebron, because the Egyptians did not go thither. The inscriptions are records of what happened during campaigns in which Egypt must have made great sacrifices. The fact that they do not refer to towns and colonies which lay beyond their scope does not prove that those towns and colonies did not exist. Following, therefore, the strict rules of evidence, there is no sufficient ground for rejecting the story regarding the Hittites at Hebron. I think, however, we are not without positive grounds for believing the story to be true. It is embellished with all the formal details which go to make up the framework of a keen Oriental bargain, and thus bears on its face the semblance of truth.

At a very early period the aggressive Hittites, according to the Assyrian tablets, made war on the Accadians. The

Hittites were dependent on Egypt for many of their supplies, and it is a matter of history that all strong nations push out their surplus and enterprising population along the highways of their commerce. It was thus that Phœnicia planted her colonies and stations wherever the current of commerce carried her merchants ; and it is thus England, France, Germany, and other peoples plant their colonial stations and outposts at the present day. There is no difficulty in believing that the powerful, aggressive, and warlike Hittites should have swarmed over their southern as over their south-eastern border, and that they should have planted stations in Southern Palestine. Nor are we left to supposition on this point: It was the encroachment of the northern barbarians on the borders of Egypt that roused Thothmes the First to drive back the invaders, and, in doing so, he began his first war against the Hittites and their allies ; and that war was carried on for nearly 500 years. At that time the Hittites and their king were in Palestine ; and Brugsch tells us that there are records, dating from the time of the First Pharaoh of the Twelfth Dynasty, referring to the destruction of Hittite towns and palaces on the border of Egypt. Mariette goes even further, and declares that one of the early Egyptian dynasties was Hittite.

The peaceful character of the transaction between Abraham and the Hittites at Hebron has been seriously urged against the genuineness of the story. This objection does not rest on a profound view of things ; it assumes that a warlike people are incapable of engaging with courtesy in a peaceful transaction. I am inclined to think that the very objection is a proof of incapacity to look at a Bible statement with ordinary reasonableness. As a matter of fact, however, the Egyptian inscriptions give us glimpses of the Hittites engaged in peaceful social and domestic transactions ; and it may be safely assumed that the Hittites could not have withstood, for a thousand years, the shocks of war from Babylon, Egypt, and Assyria, if they had not been industrious and enterprising in times of peace.

The point, however, which has been most strongly urged is the difference between the Hittite names on the inscriptions and those mentioned in Genesis. The Hittite names in the Bible are all either Semitic or Semiticised, while five-sixths of the Hittite names of the North preserved in the inscriptions are supposed to be non-Semitic. The stumbling-block is the Semitic form of the names of the Southern Hittites.

In reply to this objection, I remark—first: It would be rash to assume for certain that the Hittites were non-Semitic.

The weight of evidence seems to point in that direction; but, when we remember that Renan declared the proper names on the Assyrian inscriptions to be clearly non-Semitic as late as 1855,* we should abstain from dogmatising where we do not know. The most probable explanation is that the Hittites, like modern missionaries and merchants, learned the language of the people among whom they lived. And, if a missionary can learn the Arabic language in two or three years, so as to think and speak fluently in that language, observing the niceties of inflection and forms of courtesy, I fail to see any reason for believing that the Hittites would not make the Canaanitish language their own in as many hundred years. Afghans and Armenians pick up the language of Syria in a few months after their arrival in that land, and their children in the first generation, in name, in language, and in looks, are, to all intents, Syrians. Besides all these considerations, we must remember that the Hittite names in the Bible come to us in a Hebrew dress, and were first written for the use of Hebrews. With these considerations before us, I think we can have no hesitation in accepting as authentic the story of the Hittites in the Book of Genesis.

The Khatti of the Assyrian inscriptions, the Kheta of the Egyptians, and the חֵתִים of the Bible are thus one and the same people, known to the Authorised Version as Hittites. The claim, therefore, of the Hittite empire to recognition rests on threefold history.

Admitting the concurrent testimony of the Bible, and the inscriptions to be true regarding the Hittites, would it not seem strange that they should disappear, and leave behind them no trace of their existence? The Hittites were surrounded by such literary peoples as the Assyrians, the Egyptians, and the Phœnicians. Their relations with Assyria must have been extensive, and they could not have been ignorant of the Assyrian libraries and public monuments. Hittites who visited Egypt, either as captives or merchants, would see on the Egyptian temples great pictures representing their countrymen as vanquished, and long, boastful records of the Egyptian victories over them. It is hardly conceivable that a brave and patriotic people like the Hittites would, century after century, continue to hold the Egyptians and Assyrians at bay, without having some records or monuments of their own to match those of their enemies. Nothing less

* *Lang. Semit.*, 1855, p. 56.

than the absence of a written language would sufficiently account for such an omission on their part.

We know, however, that the Hittites had a written language, and that they were a literary people. The offensive and defensive alliance between the Hittites and Egyptians which Kheta-Sira took with him to Egypt was written in the language of the Hittites on a silver tablet. The version of the treaty, inscribed on the temples of Egypt, is a mere translation from the Hittite original. So fully do the Egyptian inscriptions recognise the literary attainments of the Hittites, that they contain a contemptuous reference to their writing propensities. The facts being such, it seemed to me only reasonable to look out for Hittite remains in the "land of the Hittites."

With this object in view, I started from Damascus, on the 10th of November, 1872, to secure the wonderful inscriptions which Burckhardt had seen in Hamah sixty years before. Our adventures in saving the inscriptions, and making casts of them, are fully recorded elsewhere, and I need only add that before leaving Hamah I wrote a long account of the inscriptions, which I forwarded from Damascus to the Palestine Exploration Fund.

The first part of my paper, consisting of simple description, appeared in the quarterly journal of the P. E. F. for April, 1873. The second half of my paper, under the heading—

"THE HAMAH INSCRIPTIONS: HITTITE REMAINS,"

after lying for a time at the office of the *Athenæum* unappreciated, was finally printed by my friend, Dr. Oswald Dykes, in the *British and Foreign Evangelical Review*, of January, 1874.

I claim no credit beyond the exercise of a little common sense for suggesting that the Hamah inscriptions were Hittite remains. The Cuneiform inscriptions were called Assyrian before Grotfend made the happy guess that led to their decipherment. The hieroglyphics were called Egyptian long before Champollion, or Thomas Young, or Dr. Birch began to unravel the mysteries of the Rosetta Stone; and it does not seem a violent supposition that the remarkable inscriptions in the land of the Hittites, may have been produced by the warlike, but cultured, people who once inhabited that land. Indeed, I should not have dwelt on this point but for the fact that my very obvious hypothesis was received at first, like Holman Hunt's scape-goat, as some kind of joke, or, as Captain Burton expressed it in Drake's life—"magno cum risu."

Professor Sayce and Dr. Isaac Taylor came subsequently to the conclusion at which I had arrived, but by quite a different route. They believed that the Lycian, Carian, and Cappadocian alphabets, as well as the Cypriote Syllabics, were derived from a common stock, which must have been in use before the introduction of the Phœnician or Greek alphabets. George Smith declared that "the real connexion between the traditions of Babylonia and Palestine would never be cleared up until the literature of the Syrian population, which intervened, was cleared up." These eminent scholars came to attribute the Hamah and kindred inscriptions to the Hittites in much the same way as astronomers have sometimes been led to the discovery of a new planet, by the existence of certain phenomena which could only be accounted for by the presence of some commanding influence. The commanding influence was the Hittite, the central stock of which the Cypriote and the mysterious scrips of Asia Minor are branches.

In my article, written at the close of 1872, I ventured to predict that the Hamah inscriptions would prove the first fruits of a rich harvest to be gleaned by the intelligent and industrious antiquary. Few predictions have been so signally fulfilled. In the first edition of my book,* published in 1884, I was able to give eighteen plates of inscriptions. In the second edition the number rose to twenty-seven. The number is constantly on the increase, and even since I began to write this paper, Professor Enting, of Strasburg, has sent me copies of new inscriptions, and Dr. Hayes Ward sends me a copy of *Scribner's Magazine*, in which he publishes two new inscriptions.

Inscriptions of the same character, with variations, are now found throughout the length and breadth of Asia Minor, and Northern Syria, from Hamah on the Orontes to Eyuk by the Halys, and from Carchemish on the Euphrates to the Euxine and the Ægean. Professor Sayce, Sir Charles Wilson, Canon Tristram, Dr. Hayes Ward, and other scholars, have testified to the wealth of Hittite sculptures and inscriptions, which abound throughout Asia Minor.

That more inscriptions have not yet been found between Kadesh and Carchemish need not surprise any one. The country has not been carefully explored. The destroying Scythians swept the land of the Hittites. The Seleucidæ, with their mania for building and re-building, occupied the land. The Romans succeeded the Greeks, and they, too, pulled down

* *The Empire of the Hittites.* Nisbet & Co.

to build up. The Moslems drove out the Byzantines; and barbarous hoards of Crusaders captured and sacked most of the towns on the Orontes plains. For several centuries the Turk, like the genius of destruction, has been fulfilling his destiny by turning the fertile plains of Syria into barren wastes, and her splendid cities and temples into heaps and mounds. The spoilers have been in the land of the Hittites for over 2,500 years, and it need not cause wonder if most of the Hittite inscriptions and sculptures have disappeared. The records of the past, however, are not all irretrievably lost. The scores and scores of enormous mounds that dot the plains of Hittite land preserve their treasures safely from the destroyer, and when the obstinacy of the Turk has been removed, and our own indifference succeeded by intelligent enterprise, the lost past shall live again, and the dead millenniums shall tell us all their story.

The legend of Memnon, son of the morning, the leader of the Keteians, is now intelligible. The Assyrians of Ctesias and Diodorus Siculus, who took part in the closing scenes at Troy, seem to be none other than the Hittites; and this hypothesis is rendered still more probable by the presence of Dardanians and Mysians at the Battle of Kadesh.

The numerous peoples who fought under Kheta-Sira, whether as tributaries or allies, obeyed a voice that claimed a right to command, and this explains the mystery of Hittite resistance for so many centuries. The shocks of Egyptian and Assyrian invasion exhausted themselves against the frontier capitals of Kadesh and Carchemish, but the mighty empire of the Hittites extended beyond, on the broad plains and highlands of Asia Minor; and so there were always fresh Hittite armies, and abundant Hittite wealth, to enable the empire to withstand the assaults of its enemies for a thousand years.

I must not prolong this paper by subsidiary questions, such as the origin of the Hittites, the origin of the script now associated with their name, the decipherment of the inscriptions, and other similar questions which would require special treatment and considerable space and time. My object has been to summarise in broad outline the more prominent and generally received facts regarding the great empire now claiming recognition. In arranging my facts I have claimed for the Hebrew Scriptures no higher authority than would naturally attach to the ancient writings of a historic people. But I think it must be admitted that in standing the test of scientific treatment these Scriptures assert their claim to be not only true, but divine.

The CHAIRMAN (A. McArthur, Esq., M.P.).—I have to congratulate the Institute on so large an attendance on such an unfavourable night, and I am sure that all present will cordially join in returning a vote of thanks to Dr. Wright for his very able paper. It is now open for any present to offer remarks upon the subject dealt with.

Mr. H. DUNNING MACLEOD.—May I ask Dr. Wright how far he considers the Hittite empire of which he speaks to have extended towards the west? Does he consider it to have included Troy?

Rev. Dr. WRIGHT.—Yes. The remains are found as far as Smyrna and ancient Ephesus; in fact, to use the language of Dr. Isaac Taylor, as far as the *Ægean*.

Rev. Dr. WRIGHT.—I may be allowed to express my pleasure at seeing M. de Lacouperie here; because it so happened that after I had finished my paper I came upon an article written by him which was of the greatest interest to me, and one of which I should have taken notice in my paper if I had had time to do so. In that article he gives an account of the Kushites, and I hope we shall hear more from him upon that subject. He also makes a suggestion which I trust will receive due attention,—after referring to the manner in which the Kushites spread over the country, he says: “Those who ascended the Euphrates carried their rude art of writing, half phonetic half pictorial, to the north of Palestine, where it became the Hittite writing; and from hence they advanced along the Mediterranean shores of Asia Minor, founding those establishments, colonies, and that trade which came by inheritance to the Carians and to the Phœnicians.” He then gives this suggestion in a foot-note:—“There are strong reasons to believe that the Babylonian and Egyptian writing have sprung from a former system.” If this be proved it will reconcile many things that are now opposite. “They have many symbols in common, with similar phonetic values, which are not loan signs. A list of such signs was begun by Professor Hommel and by myself, independently, and requires only to be extended for being published. Professor Hommel thinks that the Egyptian writing was derived from that of Babylon, and says that he can put forward some facts in support of this view. For my part I find that there are cogent reasons to believe that both writings have come from an older system, which has also produced the Hittite hieroglyphics and the pictorial figures and symbols which were preserved on the black stone of Susa, the born stones of Babylonia, and also preserved in some later symbols which may be the relics of the older system in that region.” This, to my mind, presents an extremely interesting field for investigation. I ought to add that this article appears in the second number of a new magazine called *The Babylonian and Oriental Record*.

Mr. W. ST. CHAD BOSCAWEN, F.R. Hist. Soc.—Perhaps, as the subject is one in which I personally take great interest, I may be allowed to say a few words upon it. Dr. Wright has, I must say, given us a very excellent *résumé* of the progress that has been made in relation to

the Biblical side with which he has dealt chiefly, and there are one or two points in his able paper on which I should like to speak. With regard to the pre-eminence of the Hittites in Southern Palestine at the time of Abraham, I see nothing in that contrary to the historical evidence, as far as we are able to follow it; and I think I may be able to add something to prove that the migration of Abram and the entry of that patriarch and his family into Palestine must have been between the years 2250 and 2100: for if we look at the history of Egypt at that period, we find that he went into Egypt at the time the Shepherd Kings were ruling in that country. M. Mariette, who did so much in connexion with the work at Zoan, pointed out the peculiar character of many of the art-remains found there,—a character particularly noticeable in the statues of great personages, and also in the figures of lions and sphynxes. The work was totally different from the Egyptian work, and this difference was specially noticeable in the treatment of the hair. In the year 1880, I visited the ruins of the city of Carchemish on the banks of the Euphrates, and I there saw some sculptures uncovered, which I am sorry to say were not brought to this country, nor do I think they will be for some time to come, under existing circumstances; but they were very peculiar in their artistic workmanship, and one of the most remarkable of their peculiarities was to be noticed in the figure of a lion, on the back of which were two personages, evidently divinities, represented as standing. The treatment of the mane of that lion was exactly the same as that of the hair in the Hyksos sphynxes found at Zoan. I think there are not wanting many facts to show the presence of the Hittites in considerable force in Egypt, at the time of the Hyksos invasion. There is one fact which seems to me very much to strengthen this assumption, it is that the wars of vengeance which Thothmes in the XVIIIth dynasty, and Rameses in the XIXth carried on, were entirely directed against those people. There is, I think, another point which meets the principal objection made with regard to the names of the persons mentioned in that important chapter in the Book of Genesis being Semitic. It is evident, from an examination of the Hittite sculptures, and of the sculptures of Egypt illustrating the wars against the Hittites, as well as the Assyrian sculptures representing the wars against the same people, that the Hittites were not a homogeneous race. They were rather a mass of tribes confederated together for one common object—opposition to the invaders, either from the east or from the south, who swept the fertile plains of Northern Syria. Knowing the enterprising character the Semites have ever exhibited, we cannot doubt that some members of that family must have settled among them; and if they did settle, we may be almost sure they would have brought into practice that chief characteristic of their race, the custom of trading with other people. We know that among the earliest traders in Chaldea, as far as the monuments already discovered show, were Semites, and with one exception, the earliest Semitic vernacular is derived from Chaldean documents, dating from the time to which we must assign the migration of Abram. This being so, it ought not to

be unreasonable to suppose that the settlement of Hebron was not intended so much to form a powerful garrison as probably a colonisation on the part of a body of men who had acquired some little property, and who regarded Hebron as an important centre to occupy, with a view to making it a station to which the trade of the south and from the regions around could be directed. There is another matter on which I should also like to speak, because I have travelled through most of that country myself, from the south of Antioch, to the highest ranges of mountains about Marash, and along the banks of the Euphrates as far as Dier, and I can fully endorse what Dr. Wright has stated with regard to the rich field which there awaits the explorer. The district literally bristles with mounds, which only require the spade to restore monuments of the greatest importance. There is something very remarkable about the character of these mounds. The slightest inspection of them from an elevated position shows that they are not of natural formation. It is clear that they are not only the work of man, but that they were evidently marked out by him for various purposes,—some as sites for forts, some for small cities, and some for large cities, while they are so arranged that no one mound is out of sight of another; so that it is perfectly possible,—indeed, I tried it myself on my return journey from the Euphrates,—to keep up, by means of these mounds, a chain of communication from Aleppo to the Euphrates, and from Aleppo to the Orontes, valley whereby, in the event of an attack being made or an invasion threatened along the Orontes valley, it would be possible to signal the news of the enemy's advance by means of beacon fires, or in some such way, with great rapidity over a district some two hundred miles in extent. I mentioned this to a gentleman who was travelling in that country at the same time,—I allude to Colonel, then Captain, Chermiside,—and he said he had noticed the same thing on the plain of Adana. "As soon," he said, "as you get into the plain of Adana you find the same range of mounds, and this also is the case on other plains more in the heart of Asia Minor." Sir Charles Wilson noticed the fact, that wherever inscriptions in the peculiar Hittite character were found, there were, in the same neighbourhood, silver mines; the whole of the Taurus and the Ante-Taurus were full of old and disused silver mines, and it was a singular fact that whenever an inscription was found on the rocks it was in the neighbourhood of a silver mine. If we turn to the tribute lists of Egypt and Assyria we find that the chief objects of the tributes offered by those people were of silver, and as a still more striking example of this, we see that the treaty with the king was engraved on a silver plate. Another fact which will lead me to a more important matter is this, namely, that in the posts known as the Cilician Gates, inscriptions were found showing that bodies of traders belonging to these people were in the habit of passing through. If you will look at the map of Asia Minor, and take Carchemish as the starting-point, you will see a series of stations where explorers have found remains, either of monuments or inscriptions on the rocks, in the

curious Hittite characters, which show very clearly that there was a direct roadway from Carchemish to the neighbourhood of Smyrna. Mr. Malceod has asked whether there was any connexion between the site of Troy and the Hittites. That is a question which it would at present be premature definitely to answer; but I may say that if the scratchings on the whole are inscriptions, as there seems to be strong evidence they are, they are written in a syllabary or alphabet, four or five characters of which are identical with those found on the Hittite monuments. But what more strongly emphasises the connexion of these people with Asia Minor is the fact that the legends current in Asia Minor, and preserved by the Greek writers, were clearly, in the majority of cases, of Babylonian origin. Take the story of the Atys and the Corybantes, or of the warlike maidens who accompanied Omphale in her invasion, as recorded in those legends. They were the warlike characters who are clearly represented in the sculptures at Eyuk,—bodies of armed dancers,—not, as some writers have asserted, soldiers, but undoubtedly armed females, who are probably taking part in that celebrated dance which the Corybantes were in the habit of performing. These find their counterpart in the warlike maidens who attended the Babylonian Istar, "Queen of Battles," and who fought against Gisdhubar as the Amazons did against Heracles. These things also serve to show that the Hittites had dwelt over a good part of Asia Minor, and been in contact with Babylon. Having studied this subject rather closely of late, I should like to say a word or two in reference to the important question, What was the home of these people? I must certainly say that I think we may and do see a ray of light in the suggestion of Professor de Lacouperie. We have hitherto been inclined to imagine that there was a drifting of the early tribes from east to west. This is shown in the case of one people in particular: I refer to the people whose annals you find in the Vannic inscriptions. I may say that there is a very important fragment which helps to fill up a break in the sequence of history, to be found in these Vannic inscriptions. For a time after the fall of the Early Assyrian empire, about a thousand years before the Christian era, and until the rise of the Second Empire, there is a blank in the history of Western Asia. Now, the Vannic inscriptions certainly help to fill up that gap. They are written in a language which bears no relationship to the modern Armenian, and in them we find the Vannic kings fighting and entering into alliances with the kings of the Hittites. We shall find, I think, that there was a body of what we may call Kushites, who passed northwards up the Euphrates valley, and the vestiges of these people are probably to be found in the early tribes inhabiting that district, and in the tribes who inhabited the regions round about Marash and Zeytoun, which I do not think are without some indications of the Hittite people. At Carchemish I was struck by the resemblance presented by some of the muleteers to the figures represented on the sculptures. They had the same peculiar shortness of figure, with the same evidence of muscular development; they wore the petticoat turned up about the knee, and caps exactly as we see them represented on the sculptures at Carchemish. I should tell

you that those men were natives of villages a few miles from the Marash in the heart of the western Armenian mountains. The reason for the resemblance of those men to the portraits of the ancient type found in the sculptures is, I think, to be found in the fact that all those great invasions which have swept over Northern Syria and the northern Euphrates valley, had the effect of driving the aboriginal population into the mountains. There, in their rocky fastnesses, they have lived by themselves, and in many cases have succeeded in holding their possessions so strongly that they have kept back the Greeks and other invaders, and have thus preserved their own peculiar type even to the present day. There is one other subject I cannot help referring to, and upon which I desire to urge some effort should be made at the present time. I think that something ought to be done to finish the explorations at Carchemish. It is very sad to know that there are still lying there in the trenches—I believe they are now covered up—two sculptures, which are certainly of great size; but if they are so large that they cannot be brought hither, there is no reason why casts should not be taken of them and forwarded to us. They are sculptures of the very greatest interest, because they give us a new chapter in Asiatic art. They show an influence derived from Egypt and from Assyria, and, at the same time, they show a native inventive power on the part of those people. I certainly think that the work begun out there ought to be finished, and if I might mention two other sites where explorations might be usefully and advantageously undertaken, I would say that one is that of the city of Arpad, and I think it would be found to be one of great importance. It stood a siege of three years on the part of the Assyrian kings, and the ruins are marked by a mound about ten miles from Aleppo. I visited that city, and I can say that the mound is nearly as large as that of Carchemish, and that on some excavations being made there, black stones were found with carved borders and ornaments similar to those found at Carchemish. There is another site in the neighbourhood of Carchemish, which I think might also be worked: it is situated at Tash-atan, and I believe it to be the site of the city of Pitru or Pethor, the city from which Balaam came. It is a mound occupying a position which any one with the slightest knowledge of strategy would say marks it as having been an important stronghold. It is at the mouth of a narrow valley or gorge, communicating between a plain washed by the Euphrates on the one side, and a narrow stream on the other running into the valley of Sagur. The exploration of these mounds would, I think, be work that must well repay the trouble, and I sincerely hope that something will be done by which so desirable an undertaking may be promoted. In conclusion, I have only to say that while we are all very much obliged to Dr. Wright for the interesting paper he has furnished with regard to these ancient people, those of us who go into these matters as part of our special study are still more indebted to him for the valuable information he has brought together on a subject of so much importance in his valuable work, *The Empire of the Hittites*.

Rev. Dr. WRIGHT.—I have nothing to do in the shape of reply except to discharge the very pleasant duty of thanking the Meeting for the patient attention it has accorded to my paper, and also to those who have been so kind as to speak upon it. I must say that I did not altogether anticipate such a reception as I have had to-night. Indeed, I came prepared, if I may say so, to defend my position at all points, and I am very much surprised at the way in which my paper has been received. I remember that when I came to London, only about ten years ago, I was looked upon as a kind of craze; and at last I ceased to talk to my scientific friends about the Hittites, as I did not like to be regarded as a bore. But at length, while living at Rosstrevor, I found that a friend of mine in London was calling these people to whom my paper refers “the Hittites,” and I began to think, “The Hittites are looking up.” When I came to London I found my friends Mr. Boscawen, Mr. Pinches, Professor Sayce, Dr. Isaac Taylor, and a large number of others whose opinions on this subject are worth having, had all come round, and had done so through the medium of their own independent studies, for I think very few of them ever saw my article on the subject. I do not believe Professor Sayce did, nor Dr. Isaac Taylor, nor Mr. Boscawen.

Mr. W. ST. CHAD BOSCAWEN.—I have not seen it to this day.

Rev. Dr. WRIGHT.—They all seem to have arrived at the same result by separate and independent study. It is, therefore, a very pleasant thing to meet here to-night men who thoroughly understand the subject, who now concur in the views I have ventured to put forward, and who express their opinions in a manner that makes me feel thoroughly repaid for the past. It was not always so, especially in the case of scholars who stumbled on discoveries, and who had to wait a very long time before their theories were accepted. It is gratifying to see how much faster we are living in the present day. As I have already said, I have really nothing to reply to. I must say I like this Society proceeding on the most scientific lines; for there need not be the slightest fear of the “Old Book” holding its own. I do not mean taking the Bible merely as an old ecclesiastical book; but, regarding it solely from the scientific side, the book comes out well. We may not as yet be able to prove all our points; but the spade is at work, and where we do not know, let us have patience, and before very long the spade will bury a great amount of this Biblical scepticism entirely out of sight.

The Meeting was then adjourned.

NOTE.

APROPOS of the announcement that Captain Conder claims to have in a measure discovered the key to the Hittite inscriptions, the following remarks have recently appeared :—

“The Hittites of the Bible were one of the most powerful of the tribes who inhabited Canaan in patriarchal times ; and it is probable that the Old Testament allusions to them refer, for the most part, to the branch which at that period had migrated from Northern Syria and settled near Hebron, in Southern Palestine. Abraham purchased his burial-place, the cave of Machpelah, ‘in the field of Ephron the Hittite.’ To this race, too, belonged Judith and Bashemath, Esau’s wives. Ahimelech, David’s companion, was a Hittite ; so too was Uriah ; and there were Hittite princesses amongst Solomon’s wives. But of the Hittites of the north, the Bible tells us little. There is not much doubt, however, that they were identical with the Kheta of the Egyptian monuments and the Khatti of the Assyrian tablets, and that their dynasties belonged to prehistoric ages. Whether they were Turanians or no, they were certainly at a very early epoch a dominant race who ruled the Semitic tribes around them.

“The Egyptian sculptors represented them with a Tartar type of physiognomy. They wore pointed boots instead of sandals, and had pigtails. In the 18th and 19th Egyptian dynasties the great capitals of the Kheta were Carchemish on the Euphrates and Kadesh on the Orontes. The site of the latter city was identified beyond a doubt by Captain Conder in 1881. As early as 1600 B.C.,—that is, before the Hebrew conquest of Canaan,—the extension of the Kheta southwards was checked by the Egyptians at the Battle of Megiddo ; while Rameses II., about 1361 B.C., besieged and took Kadesh. The sculptures at Abu Simbel represent this great battle, and in them the Egyptian sculptors have, as usual, introduced an element of caricature. Rameses appears driving the Hittites into the river ; and on the opposite bank their half-drowned chief is being held head downwards by his followers, who are endeavouring to revive him by this primitive and still popular method. The terms of the treaty subsequently concluded between Rameses and Kheta Sar were engraved on a silver plate, and also inscribed on the outer walls of the temple at Karnak. From the Egyptian description of this document we know that, although the Hittite names were not Semitic, they worshipped Ashtoreth and Set, the gods of the Syrians, Assyrians, and Phœnicians. These seem, moreover, to have been the generic names of local deities. Set appears, too, to have been identical with the Egyptian deity of that name,—the God of Night, whose emblem was an ass with tail raised. The mountains and rivers of Khetaland were also invoked as divinities. The tablet further shows how advanced were their military tactics ; and among their allies have been recognised the Mysians, the Dardanians, the men of Carchemish and Aleppo, the inhabitants of Mesopotamia, and of the island of Aradus. It was a confederacy of Syria and Chaldea, Phœnicia, and Asia Minor against the Pharaohs. At this period, indeed, the Hittites were nearly equal in power to the Egyptians, and the treasures which Rameses took at Kadesh prove that they were nearly as wealthy a people. Nor do their wealth and power seem to have much diminished until they were totally eclipsed by the rising power of Babylon.

“But we have shown that in still earlier times than those of which we have any record the Hittites were probably a yet more powerful race. There are not wanting grounds to justify the belief that their empire at one time

extended to the borders of Egypt. Although it is thought from the evidence of the Hittite proper names, that some of the tribes north of Carchemish and Aleppo were of the same race, we have no proof that they ever spread north of the Taurus chain. To the south, however, as well as at Hebron, there are philological traces of the tribe having lived at some epoch or other at Hit on the Euphrates, at Tell Hatteh near Kadesh, and even at Kefr Hatteh in Philistia. From all this it will be seen that there is plenty of room for believing that Hittite record, if it is ever known, may take us back to pre-historic times. As to the inscriptions which are at present known to be in this script, there are five basaltic texts in relief at Hamath, one at Aleppo, six at Jerabis. At Ibreez there is a bas-relief. There is an inscription on the so-called statue of Sesostris at Karabel, and another on the statue of the weeping Niobe on Mount Sipylos. There are texts at Boghaz Keui, and at Eyuk, which is not far inland from the shores of the Black Sea. A stone bowl has lately been found at Babylon with an incised inscription of the same character as the Hamath stones. Upon this Captain Conder, in his recent volume on "Syrian Stone Lore," tentatively based the conjecture that the key to the language might be found in Babylonia. Then there are the terra seals, discovered by Sir Henry Layard in the Record Chamber of Sennacherib's Palace at Kouyunjik, which are now in the British Museum; and the silver boss of Tarkondemos, with Hittite and cuneiform inscription, of which fortunately an electrotype fac-simile was taken, although the original was rejected by the British Museum as a forgery and is now believed to have been lost. All these examples have established the fact that this writing was used by a people who spread themselves over Asia Minor, Northern Syria, and Mesopotamia, possibly before Egypt was a Power. It will be of great interest to know whether Mr. Gladstone's conjecture that they were identical with the *Κήτριοι*, of Homer—the only allusion to them which has ever been detected in classic history—can be supported. Above all will it be interesting to see how far the arguments whereby Dr. Wright has endeavoured to assign to 'The Empire of the Hittites' its true place in ancient history can be verified."—*St. James's Gazette*.

REMARKS BY THE REV. CANON TRISTRAM, D.D., LL.D., F.R.S.

CANAAN, ANCIENT AND MODERN, WITH REFERENCE TO THE LIGHT THROWN BY RECENT RESEARCH ON THE MOVEMENTS OF THE HITTITES.—A casual observer might go through the land of Canaan, from Dan to Beersheba, and see not a vestige that could recall the story of a buried past beyond the epoch of the struggles of the Crusades. But take the spade and turn up the soil that hardly hides the form and outline of some buried monument of man's former industry, and then listen round the camp-fire to the stories and traditions of the simple fellaheen, the natives of the district,—light soon dawns on many an obscure allusion of history. Some name, last written down, perhaps, in the Doomsday Book of Joshua, and never since recurring in the registers of the nation, strikes the ear, and imparts freshness and reality to what might have seemed a musty record, as it comes from the lips of an untaught peasant, to whom that name has come down from his fathers through the lapse of four thousand years. Thus, as the eye of the Bible student looks on Palestine to-day, he clothes the narratives of the past with the surroundings of the present. Now, the first glimpse which history gives of the land of Canaan is to be found in the story of the wanderings of Abraham and the pastoral patriarchs.

What the land must then have appeared to the travellers from the East we may infer from examining the fragments, scarcely touched by the profane hands of the builder or the colonist, which remain in the eastern parts of the country in Gilead and Bashan. From Damascus to Egypt there are but two towns of any importance,—Es, Salt (Ramoath-gilead) and Kirak, the ancient Kir, or Kir Moab. These and a few villages comprise the whole settled population. No terraces scarp the hill-sides. Only here and there are the open plains disturbed by the plough. Scattered timber, more park-like than forest, clothes the mountain in irregular clumps from base to summit. The date palm still waves in the Jordan valley, on the east side. The Balm-of-Gilead, the arbutus, sweet bay, and oleaster, cover the lower ranges. Above them, as we ascend, we find the olive; higher up the evergreen oak or ilex, then the Turkey oak; while clumps of pine, about identical with the Scotch fir, crown the summit of Gilead. In the open glades the nomad Arab pitches his black tent, while his flocks and herds, camels, sheep, and goats, with a few horned cattle, depasture the neighbourhood, and disturb the gazelles and deer which at other times browse unmolested. The only cultivated land consists of unfenced patches round the towns and villages.

Such must have been the character and such the inhabitants of western Canaan when Abram first pitched in the plain of Shechem. Fair indeed, and lovely, must that *land of promise* have looked to the eyes of the pilgrims just come from the bare and monotonous plains of Mesopotamia, as they threaded its labyrinth of well-wooded hills and narrow

valleys with their purling brooks, and camped among the exuberant verdure of the moist plains. We find but few traces of towns or cities at that early epoch,—only Shechem and Hebron in Canaan proper. A dense population cultivated the seething tropical valley of the Jordan, and the shores of the Dead Sea. Phœnicians and Philistines fringed the coast-line with their settlements, but these did not touch the Canaanite who was then in the land. The Canaanites were scarcely yet an organised nation, like their neighbours. They seem to have been rather a collection of village communities who recognised the supremacy of the Hittite invaders. The country was not lawless. It was the highway of the great commercial route or caravan road between the empires of Chaldaea and Egypt, and the few allusions in Scripture point to industrious and peaceful communities. Such certainly were Shechem and Hebron.

Recent research has cast a flood of light on the movements of the Hittites who then ruled at Hebron; and we know from Egyptian records that, not long before the time of Abram, they had pushed from Northern Syria, halted for some little time at Hebron, and then moved on to Egypt, where they established for some generations the dynasty of the Hyksos or shepherd kings. Hence the significance of that passing remark in Numbers xiii. 22: "Now Hebron was built seven years before Zoan in Egypt." Zoan was the capital of the Hyksos dynasty, and the Hittites had paused seven years at Hebron before making their further advance. Through this country Midianite traders could conduct their caravans of precious merchandise without danger. The pastoral chieftain from beyond the Euphrates could lead his flocks where he would, so long as he refrained from interfering with the wells, the earliest kind of real property in history; for cultivation had not yet extended beyond the environs of the few settlements. That land was of considerable value, is shown by the purchase of the burying-ground of Machpelah from Ephron,—the first legal conveyance recorded in history.

Very different was the state of Canaan four hundred and fifty years later, when conquered by Joshua. The population must have increased enormously. The whole country was thickly studded with walled towns. Places which, like Bethel, had been but a name in the days of Abraham, were now considerable cities. Scripture gives but one incidental hint of the changes which had occurred meanwhile. Hebron and Kirjath-Sepher, which had been Hittite in the time of the patriarchs, were now Amorite, and the name of the latter changed to Debir; while in Joshua's time, the Hittites were found in the mountains. The Egyptian annals explain this. A century before the Exodus, the Shepherd, or Hyksos, dynasty having been overthrown, Thothmes III., and after him Rameses II., prosecuted great campaigns against the Hittites, invading Canaan and Syria, driving their hereditary foes out of Hebron, and overrunning the country as far as the Euphrates, but making no permanent conquests.

The period before Thothmes was the epoch of Canaanite development; for we find, in the Egyptian records, a list of over a hundred places sub-

mitting, given in the same topographical order in which the names occur in the book of Joshua. With the exception of a few strongholds, and some remote and inaccessible districts, the Israelites occupied the walled towns and the villages built by the Canaanites, and completed the subduing or terracing of the hill-sides, which their predecessors had begun. It was this terracing which, in its ultimate results, has reduced the country to the state in which we now see it. From the density of the population, every foot of ground was valuable. The hill-sides were girdled with terraces, like flights of steps, from the base to the crest of each rounded knoll, on the top of which was perched the little town. The primeval forest everywhere disappeared, and its place was taken by the precious olive tree, the evergreen foliage of which attracted the spring showers. Along the edges of the terraces ran the little cemented channels, which conducted the rainfall to the cisterns with which the whole country is honeycombed. On each step of the terraces, corn in spring, and a second crop of vegetables in summer, were raised; while fig-trees occupied every corner, and the vine was trailed over every stone-heap. The land was utilised as it is in Malta to-day.

But, in after ages, war and neglect have done their work. We have no reason to believe that the material prosperity of the country ever suffered more than temporary checks from the wars and captivities till the final destruction of Jerusalem by Titus. Even after this, though the Jew was driven out, a considerable population remained, till the ruthless devastation and massacres by Chosroes, the Persian invader, A. D. 594, swept the land with the besom of destruction. The olive-trees—at least, those which had been spared by Titus—were cut down. With them disappeared the fertility of the land. There was no man left to repair the terraces or keep open the water-channels. Over the treeless hills the clouds in spring passed without shedding their showers, while the winter rains, descending in impetuous torrents, soon washed down the terrace embankments, and carried the earth into the valleys, leaving the rocky sides barren and bare, while the hollows were choked to a depth of many feet with rich alluvial soil. Thus by the reckless wickedness of man has God's curse been accomplished.

Yet, as after some great flood, we find in nooks and corners some waifs and strays of what existed before, stranded in the eddies of the backwater; and as the waves of successive invasions of India have stranded on the hills and in the secluded valleys the remains of the Dravidians and other earlier races, so it has been in Canaan. The Israelite indeed has utterly disappeared; for the few Jews to be found in colonies in Jerusalem and some of the towns are all immigrants who have returned since the time of the Crusades from Spain or Germany or Poland. But while the nomad population of the plains is of Arab descent from the followers of the Khalif Omar, and the fellaheen, or agricultural population of the villages is of Syrian origin, the descendants of the Christian settlers after Constantine, we find traces of the old Canaanite or Hittite in the retired mountain villages east of the central ridge, to be recognised by their somewhat Ethiopian physiognomy, and by some old heathen local customs, such as sacrificing under a sacred tree or

“grove” on the hill-top at the new moon; while in the south-east of Judea at Beit-Jibreen (or Gath) we have traces of the old Philistines in the large flat-featured race, quite distinct from any others in the land. It is interesting to note that these relics of the aboriginal races are found just in the districts which we learn, from Judges i., were never thoroughly subdued by Israel.

ORDINARY MEETING, JANUARY 17, 1887.

PROFESSOR G. G. STOKES, D.C.L., P.R.S., PRESIDENT,
IN THE CHAIR.

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

MEMBERS:—H. C. Corke, Esq., D.D.S., Southampton; Dr. Cynic Thomas, United States.

ASSOCIATES:—The Right Rev. the Bishop of Bombay; Rev. H. M. Anketell, Chippenham; J. G. Bourinot, Esq., M.A., LL.D., Canada; C. M. Bult, Esq., C.S., J.P., Canada; T. Barnes, Esq., D.L., J.P., Canada; Rev. W. M. Campbell, F.A.A., United States; Rev. Canon C. G. Curtis, M.A., Constantinople; Professor C. C. Everett, United States; Rev. E. A. Eardley-Wilmot, B.A. Camb., England; Col. P. A. Elphinstone, London; Rev. F. E. Freese, B.A. Oxon, Plymouth; Rev. T. B. Harvey Brooks, M.A., London; Ven. Archdeacon J. Hughes Games, D.C.L., Isle of Man; Lieut. C. W. W. Ingram, R.N., Plymouth; J. Main, Esq., F.G.S., Glasgow; Rev. Sir F. A. G. Gore Ouseley, Bart., M.A., Worcester; Rev. A. Oates, Ware; Rev. T. Roberts, M.A., R.N., H.M.S. “Téméraire”; H. Stokes, Esq., Bath; Rev. B. Waller, B.A., Southport; Rev. H. J. White, M.A., Oxon, Redhill.

HON. CORRESPONDENTS:—T. Chaplin, Esq., M.D., Hendon; Rev. G. A. Shaw, F.Z.S., Chingford.

Also the presentation of the following works, by their authors, to the Library:—

Chalk and Flint Formation. By Rev. W. B. Galloway, M.A.

Thirty-six Hours' Hunting among the Lepidoptera of Middlesex. S. T. Klein, Esq., F.R.A.S.

Local Government in Canada. J. E. Bourinot, Esq.

The Philosophy of the Supernatural. By Rev. Dr. Platt.

The Progress of a Century. G. Lawrence.

The Story of the Rocks. By Professor Vail.

Science and the Revelation of Christ. By Rev. Professor Dallinger, D.D.

A Manual of Zoology (in Samoan). Rev. T. Powell, F.L.S.

The publication of the Paper read at this Meeting is delayed.

ORDINARY MEETING, FEBRUARY 21, 1887.

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

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

MEMBER:—Rev. B. R. Wilson, M.A., Queensland.

ASSOCIATE:—C. M. Davis, Esq., A.M., United States.

HON. CORRESPONDENT:—Rev. A. B. Hutchinson, A.M., Japan.

The following Paper was then read by the Author:—

ON CAVES. By T. MCKENNY HUGHES, M.A., F.S.A.,
F.G.S., Woodwardian Professor of Geology, Cambridge.

NOW and then it falls to our lot to find an old MS. which throws a flood of light upon some obscure part of history. It had been put aside, buried under a heap of documents of more immediate importance, forgotten till some accident exposed it, some more careful eye caught sight of it, some more experienced judgment recognised its interest.

Such to the geologist is a cave.

He runs his eye over the contents; they may be of little value, or may settle what has long been a matter of speculation or of controversy. They may be a record of the household consumption of some wild beast in his castle; they may tell of the ancient conflict of forces of nature now at rest; or they may derive their chief interest from the character of the material on which the record is preserved.

But the MS. might be passed over, or not read aright, if the discoverer be no palæographer.

So the observer may arrive at very wrong conclusions as to the age and history of a cave, unless he be familiar with the operations of nature which form and fill such caves. This, then, is the point on which I invite discussion this evening: The formation of caves and cave-deposits, with references to some of the more interesting of those which have been explored.

To arrange our subject, I would first notice that there are artificial as well as natural caves, and many natural caves

modified by man. In quite recent times, the soft New Red Sandstone has been scooped out into cells and summer-houses. The chalk has been excavated from very early times in the search for flint, and traces of sojourn in such pits are not wanting. We need not stop seriously to discuss the suggestion that Fingal's Cave was excavated by man. The rock-hewn tombs around Jerusalem, the catacombs of Italy and Egypt are artificial caves.

All along the Vezère and other cliff-margined valleys in the South of France we see the natural caves and rock-shelters, modified sometimes by man, walled up and occupied as store-houses, or even as dwellings. History tells us that those caves were frequently held by troops during the long occupation of that part of France by the English. The Rock of Tayac, like Gibraltar, "a kind of fortress entirely hollowed out of the rock," is frequently mentioned in the history of the wars of the fourteenth and fifteenth centuries.* And the Aquitani, when pressed by Cæsar's troops, retreated to their caves in South-central France. I have heard of a man who lived for some time in a cave in Yorkshire, coming out at night for food,—milk from the neighbours' cows, eggs, or whatever else he could lay hands on. There were many odds and ends in that cave which might have been relics of his sojourn, as well as others of more remote antiquity.†

There are hardly any records of research in caves which are known to have been occupied in recent or historic times. A systematic examination of all the caves in which history tells us the inhabitants of any district once took refuge, and an exact description of all found and observed in them, would be very interesting, and might furnish important evidence bearing upon doubtful questions.

Artificial caves, however, or artificially modified caves, form a very small proportion of those with which we have chiefly to do. The caves in which primæval man lived, and into which in old times hyenas dragged carcasses of the animals they killed or found dead along the river-courses, were all natural caves. So are the celebrated stalactite caves of Germany and America. But we must inquire into the mode of formation of natural caves if we would understand the conditions which surrounded primæval man or speculate on his age.

There are sea-caves formed by the waves that lash the cliffs as if sounding them to find their weaker places. The water

* *Reliquiæ Aquitanicæ*, p. 4.

† Exploration of Cave Ha, *Journ. Anthropological Inst.* 1874.

itself would soon destroy a jointed rock. As each storm-wave rolls in, it deals a tremendous blow on the fissured mass: Every thin packing of clay between contiguous blocks is soon washed out, and the fissures themselves enlarged. Then there comes into play another action. The space behind the block is filled with water; the thumping wave falls on the narrow opening on one side of it, not on the whole at once; the force is multiplied ten or a hundred times by the hydrostatic paradox, and the block is hammered out. Even in a river this operation is seen going on. Along the valley above Sedgwick's old home in Dent, thin beds of carboniferous limestone with shaley partings form the bed of the stream. The shale perishes, and the great slabs, 5 feet to 10 feet across and nearly 1 foot thick, lie side by side on the bed of the stream. Then in one of the floods so frequent in that district the fissured limestone is filled, and the surplus water rushes in a torrent over the usually almost dry channel. A slab is lifted by the hydrostatic paradox, turned over by the torrent, perhaps swept down, or often left a record of the lifting force which got it out of its bed, but in doing so destroyed the machinery by which it lifted it. So sea-cliffs are more apt to be scooped out into caves and crannies where the rock is jointed or crushed. Any soft, readily-decomposed dyke traversing the harder rock is also more easily removed.

But that is not the only process by which these sea-caves are formed. On the coast of Pembrokeshire, near St. Davids, there is a hole among the crags near high-water mark where, at a certain state of the tide, with each recoiling wave there is a loud sucking noise as the air is being forcibly drawn in through small, wet, weed-covered fissures to take the place of the receding water. It is known as Llesugn from the sound. Were it not for the cracks communicating with the air above we should not be reminded of this force being exercised by every wave in the cave below. Any loose material would be drawn back with the wave, and perhaps carried out of the cave altogether. Many of us are familiar with the phenomena known as "Blow Holes," or "Puffing Holes." The incoming wave fills the tapering cave, and, just as the bore coming up a tidal river rises higher and runs more fiercely when the converging banks force it to pursue its way through a more contracted channel, so when the wave rushes into a narrowing, funnel-shaped cave, with a small aperture communicating with the surface, the water is forced up through the opening, and often a spout of spray is carried high into the air. All these phenomena tell us of the enormous force exerted by the waves

upon the coast, and explain how caves must everywhere be formed where shattered or softer rock is exposed to the lash of the wind-driven sea.

But this is not all. The wave picks up great boulders and hurls them at the rocks that bar its advance. It is quite common, after a storm, to find large stones lodged on a promenade or pier, where they must have been caught up *in* the wave and thrown upon the land. Stones are always carried forward *up an incline* as far as the waves advance; but the cases I refer to now are those in which the stone has been thrown up to the top of a vertical wall. The last place I remember having seen this was in a great storm a few years ago at Hunstanton. The same thing takes place on a grand scale on some of the wild, rocky cliffs of North-Western Scotland, for instance. The Director-General of the Survey has described how in storm, great blocks are hurled up on to the top of the cliff near the Old Man of Hoy.

The force of the Atlantic waves at the Skerryvore Rocks, as estimated by the marine dynamometer, an instrument designed by Thos. Stevenson for this purpose, was found to be as much as 6,083 lb. to the square foot.*

From the height to which the spray was thrown, he inferred a pressure of about 3 tons to the square foot; and further recorded that a block of stone, estimated at 48 tons in weight, "was seen to move under the influence of each wave."†

"On the Bound Skerry of Whalsey, which is only exposed to the waves of the North Sea or German Ocean, he had found . . . masses of rock weighing $9\frac{1}{2}$ tons and under, heaped together by the action of the waves at the level of no less than 62 feet above the sea; and others ranging from 6 to $13\frac{1}{2}$ tons were found to have been quarried out of their positions *in situ*, at levels of from 70 to 74 feet above the sea. Another block of $7\frac{7}{10}$ tons, at the level of 20 feet above the sea, had been quarried out and transported to a distance of 73 feet . . . over opposing abrupt faces as much as 7 feet in height."‡

It is clear that such waves and such boulders would make short work of broken rock or a rotten dyke, and any old cave or fissure opened out by the sea would not be likely to have much of the original deposits left in it. The first storm would clear out all earth and bones, and leave in its place only the well-worn pebbles of a rocky shore,—the battered shot of nature's great marine artillery. A sudden upheaval would leave the cave either quite clear, if it was on a clean,

* Stevenson, Thos. *Edin. New Phil. Jour.* xlviii. 1850, p. 41.

† Ditto, *Proc. R. Soc. Edin.* vol. ii. 1844-50, p. 13.

‡ Ditto, *Proc. R. Soc. Edin.* vol. iv. 1862, p. 200.

rocky shore, or filled with heaped-up pebbles, if it opened on to a shingle beach. By its form and by its contents we could generally make a shrewd guess whether it was a sea-cave or not. We should ask whether the parts where the cave expands are those on which the sea would act with greatest force and efficiency, or whether the shape could be better explained by reference to torrents coming in the other way. We should examine the contents to see whether in their character or arrangement they indicated the action of the in-rushing water, or whether they are such as could never have survived the scour of tidal and wind-driven waves. When we have to inquire into the origin of caves in inland cliffs and on mountain-sides, now far above the sea, where many of the traces above-described may have been long removed by denudation, there are further tests to be applied. There we should have regard to their manner of occurrence and their place in the physical geography of the neighbourhood. A sea-cave does not necessarily, or even commonly occur in the line of drainage from the uplands, but in the higher cliffs and headlands between the valleys that run down to the sea. Whereas the caves due to subterranean water-courses lie in the lines of drainage; and the caves due to sub-aërial waste coincide in distribution with the outcrop of the beds that readily lend themselves to that kind of weathering.

Moreover, allowing for the possibility of unequal elevation of different parts of a coast-line, we can still generally find sufficient evidence to show whether the rock in which the cave occurs forms part of an old sea-cliff or of an escarpment.*

We must remember also that during the formation of a sea-cave the base of the cliff is being swept by the sea. Sometimes an inland stream washes the base of a rock in which a watercourse cave has its outfall, but generally in the case of inland-formed caves a vast mass of talus is being formed along the base of the cliff in which the cave occurs. The scour of floods may keep the mouth open, but as the water is being drained off to other and lower levels, this sweeping of the cave mouth ceases, and the cave deposits show interbedded fallen rock and transported earth and stones, and often the remains of animals.

As a general statement we may say that a typical sea-cave runs into a cliff which rises vertically from the level of the

* Cf. Whitaker, *Q.J.G.S.* vol. xxiii. c. 186, p. 265. *Geol. Mag.* vol. iv. 1867, pp. 457, 443.

floor of the cave, or is even undercut a little, because the talus has always been removed from the base, so that the fragments broke away all over the face of the cliff from top to bottom, and the base sometimes was even undermined by the waves.

In the case of an inland cliff, on the contrary, the fallen rock is not removed, so that only the upper part of the cliff above the sloping mass of talus is exposed to the action of the weather. The exposed part is reduced in height as the talus grows, so that the cliff keeps on receding above only, as the talus keeps covering up more and more of the lower part.

The form that a chalk cliff would eventually have behind the talus has been calculated by the Rev. O. Fisher.*

Of course, the sea-cliff, when removed inland by elevation, gets, after a time, eaten back by sub-ærial weathering, and covered over by talus like any ordinary escarpment.

Gaping fissures of such a character that they could in any case be looked upon as caves are very rare, but the fault-breccia that commonly fills such cracks is easily removed, and the various denuding agencies are apt to follow fissures, and thus caves be formed along them. The unequal flow of lava curling and coiling over the half-cooled mass of earlier flows sometimes leaves openings like caves.

It is said that some of the caves in volcanic districts are opened out by the various acidic vapours which act on the micaceous and other schistose rocks which have been already fissured by the earthquakes so frequent in those countries; as, for instance, in the case of some of the caves of Corinth and the Cyclades.†

These are, however, few and unimportant, seldom occurring where a cave would be much frequented by man or the lower animals.

The commonest caves, and those which generally have proved of greatest interest, are the old subterranean watercourses so frequent in limestone rocks. The way in which these caves are formed is well known, but many of the phenomena connected with them appear to be less clearly understood, and so we hear of various startling theories propounded which, on inquiry, turn out to be based on a wrong interpretation of the mode of formation of the deposits found

* *Geol. Mag.*, vol. iii. 1866, p. 354. See also Davison, *Geol. Mag.*, vol. 1886, p. 65.

† Virlet, *Bull. Soc. Géol. de France*, t. ii. p. 329.

in such caves. It is to these questions I especially invite attention to-night, and in the selection of examples in illustration I shall be chiefly guided by the desire to make clear the distinction between the age of the caves and of the cave deposits, and the mode of formation of the cave earth and laminated clays, stalagmitic floors, and broken-up travertine breccias, stream-gravel, and angular talus.

First, I would just remind you that these caves are formed in a rock which can not only be mechanically broken up and carried off, but can also be dissolved in water and carried away in solution wherever water can pass. Even pure water can take up two grains per gallon of carbonate of lime, of which these rocks are largely composed. But pure water is very rarely found in nature. The rain generally takes up some carbonic acid from the air, and when it falls on the ground gets a great deal more from the decomposing vegetation; and water with carbonic acid in it acts rapidly upon the limestone rock, carrying off part of it as a bicarbonate of lime, while the earthy part is washed away in mechanical suspension till it settles down in some pool of still water as mud, often forming a considerable part of the cave-earth which fills all the interstices of the broken-rock. As may be seen by the analyses of hard waters, it is not uncommon to get 25 grains per gallon of carbonate of lime in the water of limestone districts, and this means the never-ceasing operation of the agencies which tend to form caves.

So, of course, the most favourable conditions for the formation of such caves are,—First, a limestone into which the water can trickle down along joints and fissures, and find its way out at some lower level. Secondly, an area over which the rain can gather into streamlets and collect from vegetation the acids which will help it to dissolve the rock. The crack into which the water first finds its way may be very small; the water soon opens it out, acting first chemically, then mechanically, on the surrounding rock. When the sand and broken rock get a free passage, mountain torrents, full of débris torn from the hill-side or washed out of ancient boulder-clays, are precipitated into the chasms, which take the place of the half-opened joint, and the work goes on apace.

It is quite clear that in such circumstances it must often happen that, as the clay or shale on the hill-side is being denuded away, the water must find its way into the jointed limestone further and further back continually, and, in the deep recesses of the mountain, new channels must often carry off the water that once ran higher up. Thus, the higher out-falls are left dry, and then they are in a state for man and

beast to inhabit. Sometimes, however, when all the hill is full after some great thunderstorm, water spurts out of every joint and spouts in torrents from each cave, and until the cave is quite beyond the chance of such catastrophes, we cannot hope to find a clear, continuous record of its old inhabitants.

To give an example of a cave now being formed in one part and periodically modified in another, I will carry you to the flanks of Ingleborough, where the conditions are peculiarly well suited for the formation of caves and for the examination of all the accompanying phenomena. Many of you are familiar with the form of the grand bluff known as Ingleborough,—the most conspicuous feature as you look north from Lancashire towards the borders of Yorkshire and Westmoreland. Its flat cap of millstone grit; its steep slopes of rapidly-crumbling Yoredale shale, here and there braced up by *throughs* of sandstone, or grit, or limestone; its great table of mountain limestone, on which these all stand; and its base of Cambrian and Silurian, altogether combine to furnish some of the most charming bits of scenery and most interesting bits of geology in the kingdom. On the S.E. slopes of Ingleborough is a great hollow space where the water runs off the impervious Yoredale shale and the patchy drift down to the basement table of mountain limestone. The drainage area is about a square mile, and the stream is usually small and generally lost at once in the first open joints of the limestone that it gets to. But a flush of rain-water soon fills these crevices to overflowing, and the surplus water rushes on 100 yards or so to a great chasm, known as Gaping Gill Hole, into which it plunges with a roar. The air dragged down, tangled in the water, ascends in a current, carrying mist and spray far above the chasm's brink. I have watched this wonderful abyss many a day of storm and sunshine. No one has ever been to the bottom of it; but I can tell you something more about it that bears directly on the subject we are considering.

In that country, so favourable for the formation of all the various kinds of swallow-hole, cave, and keld, I once had the good fortune to witness one of those grand storms which in a few minutes change the face of nature, and in a few hours leave a mark that ages may not efface.

I had climbed some way up Ingleborough. It was a glorious July morning. Myriads of insects were busy with their own various pursuits. The haymakers were hard at work; more hurried, perhaps, as the weatherwise saw thickenings towards the south, and felt the sultry heat that warned them

there might be a storm. I turned now and then as I got higher, and saw the mist gather on the southern horizon. Soon it took shape and formed in the eddies as the rapidly-rising wind crept on. Two principal masses of cloud came crowding up, converging on Ingleborough, from Lancaster and Clitheroe. I had once before seen that kind of sky in South Wales, and, a few hours after, thirty-eight bridges were carried away in our county. So warned, I hurried homewards, and it was well I did. The clouds appeared to me to be rolling on in vertical planes. I ran, and only just got in to my inn before the worst was on us. Drenched haymakers, who had lingered too long in some insufficient temporary shelter, kept coming into the village. The storm burst with all its fury on the south-eastern flank of Ingleborough.

The stream that drains that area runs through the village of Clapham. The valley is dammed close above the village, to form a small tarn. This soon felt the flood, but, of course, the equalising effect of a lake upon the stream below it prevented our realising the tremendous rainfall for a time; because, before the stream could be raised six feet as it flowed out of this lake, the whole area of the lake had to be raised to that extent. But very soon this was done and the arch was filled, and a great spout of turbid water was projected forward on to the rocks at the base of the dam above the church. I went up the valley round the lake towards the celebrated Ingleborough Cave. It was a striking scene. Water spouted out of every crack and joint in the rocks, but the united subterranean watercourses could not carry it all, and the overflow from the drift-covered country above the usual outfalls rushed down the valley, carrying mud and boulders with it in its headlong course. The stream below the cave runs over bare limestone for a considerable distance, and the noise made by the boulders, as they were rolled along the rocky floor, was so great that my companions thought the thunder-storm was beginning again, and hurried home. I went on to the great cave. Here I saw a wonderful sight. The lower cave was full, and the water was spouting out of the upper cave, which is usually dry, as you pour water out of the mouth of a kettle; and well it might, for, if the swallow-hole that feeds it was full to overflowing, it had had the pressure of more than eleven atmospheres upon it.

This was one of the most instructive geological phenomena it has ever fallen to my lot to witness. Here I saw what was, to all intents and purposes, a local cataclysm. Gentle slopes of pasture, where usually no stream ran, were suddenly gashed by a torrent, and the débris swept far away across the

lowlands. Underground passages, high above the present water-channels, were swept clean by the body of water forced through them under enormous pressure. Caves that had been sealed up for years with barriers of stalagmite, which one would have thought might have defied the rush of any flood, were burst open. Most of this débris—all, in fact, that was moved by the first rush of water—was carried down the valley. Some remained around the mouth, and some in embayed corners in the caves. Here we saw fragments of stalagmitic floors, mixed up with débris washed in from the swallow-holes above. Some might have seen here evidence that, after the cave had been formed and occupied and gently filled by earth, and coated and partitioned by stalactite and stalagmite, there came an age of flood,—perhaps of submergence,—when the old deposits were re-sorted, the old floors broken up, and that the cave then entered upon another phase of its history. How different the facts! I saw this revolution taking place. It was all over in three short hours. It was another illustration of the great law of Uniformitarianism, which I have heard the Duke of Argyll well state thus: *Local catastrophic action is not inconsistent with continuity of causation.*

We must bear these things in mind when we are examining cave-deposits.

The peat torn away from the mountain-side above was so beaten up in this great natural churn that the water of the tarn did not get clear for months. The sediment did not settle for three weeks in a long glass which I filled during the flood. There must have been a layer of fine carbonaceous clay formed over the bottom of the tarn and in many a deep cave-pool after that storm. When the rain ceased, the water soon ran off the mountain-side, and I went up to examine Gaping Gill, the great swallow-hole that feeds the cave. I found a passage opened out among some blocks on one side of the stream a little above the chasm. I thought I might perhaps find a zigzag descent, which would lead me down into Gaping Gill Hole. So I crept in.

I soon got beyond the light, and therefore took the precaution of throwing stones in front of me before I advanced. I found the slope increased rapidly, and then all of a sudden the stones dropped into a deep hole, down which they whirred, knocking the sides here and there till they dropped, with a booming noise, into deep water below. I wriggled out, and returned another day, with friends and candles and string; for I could not drop the stones straight so as to clear the sides, and so estimate the depth by the time they took in

falling. Sometimes the weight I attached to the string was too small, so that the increased weight of the string itself, when wetted by the splash of underground waters, prevented my being able to judge whether my plummet had touched the surface of the water below or not. Sometimes the jagged rocks cut my string, and I lost hundreds of feet in this way. At last, however, I got the right sort of string and a convenient weight, and I found that the water here plunged into a vertical hole 360 feet from the grass-covered turf above.

This was not, however, the principal chasm, and I saw a curious sight on the southern, or lowest, face of the great chasm beyond: it was battered and bruised as if it had been bombarded for hours, and so it had. In that flood hundreds of boulders, carried forward by the rush of water, were hurled against the opposite face of rock, and then, dropping into the great chasm, were hurried away through the subterranean watercourses and caves down to the valley far below, where they still rolled on with a noise like thunder over the smooth, rocky bed of the stream, till arrested when the velocity of the water was checked in the wider spaces, or finally stopped in the little tarn below.

Here was the whole story of the formation and infilling of limestone caves, and the sudden breaking up of all the older deposits and the return of tranquil deposition, to be read in Nature's clearest writing.

First we saw the results of the chemical action of the acidulated water running off the peaty moor, and opening out the crevices in the jointed limestone.

Then there was the mechanical action observed on a grand scale in storm,—the boulders and pebbles pounding away the solid rock. And next there were the sand and mud left as the water subsided, and the old state of things returned.

Another curious fact I noticed, which shows how the fragmentary rock is rubbed down into mud by the action of running water. There was a fetid smell arising from this flood water, such as the people about there said they had not perceived before. I followed up the stream, and noticed a great quantity of black sand thrown down here and there along its course. This was derived from the bituminous limestones of the lower part of the Yoredale rocks and the upper part of the mountain limestone, and I at once suspected the cause of the smell. When I rubbed a handful of this sand together there was the same fetid smell at once produced. The air tangled in the seething flood was carried down the valley, and, when released, gave off the gases caught up from the pounded rock.

As we cannot follow these watercourses down from above through all their subterranean wanderings, let us go down into the valley below where the water comes down, and see if we can work our way back into the hill towards the foot of the great chasm, and see what is going on there. It is here we find what is more properly a cave being formed. The water drops from one level to another, then runs along between the beds, and drops again. By putting your ear to the fissured rock in one place, you can hear, from the deep recesses of the earth, the sound of a waterfall that man has never seen. Not far off, a beautiful clear river flows out of the lower cave. This is 600 feet below the swallow-hole, where the water enters on the hill above. When the rain floods the stream above, this, too, runs turbid. Some 20 feet above it is the entrance to the other cave, the celebrated Ingleborough Cave, a more ancient outfall for the water, which now runs at the lower level.

This cave was explored many years ago by Mr. James Farrer. I have followed it for about a quarter of a mile, and, with some others, been let down to a lower level at the end. We squeezed our way along till we came to a long, deep cave, full of water, which seemed to flow gently towards the mouth of the lower cave. In the great flood of 1872, all the subterranean caves and fissures were filled, and the water spouted out of the upper cave, carrying along with it great masses of rock, which helped to break up the stalagmitic floors and barriers. This flood was so exceptional that most of the *débris* was carried clean away; but we saw, when we examined the ground round the mouth of the cave, and the well-known passages inside, what had been going on; how stalagmitic floors had been undermined, broken up, and re-deposited, and how the torrent *débris* was sometimes left in the embayed corners of a limestone cave. But this was a cave not far above the existing watercourse. When a cave has been formed in the side of a rapidly-deepened gorge, where, however high the flood may rise, the water can never sweep it out with a rush, gentler processes of denudation and deposition still go on. The *débris* that falls about the mouth ponds back the rain, and gathers in the fissured rock, and turns in the rivulet that would have trickled down the hill. The damp clay clings to the rock and frets away its surface, and things washed in work their way down along the face of the opening, gradually-weathered limestone, and lie in clay washed down with them.

It is easy to distinguish the chemically-fretted rock from that which has been worn, smoothed, and rounded by the

mechanical action of the sand and pebble-laden water; as you can distinguish the pholas-bored rock from that in which the holes are due to weathering. On the chemically-weathered surface the less soluble grains and bands stand out. This is a useful test.

When any partly-closed cave is invaded by periodic rushes of rain-water, the débris is carried down from above through fissures, or washed in from the mouth, and so we find re-sorted drift and the material of the rainwash from the surface-soil outside the cave occurring also in layers in the cave; and if the cave happens to be occupied by wild animals when not flooded, we find their bones and the remains of their food scattered over the floor or buried in the rainwash.

But when the turbid water fills a pool in the cave or a pond outside it, and the mud is allowed to settle down quietly, the coarser falls first and the finest last. Then the water evaporates or soaks through the sides, or perhaps remains clear and tranquil till the next rain carries in a flood of muddy water. The deposit so formed will have a tendency to split along the layers of coarser sand or loam which first settled down after flood; that is, it would be a laminated clay. As long as the pool was about the same depth, and the amount of mud carried in suspension in the water was the same, the thickness of the laminæ would be practically the same, representing just the mud in one pondful of turbid water, whatever the interval between the refilling of the pond might be. The turbid water may come from the bottom of a glacier, or from melting snow, or from a heavy rainfall; but it certainly has no necessary connexion with glacial action. We see laminated clay so formed commonly in the corner of any old quarry, in ditches, or in caves.

In Chapel le Dale, a valley on the west side of Ingleborough, there is a beautiful chasm which has been so opened out by the action of the torrent that you can get down to the bottom, where the water plunges on to a bed of broken rock and pebbles, through which it passes, as through a sieve or very coarse filter, into the water-courses that carry it off down Chapel le Dale. This great chasm is probably a fair representative of all the large swallow-holes. Hull Pot and Hunt Pot, on the flanks of Whernside, are of the same kind. Probably there is in Gaping Gill somewhere a place where the water in ordinary weather filters through coarse gravel, for I have sent down many boards with a notice on each that I would reward any person who brought it back to me, but I have never heard of one of my notices being found. Yet at times great boulders do get through, so it may be that the

paint of my notices was destroyed in the subterranean waterfalls and rapids.

These chasms or funnel-shaped holes are the feeders of the caves. They are only vertical caves formed in the horizontal surface of the rock. They are known as Swallow-holes, Pot-holes, Sink-holes, and in Italy as Dolinas. They have various local names, expressing the idea that they are not part of the more regular and common operations of nature: the Devil's Chaldron, as in French, Chaldrons du Diable, Marmites des Géants, Bêtoires, or, more simply named, they are the Katabothra of the Greeks.

They begin sometimes under the covering of drift, and, when the opening grows too large, or the covering soil is sodden and will not hold its own weight together, the surface breaks in. Mr. Haythornthwaite, of Kirkby Lonsdale, told me that on a farm of his above Wethercote Cave, after wet weather, he once saw one fall in.

How swallow-holes are formed in chalk has been described by Prestwich.*

The age of the cave-deposits is quite a separate question from that of the caves themselves. The formation of the caves was a time of destruction; but the infilling of the caves belonged to a time of accumulation—when there was no great scour through the caves, but the rain carried in earth and stones, if there was loose drift above, or only muddy water if the cave was nearly closed, or perhaps nothing was deposited but the fine unctuous clayey residuum of the chemically-decomposed limestone itself. Angular fragments disengaged by frost or heat formed a barricade about the mouth. Bones were washed in or carried there by beasts of prey—and man. Buckland† referred most of the caves that he explored to hyena-dens. Constant Prevost‡ thought the bones that occurred so thickly in the cave-earth in Franconia were all washed in by torrents. This explanation will hold only in exceptional cases. The bones may have been washed from one part to another of a cave, and a few do get washed in from above. I have seen three sheep being carried down towards a swallow-hole, and have found two drowned rabbits and some dead trout on the gravel at the bottom of Hunt Pot, on the flanks of Whernside. But we never see the ground so covered with bones of various animals that a flood

* *Q. J. G. S.* vol. x. 1854, p. 222.

† *Reliquiæ Diluvianæ.*

‡ *Mem. Soc. d'Hist. Nat. Paris*, t. iv.

would wash them into caves and form an ossiferous deposit like that in the caves of Franconia.

There can be, however, no general explanation for all bone-bearing caves. We must examine all the evidence in each case, and then form our opinion as to how a particular bone-bed was formed. Buckland's view seems to me to be in most cases the correct one.

So are caves formed and modified, and filled and swept clean and filled again, and we must bear all these facts in mind when we attempt to read the story of a cave from the deposits which we find in it.

Broken-up stalagmitic floors are not evidence of the action of the sea, but, on the contrary, must generally be referred to land floods.

Laminated clays are not evidence of glacial action, but only of alternations of muddy and clear water, such as follow rainy and fair weather.

Some of the most interesting caves, in respect of their contents and the light they throw on the history of primæval man, are only rock-shelters—*abris*—such as are seen in the Dordogne district.* They are sometimes longitudinal sections of parts of subterranean watercourses, but are more commonly due to the weathering away of soft rock between two harder beds. It does not always require a stream or direct rainfall to wet the surface of a rock sufficiently to let the frost act upon it. The travelling moisture of the air, condensed in and on the cold rock, is enough, and is probably the chief agent in case of a rock undercut so far that the rain cannot touch it, just as Rendu† explains the film of ice upon the snow at high elevation not by the melting and refreezing of the snow, but by the condensation of the little moisture left in the air which comes in contact with the snow in those high regions.

The carbonate of lime of the limestone is removed by the water and carbonic acid; but whither does it go, and what becomes of the earthy residuum which forms so large a part of some limestones? These can also be traced, and furnish us with evidence of another kind that this subterranean chemical denudation is going on. When the acidulated water falls upon chalk, for instance, and, instead of being collected into rivulets, acts over the whole surface, we find a great mass of red clay, full of flints which have been weathered out. A great part of this red clay is the insoluble portion of the chalk. All limestones have a good deal of iron

* Lartet, Christy, and Jones, *Reliquiæ Aquitanicæ*, 1876.

† Rendu, *Théorie des Glaciers*.

in them. When the limestone is weathered away and the iron is oxydised, it colours the earthy residuum red. So cave deposits are often red. When the same process has been carried on at a considerable depth, as, for instance, over the surface of the chalk where covered by the lower Tertiary deposits, the residuum is unoxidised and green.* The carbonate of lime has been carried away in solution, making the spring and river water hard, lining all kettles and boilers with fur. At the mouth of a cave or a spring-head in a limestone district, where the water first gives off part of its carbonic acid, down goes the carbonate of lime which the water can no longer carry, and coats the moss and grass, and anything on which it can collect; and thus we see in petrifying springs only a proof that the chemical waste, which, under certain conditions, forms caves, is going on continually.

The quantity of travertine thrown down in some districts is enormous. A great part of Rome is built of this, the *Lapis tiburtinus*, so named from Tivoli.

In caves, as the water gets towards the outlet, the carbonate of lime is precipitated round the edge of a pendent drop or on the margin of some tranquil pool, or, instead of the water eating away the walls of the cave, it coats it over with stalactite, and so protects it from further waste. In doing so it frequently closes up altogether the fissures through which the water once ran. So it grows here, stops growing there; is laid on thickly in one place favourable for its rapid precipitation,—as, for instance, where the water is splashed over the surrounding stones and aërated at a waterfall,—while it takes ages to form a thin film in another adjoining chamber. When the great storm of 1872 broke up the floors at the mouth of Ingleborough Cave, I saw modern ginger-beer bottles which had been buried a foot deep in the stalagmite. On the other hand, Pengelly records that names cut on the walls of Kent's Cavern as far back as the beginning of the seventeenth century† are only just varnished over, as it were, with a thin stalagmitic coating. From the nature of the case this travertinous deposit must be of extremely irregular accumulation, and it is of no value as a measure of the age of the deposits which it covers. On the spray-moistened blades of grass or moss evaporation is rapid, and the travertine soon forms a thick

* *Q. J. G. S.* 1866, p. 402.

† Pengelly, *Brit. Assoc. Reports*. Kent's Cavern Committee, 10th and 11th Report, 1874, 1875.

porous mass; and inside the caves there is a difference in the quantity of water that trickles over different parts, a difference in the amount of carbonate of lime in solution in the water, and a difference in the rate of evaporation and giving-off of the acid gas.

Most of the leading facts with regard to caves and cave-deposits were noticed by Dr. Buckland, and clearly told in his interesting book, the *Reliquiæ Diluvianæ*. We must remember, of course, that he wrote that work to support a theory, and so, when he gets to the description of the gravels, &c., associated with the cave-deposits, either in or near the caverns, he sees in them the evidence of a short and transient, but universal, flood. But he quite realised the long sojourn of the beasts of prey in the caves, and the many generations of animals that furnished them with food. He says that he had estimated that in some of the German caverns the bones found indicated ten times the number of individuals that could in the flesh have been crammed into the cave. He spared no pains in gathering information as to the habits of the modern representatives of the hyæna and other animals whose remains occur in the deposits; and his graphic description leaves little to be added. It is interesting to read his ingenious inquiries into the cause of the polished and worn bones which are found in these old hyæna-dens, which he refers to the trampling of the animals on the fragments as they lay partly imbedded in the muddy floor; pointing out, by way of illustration, how some objects of reverence, in stone or metal, have been rubbed down by the touch of devotees. He probably had in his mind the toe of the bronze statue of St. Peter in Rome, which has been polished and worn by the lips of the faithful.

Buckland's view, that the deposits of the celebrated Kirkdale Cave, and other similar caves which he refers to, would be connected with a great submergence, which he identified with Noah's Flood, was not, however, so wild as we are sometimes inclined to think, in our eagerness to assert the independence of such inquiries from all preconceived ideas or theological tenets. There certainly is evidence in many places along our coasts of small depressions since the occupation of those districts by man, and it is extremely probable that the land had not, at any rate, recovered its present elevation in this country after the greater submergence that followed on the Glacial age, before man appeared on the scene.

There is a great deal of evidence of torrent-action in these caves. There are marine shells washed into them and buried in the same earth as Palæolithic man and the extinct

mammals. Buckland's view was, as I believe, far more nearly in accordance with facts than the views of those who have argued for the pre-Glacial age of some of these caverns, which contain only the later group of early Pleistocene mammals. It agrees with the view that there has been a great submergence since the occupation of some of the known Pleistocene caves, but is less wild than the theory that the deposits of that submergence are Glacial because they contain a large percentage of material derived from older Glacial deposits. I have already combated the view that the contents of the Victoria Cave * were pre-Glacial, and I have recently † examined the evidence upon which the theory that the contents of the caves of Ffynon Beuno were pre-Glacial because they were anterior to the submergence which followed the Glacial age. This view was far more untenable than that of Dr. Buckland, for its advocates held that if the sea of the last submergence washed the mouth of these caves after they had received the deposits containing the Palæolithic remains now found in them, that in itself would constitute a proof that those remains were pre-Glacial.

It is a very curious thing that, although we find such abundant evidence of Palæolithic man in caves as well as in river deposits, there should be so few remains of his bones. Perhaps it was because such little care was taken of the dead that all traces of them were soon destroyed by beasts of prey. However, the fact remains; and, therefore, it is of great importance to inquire into any alleged occurrence of human bones of Palæolithic date. One such announcement was made some years ago, when it was reported that a whole human skeleton had been found with the remains of the mammoth and other extinct animals in a cave on the coast near Mentone. The skeleton was brought to Paris, where I saw it. In a photograph which was shown to me soon after the discovery there were two Neolithic implements lying beside the body, but these were not exhibited with it in Paris. The body was lying on its side in a red earth, with few fragments of any kind in it. There was a quantity of oxide of iron about the head, which might have been the remains either of ornaments in pyrites or of a pigment formed of redde.

Some years afterwards I had an opportunity of examining the place where it was said to have been found, and of con-

* *Trans. Vict. Inst.* March, 1879, vol. xiii. p. 316.

† *Q. J. G. S.* (Nov. 17, 1886), vol. xliii. 1887, p. 73.

versing about it with M. Bomfils, who was there at the time it was discovered. The cave is one of several which occur east of Mentone in the Limestone Rocks, known as Baousse Rouse, the Red Rocks. The cave was partly filled with cave earth and angular fragments of limestone fallen from the roof and sides. In this the skeleton was found, as far as I could gather, *interred*. I learned that the implements which I noticed in the photograph had not been found with it, but had been put in to make a better picture. It appeared that, though found with the bones of the extinct mammalia, it was not Palæolithic, but buried among them, and so it may have been of any subsequent date. The evidence, however, which appeared to assign its more probable age to it,—namely, Neolithic,—was unfortunately of no value, as the implements were not found with the skeleton, but only placed by it to make a more interesting photograph.

Some caves, like that of Adelsberg, about twenty-six miles east of Trieste, open out into grand halls draped with stalagmite and sparkling with crystalline incrustations. One of the chambers measures $665 \times 640 \times 100$ feet, and in another, on every Whit-Monday, a great ball is given. The work of excavation is still going on here, for a river empties itself into the cavernous rock below the entrance to these grottoes, and is heard roaring in the deep recesses far within the cave.

In other cases, instead of such vast halls, we find a more immense extent of galleries, as in the Mammoth Cave of Kentucky. Both suggest a great lapse of time. In this it is estimated that there are about 150 miles of underground passages. All the drainage of that area drops into great swallow-holes which join the general network of subterranean channels. In them a uniform earth temperature of 54 deg. Fahr. is maintained. No frost and thaw aid the denudation there. As long as the area drained has been unchanged and the amount of acid in the water has not varied, the rate of waste has probably been the same; and though we cannot offer any numerical estimate of the time it has taken to remove so much rock in this way, we cannot help feeling that it must have been very long.

If we turn to the fauna of this cave, we get a peep at Nature carrying on some of her most mysterious work. Here we find animals modified to accord with their surroundings, organs unused being atrophied and lost. Where there was no light, they could not see. So many of the insects, crustaceans, and fish are blind. The wild spring and headlong flight of the grasshopper would be dangerous in those dark recesses. The poor insect would dash against the rock or

drop into some treacherous pool. So nature deprived it of wings, and, instead, lengthened its antennæ, so that it could feel in time to save itself when, with less impetuous leaps, it came against an obstacle.

Do these changes also point to a great lapse of time? or may we believe that among the lower forms of life, and those in which the generations follow one another most rapidly, these changes also may be much more rapid? There is nothing in the nature of the case to show that evolution must be slow. If forms of life are modified by their environment, the rate of change in the organic being *may* yet be slow; but, as far as we can see, it often is very rapid. What an opportunity for studying such questions. An animal, the type of liveliness—the sunny grasshopper, the flying ruby emerald or topaz—is plunged at once and for ever into the darkness of earth's innermost recesses. No need of wings, where it dare not fly; no use for eyes, where it cannot see; no advantage in gorgeous hue, where there is no light to be reflected. What will become of it? Nature cuts off its wings; nature blinds its eyes; nature washes out its brilliant colours; but, in compensation, gives it means to guard against its new dangers by lengthening out its antennæ, to let it feel its way about.

If this process is still going on, what will it come to? Does it go on indefinitely throughout all nature, or are there limits of evolution for all, or its own limit for each form? On the one hand, from analogy we learn that we must not assume, because development goes on constantly within our short experience, that it must go on in the same way indefinitely. Were a being from a treeless planet to visit our earth and report upon what he observed of the growth of an oak, he might record that the tree developed in the same way each year—bud, leaf, flower, fruit; and that twig, branch, and bowl grew in proportion; and the roots shot out downwards and sideways, seeking, with what looked almost like intelligence, the best-suited soil. He saw no reason why it might not go on for ever while our earth could bear it. How different the fact. The oak tree has its term of life. So may species, for aught we can at present certainly say, have their term of life. But what determines it? Again, I appeal to analogy not as an argument so much as in illustration. Fairy-rings on the grass are the annular spaces on which a certain fungus grows. This fungus scatters its spores all round, but they will grow only on the virgin soil outside, and, as they will not grow where they have grown before, inside the ring the species becomes extinct.

But plants help one another. A forest creeps along the hillside and the vale, destroys the life that will not grow below it, but itself exhausts the soil, and in time perishes, having, however, renovated the soil for other plants which were kept out so long. In the four and six course farming man recognises this. Many diseases are but growths which creep across the world, feeding upon the constitutions that favour them, and then die out. Could we but destroy the seed that lingers somewhere to spread again over an earth peopled by new generations.

Shall we say, then, this is the difference? The individual has a term of life measured by the vitality inherent in himself, which cannot be wholly renovated.

The species has no limit to its life, save that imposed by its surroundings, which, however, it renders unsuitable by using up that on which its life depends. This, however, can be renewed. But will the same life be there to take advantage of the renovation? That is the question in each case.

The dying-out and migration of species thus becomes only the outward growth of the *fairy-ring*.

The incoming of new species only the appearance of the wingless, colourless grasshopper in the Mammoth Cave.

The CHAIRMAN (H. Cadman Jones, Esq.).—I presume I need hardly put it to the Meeting that we should return our thanks to Professor Hughes for his very interesting paper, which it has been a great pleasure to listen to. After some communications have been read, it will be open to those whose studies have lain especially in the direction of the subject taken up to commence the discussion.

Captain FRANCIS PETRIE, F.G.S. (the Honorary Secretary). Among the letters received from those unable to be present this evening are the following. The first and second are from the Duke of Argyll and Professor Hulke, F.R.S., mentioning that they have read Professor Hughes's paper with much interest, and adding that they have no criticisms to pass upon it. The third is from Sir J. William Dawson, K.C.M.G., F.R.S. :—

“ McGill College, Montreal,
“ March 16, 1887.

“ I beg to thank you for your kind communication of an early copy of the interesting paper by my friend, Professor McKenny Hughes, on Caves. I am glad that Professor McKenny Hughes is applying his well-known acuteness and discrimination to those modern deposits which have given rise to so much somewhat crude discussion and speculation. His paper on the Drifts of the Vale of Clwyd * I regard as one of the most valuable we have recently

* *Quarterly Journal of the Geological Society*, February, 1887.

had, and especially so as placing the drifts of Wales more closely in relation with those so widely distributed in Canada, than heretofore. In the present paper he has very clearly illustrated, in the case of Ingleborough Cave, the fact that true uniformitarianism in geology includes local and occasional catastrophic action. This I regard as of the most vital importance to geological reasoning, and especially in the explanation of cavern deposits and river gravels, which, more than most other formations, are liable to be affected by violent and paroxysmal local *debacles*, as well as by apparently capricious accidental changes. The utmost caution and the most careful and minute observation are necessary in dealing with these deposits, and in estimating their ages and their relation to the human period.

“With kind regards,

“I remain, yours truly,

“J. WILLIAM DAWSON.”

“Captain Francis Petrie.”

The Rev. J. Magens Mello, M.A., F.G.S., writes:—

“I am very sorry that I am unable to be present at the reading of Professor McKenny Hughes's paper this evening. To the greater part of it I have nothing that I could add save in the way of corroboration from personal observations of similar instances. But I have the very strongest doubts whether there can be any trace whatever left in our caves of the Noachian Deluge, even granting that catastrophe involved our islands, which I am hardly prepared to admit. My own experience of British caves, both from observation and from reading, tends to show that the contents of, at any rate, most of them have been the gradual accumulation of a long series of years, during which they were occupied partly by beasts, partly by men, and that there is no evidence whatever to be found in them of so sudden a cataclysm as the Great Flood, the historical character of which is, however, abundantly confirmed by overwhelming proofs of various kinds.”

The Rev. Dr. Walker, F.L.S., says:—

“Dun Mallard, Cricklewood,
“February 19.

“On p. 96, Professor McKenny Hughes speaks of the appearance of ‘the wingless, colourless grasshopper in the mammoth cave.’ I should be glad to be informed whether or not the *same* species, winged and coloured, is found outside the caves in broad daylight? If not, the inference would seem to be that the grasshopper in question had originally been created sightless, to fit it for its natural surroundings, and not have gradually become so through the unused organ being atrophied and lost. As it is inconceivable that any particular species would survive in the dark cave, and have disappeared long years since in the open air, where all the conditions for supporting and prolonging existence are so much more favourable. Lastly, short antennæ and the possession of wings are not the characteristics of *all* grasshoppers living in the light, as I can prove by species captured by myself and in my own collection.”

Also a letter, just received, from Sir Charles Warren, regretting that he is unable to be present, as he had intended.

Sir WARINGTON W. SMYTH, F.R.S.—In response, sir, to your invitation, I have much pleasure in saying that I am sure the paper we have just listened to must have been a great treat to the whole of us. My friend, Mr. McKenny Hughes, the Woodwardian Professor of Geology at Cambridge, has had an unusual amount of experience in hunting up and examining caves, and I may state that, having during a series of years had opportunities of exploring several of those he has mentioned, I feel particularly indebted to him for the graphic account he has given us of a district and cave I have not seen. I shall not attempt to follow him into the difficult region into which he has been carried by the wingless grasshoppers of which he has spoken,—a part of the question which we may look upon as separated from the earlier portion of the paper. I desire only to express to him the reasons why I feel especially gratified with some of the points he has put before us in describing the modes by which caves have been formed and the manner in which they have been filled by various kinds of material. I recollect that in my earlier days of geological study I was surprised to find that a former generation of geologists—I speak especially of Professors Buckland and Sedgwick and their continental contemporaries—set very great store by the examination of caverns, and entered not only into a series of explorations, but of philosophic considerations, of a most interesting character, on this subject. Indeed, I do not know that anything more interesting can be pointed out than the work by Professor Buckland, of which Professor Hughes has reminded us,—*Reliquiæ Diluvianæ*,—although it is, doubtless, true that the theory on which he relied so much at the time he wrote that book is now very much discredited. The descriptions he gave with such admirable freshness of the different caves he visited and the facts he submitted cannot be studied by us without great advantage. I had the happiness, when a young man, of making a tour into that part of Franconia in which Dr. Buckland particularly delighted, and of seeing some caves in the neighbourhood of Muggendorf, which he made a special locality; and the impression formed in my mind coincided with his view as to the filling of the caverns in that part of the world by a succession of cave bears with the bones of animals which they had dragged in, so that in process of time they became a rich harvest to the geologist, who, on taking up the stalagmite which covered the cavern floors, found the bones of those animals embedded in it. I remember being greatly struck with a cave high up the side of the Muggendorf Valley, where it was clear that the hollow had been formed by the action of water containing carbonic acid, and that some of the bones discovered there must have come in by accident from openings above. In fact, the bones of two human beings were found in that cave underneath the chasm through which they had evidently fallen. The same thing has been impressed on me most forcibly in the district of Cross Fell, Cumberland, where, having, some few years ago, had occasion to be frequently crossing

the mountains, it happened that, being short of time, I was sometimes so pressed that, after I had left the railway at Penrith, in making my way over a place 1,000 feet high to my shooting-box on the middle of the moor, I was overtaken by darkness before I could reach home. I had observed how amenable the district was to swallow-holes. Very often, where there was only a thin covering of sandy rock, there was, at short distances from one another, a succession of caverns hollowed out of the limestone stratum, and these becoming enlarged had given way at the top and fallen in so as to leave a crater-like opening. One night, when it was pitch dark, I came suddenly upon one of these craters, and tumbling head over heels picked myself up at the bottom. I then found that I was very near a little hole through which water was trickling, and when I got to the shooting-box I found, on putting my hands in my pockets, that they were full of moss ; so that I felt sure I had had a complete capsiz. It struck me that, supposing I had broken my legs and had been left there to starve to death, my bones would probably have been carried by the water through one of the openings in the rock into a limestone cavern beneath. Thus it seemed to me that at times small bones may have been introduced into caverns through these openings above, and at others, bones of the larger animals may have got in through the chasms we find in the rocks. There is the Plymouth limestone again, which often, through quarrying operations, has been the means of presenting to us the bones of lions and tigers and a number of other animals which at the present day are strangers to anything like our latitudes ; but I will not detain you by going into this branch of the subject. I may say, however, that what has been put before us in reference to the Ingleborough and other caves teaches us a very important lesson. I was rather astonished by what the author of the paper told us as to the stalagmitic floors being forced up by the action of a very heavy flood of rain water, and I cannot help seeing therein one of those difficulties that are exceedingly apt to puzzle tyros in geological inquiry. I have always felt that the examination of these caves ought to be conducted with the very greatest care and caution, and that the question of their formation and contents was a matter requiring to be dealt with by the most experienced geologists ; because, when we come to the breaking up of stalagmite floors and the bones embedded in them, it stands to reason that conclusions of the most dangerous kind may easily be arrived at far too hastily. Whether one refers to caves that are to be found on the sea-shore or to caverns met with in the inland limestone districts, there are on all sides a great many subjects to be considered in forming our conclusions. I cannot help referring to one peculiarity in regard to caves, which, perhaps, Professor Hughes has not seen, but which I have noticed in a district to the east of Ingleborough, namely, at Swaledale, in the locality of Grinton Moor, where one finds on going through the caves the joints in some of the beds are enlarged in a curious fashion. The caves there, where the miners find the most valuable lead ores, are longitudinal, and present appearances so numerous, and so

obviously showing the results of the very long continued action of subterranean streams, that one is puzzled as to what has occurred there, and at a loss to connect what is seen with those great bodies of water which may through the weathering of the limestone, have washed everything out. There no boulders are to be seen—nothing but the most beautifully fine dolomitic sand and crystallised lead ores, sometimes showing in large masses, like sides of bacon. In the Forest of Dean there are similar openings, where a valuable iron ore is found, the other materials in these caves also being almost entirely dolomitic. I should like to hear from Professor Hughes whether he has observed anything of the kind at Ingleborough. Here let me say that I think one of the most important lessons we have to learn is, the great caution that ought always to be observed in seeing that our observations are made with scientifically systematic precision; and, in the next place, in only accepting statements that are made as to these matters when they are founded on exact work of this kind, undertaken by experienced persons, well qualified to judge of the mode in which cave-openings have been formed as well as of the mode in which they have been filled.

Mr. J. STALKARTT.—I should like, in saying a few words on this subject, to know whether the history of the tigers and hyænas, whose remains are found in the caverns spoken of, is different from that of the tigers and hyænas now existing in different parts of the world? Ordinarily, when a tiger or hyæna kills any animal he does not drag it into a cave, but eats it where it has been seized; it is only when it has young to feed that it drags the carcass to its den. A lion does not carry its prey up a mountain side; it lies in wait near the track of the animal it kills, and there takes its fill. The hyæna might drag its prey down a hill, but would hardly drag it uphill. We know that in India these animals kill and eat their prey on the spot, only sometimes carrying their prey a short distance. They may quarrel over the remains, and drag pieces hither and thither; but, for the most part, they eat where they kill; that which they leave is chiefly the head. Suppose a bullock that has died a natural death is found: the jackals quarrel over it; a leg is drawn here, and another there, but the greater portion of the carcass is left, and the head, which they cannot gnaw, invariably remains. Therefore, I am not inclined to believe that these caves were the resort of hyænas in the manner alleged. I think we ought to inquire into the fact whether the hyænas referred to by geologists had habits differing from those of similar animals at the present day.

Mr. S. R. PATTISON, F.G.S.—I take it that the hyænas spoken of as found in caves were not only inhabitants of those recesses, but made incursions in search of prey. In Somersetshire the existence of the lion is too well attested to admit of any doubt, and the fair inference from the bones found in the caves is that they were dragged there. It is, however, by no means certain that all the hyæna and other bones found in caverns were those of animals dragged in: doubtless many of them are those of

animals that died a natural death where they are found. I am sure we ought to be thankful that Professor Hughes, during his Ingleborough explorations, was able to escape being made a martyr to science; for I can understand, having travelled those moors myself, how easily an accident of a serious nature might have occurred. As to the paper this evening, it fully bears out Professor Hughes's promise to tell us all about the operations of nature in forming and filling these rocky caves; and not only has he kept his word in this respect, but he has given us a graphic and picturesque account of the exceptional meteorological circumstances which sometimes act as factors in these transactions. With regard to the glacial period, it may be gathered that there was first of all a glacial period; then a pluvial period which has been slightly referred to as that of a Deluge; then the period in which there was the final subsidence of the land and the accumulation of modern gravels which we now behold. The controversy arises as to whether the animals whose bones are found in the caves lived before the glacial period or afterwards. What I have to say on this point is that the glacial period is really a sort of sliding scale. Its effects may have been felt at one spot and not at another at the same time, so that there must have been constant wasting at one time and place and constant accumulation at another; the result being that life may have made its appearance, and then its evidences may have been mechanically covered up by the changes. The subject is one of extreme difficulty, and I should say it is impossible, as far as dogmatic assertion goes, to say much more than this. I quite agree with Sir Warrington Smyth that these matters should be dealt with by geologists with the utmost caution, especially with regard to the conditions of life during the glacial period. With regard to the animals found in the Kentucky Cave, Professor Hughes thinks that certain of the features to which he refers in the case of those creatures have been modified by their surroundings; but the fact is that there is no trace of modification, for, as far as our knowledge goes, the features there remarked have always been the same,—the long antennæ and absence of wings in the insects he alludes to having been constant. Consequently, I cannot see the force of producing these as proofs of evolution. Then, as to the mushrooms in the fairy rings, which, it is said, are prevented from growing inside through the material being exhausted, so that there the species become extinct; I submit that the species does not become extinct. The individual dies, but not the species; and, although it may be speculated on as a theory, we have no instance of a species dying out in that way. I will not now enter into any argument upon the point, but simply claim to enter a *caveat* against it.

Mr. D. HOWARD, V.P.C.S.—It seems to me that the paper to which we have just listened is one of exceptional value, not merely on account of the inherent interest of the subject, but from the very useful and sound method of study it puts before us. It was, I think, a most fortunate accident that led

Professor Hughes to Ingleborough at the time of the great storm, the effects of which he has described, because a more accurate and valuable account of that catastrophic incident could not have been furnished. The subject is one of very great importance in many ways. The more we are struck with the continuity of causation, the more must we guard against circumstances which carry the idea too far, especially in regard to questions connected with chemistry, which afford abundant examples of the danger of carrying this theory beyond its legitimate scope. We have many examples of stalagmites forming with perfect regularity, and we assume that the process has been going on from endless time. I have twice seen the Ingleborough Cave. The first occasion was during a very wet summer, when a vast deal of water came down, not in torrents, but with a very rapid formation of stalagmite. The autumn following was very dry, and the stalagmitic formation not so rapid, and I could not help thinking how utterly impossible it must be to form anything like an accurate judgment of the speed of formation when the process was shown to be going on at two different rates. It is not merely the action of carbonic acid in the destruction of the rock that strikes one, but the wonderful way in which the solvent process goes on hollowing out the lime and disintegrating the stone, until some flood occurs and washes away vast quantities of the broken up débris. This is specially the case in the carbonated rocks, where you get a more rapid solution than in other cases; because the rock is honey-combed and cut to pieces in a wonderful manner, so that it goes to pieces with a comparatively small rush of water. Throughout the whole of this question you must bear in mind that a very slight alteration in the balance, whether of the carbonic acid produced by the surface vegetation, or in the proportion of water to carbonic acid, may make a very wide difference in the result. The presence of a little more or less silica in the water may make a vast difference in the mode in which the travertine is deposited. Any one who has had experience in connexion with steam boilers knows full well that you may have it deposited in an exceedingly hard scale if there be a sufficient amount of silica to cement it together; or, if this is not the case, it may exist as an exceedingly soft powder, which blows away directly the blow-off cock of the boiler is opened; in the same way it is not merely the percentage of carbonate of lime that is dissolved and set free by the evaporation of the carbonic acid, but whether there is sufficient cementing action going on to form a solid mass to resist the inflow of the water. One cannot help being struck with the amount of careful knowledge displayed by the author of this paper. He goes back to the most minute forms of things. This is what Lord Bacon did many years ago; but the lesson is one that has not been fully learned yet, although it is refreshing to find that it has been acquired and put in practice by Professor Hughes.

Sir WARINGTON W. SMYTH—(taking up from the table a pipe encrusted with stalagmitic deposit) asked how long it had taken to produce that result.

Professor HUGHES said he was unable to say.

Sir WARINGTON W. SMYTH.—I have seen a pipe as large as this filled up in two years.

Professor HUGHES then replied, saying :—A question has been raised by Sir Warington Smyth as to how the bones got into the caverns. That, question is one that ought to be asked with regard to each cave separately. There is, first, the suggestion that the bones may have been washed in from above. I have discussed this point (p. 90). Or the bones may have been carried in by animals that inhabited the caves ; and then we have to consider whether these caves were ever hyæna dens, whether the beasts of the present day behave in the same way as those whose remains are found in the caves appear to have done. Dr. Buckland found that they do. He examined carefully the bones of the animals gnawed by hyænas, and found the marks of teeth on the bones so dealt with, and that those bones which had marrow in them or some little flesh adhering to them have had splinters torn away, or are altogether broken up. Thus, it is clear, from the accumulation of evidence, that hyænas were there, and had dragged in the remains of many of the larger animals which are found lying about. In some cases we find, instead of a mass of broken bones, the bones lie whole upon the floor of the cave. This seems to have been the case where the remains of bears are found ; it is different when we have a hyæna den. It is evident that, in determining these questions, a great many things have to be taken into account. As to the way in which the carcasses are dealt with, we must remember that, when the larger animals have done with them, the smaller ones come in,—the foxes, the rats, and the mice,—all of them pulling the bones about. We trace them by the marks of their little teeth. Thus, you may find the bones drawn up into crevices into which they could not have been carried by the larger animals. Once, at Cambridge, I was shown a set of bones that ought not to have been in the gravels, from which they were said to have been obtained. I went and asked the workmen where they got them. They showed me the place, and told me they were in a sort of hole stretching from one point to another across the corner of the pit. I cleared out and examined the hole, and noticed in it a series of claw-marks, showing that the place had been used by badgers and foxes. Thus we had another example of the way by which the bones were conveyed into places where the larger animals could not have taken them nor water have washed them. Or, again, the bones may be those of animals which died in the cave—bears, for instance. In one case the bats were described as furnishing, in the shape of their own bones, a large portion of the deposit. Thus, it will be seen, we have to go from one thing to another to arrive at the true explanation. Those animals came there, lived there, and died there, and the remains of bats covered the whole of the bottom of the cave. Owls and other birds of prey also bring in remains of animals, as I pointed out in the case of Cave Ha. The same kind of thing has been noticed in America, where in the upper layers of cave-deposits are, in a number of cases, found

the pellets of owls, and lower down the bones of small animals, packing all the interstices. Therefore, it is necessary that in every case we should consider how the bones found in a particular cave got there.

Mr. J. STALKARTT.—They do not eat in caves. We find in India that the tiger will not go into a cave where he has a wilderness or jungle at hand. This is so in the case of the tigers close by the Himalayas; but another tiger, which is rather smaller, and is found on the other side of the Ganges, does go into caves, and has there been shot in the most plucky manner by British officers. If you get evidence from those caves of such a deposit of bones as has been described, then, doubtless, the inference which has been drawn will hold good. It may be that the hyænas spoken of may have gnawed the bones before they got into the caves. When a lion or a tiger has killed an ox or other large animal, and sucked the blood or eaten part of the flesh, the jackals go to the carcass and finish the work, or the vultures assemble and tear it to pieces.

Professor HUGHES.—We have not found traces of the tigers behaving otherwise than according to their ordinary habits at the present time. We do, however, find remains of hyænas in the caves, and, as we are informed, the hyænas of to-day do leave their marks on the bones of the animals they eat, and other traces, just such as are found in the caves, and that, I think, is sufficient. With regard to the glacial epoch, I have confined myself to what has happened in one particular valley, and asked what is the order of events found there, for the glacial conditions found in another hemisphere can make no difference as far as this particular matter is concerned. The record of intermediate forms is exceedingly rare. If we could find in any of these caves a set of deposits representing every stage in the growth of cavern-deposits, we should possibly get all the various developments of the intermediate forms of life; but, not having these, we say that the remains we find are those of creatures which do suit their surroundings, and differ from the nearest allied forms by modifications such as might be carried out according to the laws of evolution as worked out and observed within the limits of our lives. It is one of those cases in which you have an hypothesis founded in the first place on one bit of evidence, and then supported by the comparison of that with another bit of evidence, until you get more and more data added to what was at first insufficient and the foundation of a tentative hypothesis only, and in the end you come to the conclusion that nothing but that hypothesis will fit in with all the observations made. With regard to what has been said about the fairy rings, what I meant was that the plant became locally extinct within the circle, and, if its possible area of growth were limited, and it were pushed to the margin, it might, in the same way, become totally extinct. As to species having died out, I need only mention the sea-cow, the dodo, and the auk.

Mr. PARTISON.—I did not mean it in that way.

Professor HUGHES.—Then, we are agreed. All we have to do is to show

that species do appear under such conditions, that we may say they have been modified to suit certain laws, and that they die away when the surroundings are unsuitable. As to the rate of modification, I will only mention the change in the character of shells produced by the introduction of unfavourable conditions, such as fresh or salt water, and refer to the vast mass of evidence given by Darwin, in his work on Plants and Animals under Domestication.

The Meeting was then adjourned.

ORDINARY MEETING, MARCH 7, 1887.

THOMAS CHAPLIN, ESQ., M.D., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following Paper was then read by the Author :—

ORIENTAL ENTOMOLOGY.

By the Rev. F. A. WALKER, D.D., F.L.S.

THERE can be no doubt but what the naturalist labours under certain special disadvantages in collecting in the East. For example, if he happen to be in Syria or Palestine, the chances are that he will be on horseback the greater part of the time, as the only means of travelling, owing to the heat and the stony hill-sides, and will on that account fail to capture many an insect.

Difficulties
of collecting
in the East.

Again, the traveller in a distant land, or even in an unfamiliar spot (for this remark must not be understood as only applying to the East), through ignorance of the particular plant affected by this or that caterpillar or perfect insect, or, at all events, where the plants in question grow, may waste his time in fruitless search, and may be more successful on the last day of his stay, if he finds the flowers he has been looking for, than during all the rest of the time put together.

By the term "Oriental Entomology" are to be understood all species of insects found in the East, not only those peculiar, or nearly so, to that region, but such as occur also in many other lands. This paper, naturally, only has reference to those parts of the East that the writer has personally visited, and where he has consequently observed and collected—namely, various places in Egypt, Palestine, Syria, Asia Minor, Turkey, Greece, on the first occasion; and Egypt and Nubia on the second.

Oriental
Entomology
—what it
must be
understood
to signify.

Three different types of Eastern butterflies (Lepidoptera Rhopalocera).

Such butterflies as fell under my observation in the East may conveniently be divided into three different types, for the better distinction and comprehension of the same; namely:—

1. English.
2. Mediterranean littoral.
3. Purely Eastern.

Typical British butterflies observed in the East.

I propose to term such species "Typical British Butterflies" as may be ordinarily seen in the course of a summer day's walk, and are ordinarily common and abundant at home, and not all the British kinds, including our rarer and more local, occurring in the East. For example:—

1. P. Brassicæ, Alexandretta, April; Corfu, June.
2. P. Rapæ, Philadelphia, May.
3. A. Cardamines, Ephesus, May; near Athens, June.
4. C. Edusa { near Jaffa, April 10; Shtora, April 18;
Philadelphia, May 10; Corfu, June;
and very generally distributed all along
the Mediterranean.
5. S. Janira, Corfu, June; Athens, June.
6. P. Alexis, Ephesus, May; Corfu, June.
7. C. Phlæas, Ephesus, May.
8. V. Urticæ, probably Corfu, June.
9. V. Cardui, road to Marathon, ditto to Laurium, June.
10. V. Atalanta, Corfu, June; Athens, May.
11. G. Rhamni, near Alexandretta, April; Belgrade, May.
12. S. Megæra, Corfu, June.
13. C. Pamphilus, Belgrade, May.
14. P. Linea, Acropolis, Athens, May.
15. P. Sylvanus, road to Marathon, June.
16. P. Machaon, Ephesus, May.
17. A. Cratægi, Ephesus, May; Deceleia, June.
18. L. Sinapis, Corfu, June.
19. S. Semele, Eleusis, May; Lycabettus.
20. A. Galatea, Acropolis, May; Lycabettus.
21. M. Cinxia, Belgrade, May.
22. T. W. album, Deceleia, June.
23. T. Rubi, Deceleia, June.
24. A. Lathonia, May.
25. P. Daplidice { Between Jerusalem and Jericho, April 4;
Jordan, April 5;
Philadelphia, May 10;
Colonos and Ceramcicus, Athens, June.

Local British butterflies observed in the East.

Rarest British butterflies observed in the East.

Twenty-five out of our total number of sixty-six British butterflies are here set down as coming under my own obser-

vation during the four months I spent in the East in 1882. No doubt there are some other kinds found equally in England and the East that I did not happen to come across.

1. P. Podalirius, Baalbec, April.
2. P. Alexanor, Ephesus, May.
3. G. Cleopatra, road to Marathon, June.
4. M. Didyma, Corfu, June.
5. V. Egea, Philadelphia, May.
6. L. Camilla, Prinkipo, May.
7. Minois Actæa, road to Laurium, June.
8. Minois anthelea, Deceleia, June.

Butterflies
typical
of the
Mediterranean
littoral
observed in
the East.

The geological formation of several of the countries bordering the Mediterranean is almost identical as regards the limestone hills, rocks, and boulders. Similarly the dark-red earth beneath the olive-groves on the sloping shores of Corsica closely resembles in colour the soil under the same trees on the sides of the hills of Judæa. Thus Palestine, Syria, Attica, are akin to a considerable extent in reference to the nature of their respective coast-line. From the identity of the geology follows, as a matter of course, a sameness to a great extent in the respective botany of these different lands, and again from the sameness of the botany follows the corresponding character of the entomology of these various countries.

Medi-
terranean
littoral—
what is in-
tended by.

The term "Mediterranean littoral" was used by Dr. Post, the well-known Professor of Botany in the American College at Beyrout, to denote the geographical distribution of plants along the said shores. On the present occasion it will be found convenient to apply it to the range of certain species of insects.

Eastern lands have this in common with the rest of the "Mediterranean littoral," of which they form a part, that three of the European species of Papilio, or Swallow-tail, are found there. Only one kind occurs in England, only two in France and Germany; or, if the third kind occurs at all in France, it will only be in the extreme south—as, for instance, the neighbourhood of the Pyrenees. I have myself seen and captured the three kinds in the East, though not all three in the same place.

Fauna of the
Medi-
terranean
littoral—how
exemplified
in Eastern
Entomology,
in respect of
the Papilios.

The said three are as follows:—

P. Machaon, England,	{ Generally distributed on the Continent,	} The East.
P. Podalirius.	{ Generally distributed on the Continent,	} The East.
P. Alexanor.	South of Europe.	The East.

P. virgatus.

It may be remarked that the Eastern real or supposed variety of *P. Podalirius* has received another name, *P. virgatus*, owing presumably to some difference in the stripes. The specimen of *P. virgatus* that I have had for some years in my cabinet is from Damascus; the one that was captured during my visit to the East is from Baalbec. If there be a distinction, as far as I can see, it is in the fact that *P. virgatus* has a narrower dark margin; *P. Feisthamelii*, the German variety (which has also a whitish in place of the primrose ground colour), a broader ditto than is the case with the ordinary type of *P. Podalirius*. *P. Machaon* was noticed at Ephesus, and on Mount Pagus at Smyrna. *P. Podalirius* was again seen at Deceleia and in Corfu. I pointed out *P. Alexanor* to my courier near the Sisyrrha quarter of ancient Ephesus, when he captured it, a large specimen, in fine condition, and the only one I have ever seen alive. I consider this insect as good a catch as any I succeeded in making in the East. As regards the fourth European species of *Papilio*, *P. Hospiton*, it does not enter into the present discussion, being exclusively confined to Corsica.

P. Feisthamelii.

Fauna of the
Mediterranean
littoral—how
exemplified
in Eastern
Entomology,
in respect of
the Pieridæ.

It would be going too far, perhaps, to assert, in the absence of further evidence than such observation as I have been able to bestow, that our three common species of *Pieridæ*, so abundant at home, are actually rare in the East. I can only say that I have never seen many of them there. I saw and captured one (female) of *P. Brassicæ* at Alexandretta in April, and one (male) of *P. Rapæ* at Philadelphia in May. On the other hand, it is certain that three other species of *Pieridæ*, either very rare or local with ourselves, are by no means so along the Mediterranean littoral, and that I caught all the said three kinds, and one of them in abundance, in the East. This will be best exemplified by the following statistics:—

Synchlœ Daplidice.

1. *Synchlœ Daplidice*. Bath white. (Our rarest English butterfly, and never seen by me alive in England.)

Of this butterfly there are specimens in the collection belonging to Highgate School, captured at Rome and Milan by a relative, at Lido and Ajaccio by myself. Ditto in my own collection, and captured by me between Jerusalem and Jericho, and on the banks of the Jordan, at Colonos and Cerameicus, Athens, and at Philadelphia.

Leucophasia Sinapis.

2. *Leucophasia sinapis*. Wood white. (Only seen by me in the New Forest, in England.)

I have caught it in osier-beds near Martigny, at Gorla, Bellaggio, and, as regards the East, in Corfu.

3. *Aporia cratægi*.^{*} Black-veined white. (If I ever caught this butterfly, or even saw it alive in England, it is upwards of twenty-five years since.) I have caught it at Fontainebleau, Chamounix, Baveno, on the Lago Maggiore, and, as regards the East, in abundance at Ephesus, on the slopes of Mount Prion, and I have also seen it at Deceleia.

*Aporia
Cratægi.*

A *primâ-facie* reason for the non-appearance of the commoner sorts would seem to be the absence of the cultivation of cabbages and turnips, that serve as food-plants for the caterpillars of *Brassicæ* and *Rapæ*, to the same extent as at home; for, though there are market-gardens in the neighbourhood of Jerusalem, and on the site of the King's garden, mentioned by Nehemiah, close to the Pool of Siloah, these are principally devoted to the production of artichokes and salads.

Some specimens of one, *P. Brassicæ*, that I saw several years since in the collection made by Mr. Lord in Egypt, were, to the best of my recollection, both larger and yellower than our own, in consequence, in all probability, of the warmer climate.

Brassicæ of
larger size in
Egypt.

The *Vanessas* constitute our gayest tribe of butterflies at home; yet those that I have seen are few and far between in the East; indeed, of *V. Egea*, which is not a British species, I saw (but, unluckily, failed to capture) one specimen in the dry bed of the Sari-kizi, or stream of the fair girl, at Philadelphia. This butterfly belongs likewise to the Mediterranean littoral, being found in the South of Europe. Perhaps *V. Atalanta*, *V. Io*, and *V. Urticæ* need our nettle, *V. Polychloros* our elm, as a food-plant. It is true that in one or two places I saw *V. Atalanta*—the Acropolis, for example, and Pass of Daphne; and *V. Urticæ* once,† I think, in Corfu; but these are only exceptions to the rule. I must have missed the right time and place for this particular genus, for that all our seven species of *Vanessa* are found in Asia Minor and elsewhere, I make no doubt, on reference to Kirby's *Lepidoptera*; and from what I have elsewhere read. *V. Antiopa* is mentioned in Canon Tristram's article on "Palestine" in the *Dictionary of the Bible*, and is, no doubt, far

Absence of
Vanessas in
the East.
V. Egea.

V. Atalanta.
V. Urticæ.

V. Antiopa.

* I took this in unlimited quantity about Torquay in May and June, 1855.—H. B. Tristram.

† These come out in the hilly and oak-clad parts in July and August. Plentiful in Bashan in July.—H. B. T.

commoner there than with us. It does not follow, however, but what other species may be much less abundant there than at home. *V. cardui* proved literally the only abundant species of *Vanessa* on the Acropolis and elsewhere round Athens in May and June, 1882, and in Corfu also at that date, and in the neighbourhood of Cairo in the month of December, 1883. The occurrence of this butterfly, however, proves nothing in reference to the special entomology of a particular district, as it is cosmopolitan, like its food-plant, the thistle, from which it takes its name. It often appears in perfect swarms,* but is occasional and variable in that respect, though several specimens are seen every year. The best parallel to the species that remain to be considered may be found in the fauna of the South of France.

Compare the following table:—

Other
Eastern
butterflies of
the Medi-
terranean
littoral.

<i>G. Cleopatra</i>	Taken by my relatives and John Curtis, the author of <i>British Entomology</i> , in 1830. Montpellier	Taken by my father in 1872, Rome	Taken by myself in 1882, road to Marathon, June; Corfu, June
<i>Anthocaris Belemia</i>	Specimens in my cabinet believed to be from South of France, 1830		Taken by myself in 1882, between Jaffa and Latroon, March 28; Beyrout, April 11
<i>Anthocaris Belia</i>	Ditto		Taken by myself, Philadelphia, May, 1882
<i>Limenitis Camilla</i>	Taken by my relatives and John Curtis, South of France, 1830	Taken by myself, Bellagio, Sept., 1872	Taken by myself, Prinkipo, May, 1882
<i>Minois Actæa</i>		Ditto, Martigny, 1867, and road to Great St. Bernard	Ditto, road to Lausanne, June, 1882
<i>Arge Titea</i>	Ditto (then called <i>Lachesis</i> .)		Acropolis and Eleusis, May and June, 1882.†

* In all my five visits to Palestine I have found *V. cardui* literally in swarms.—H. B. T.

† Some of our own *A. Galatea* were also taken by me on these occasions. I was unable to distinguish *Galatea* from *Titea* on the wing. Canon Tristram retains the old name of *Lachesis* for the species now known as *Titea*. Similarly, in treating of the *Pieridæ* and *Satyridæ*, he keeps to the old generic names in vogue before the subdivision of genera. "*Arge*" is "*Hipparchia*," and "*Anthocaris*" "*Pontia*" in his list.—F. A. W.

Melitæa Didyma	Road to Great St. Bernard, 1867	Corfu, June, 1882
Lycæna Melanops	According to Kirby, found in South of Europe, and called Cupido Melanops	Alexandretta, April 28, 1882
Satyrus Semele	Road to Gt. St. Bernard, 1867	Neighbourhood of Athens, May and June, 1882
Epinephele Ida	According to Kirby, South of Europe, Algeria	Corfu, June, 1882
Argynnis Lathonia	South of France, 1830; Villers la Ville, near Brussels, 1857; Lucerne, 1865; Bellagio, Genoa, Pontresina, 1872	Philadelphia, May, 1882

This list might be further extended, but what has been already stated will amply suffice. As a matter of course, these artificial divisions, framed for the sake of convenience, will overlap one another to a certain extent; and some of the most characteristic species of the South of France, the Vallais (where, twenty years since, I saw more species of butterflies in one single day than I had ever seen in my life before), and the East at the same time, are also found, though very rarely (Argynnis Lathonia, for example), in England. *S. Semele* is also English, somewhat local, but abounding in limestone and slaty districts in North Wales and North of England, which resemble the geological formation in Greece; and the lower wings of the Grayling (which is its English name), when it is settled on a rock, can scarcely be discerned from the lichen that overspreads the boulder.

Thais may be regarded as an Eastern genus for all practical purposes, as nearly every collection from Palestine, or Syria, or Asia Minor contains either *T. Apollina* (*Doritis Apollinus* according to Kirby), *T. Cerisyi*, or both species. And *T. Apollina* is quite the commonest butterfly during the month of March in Palestine, where I captured it on the plain of Sharon, and also where it occurred in great abundance on the Mount of Olives. I have never met with any species of this tribe anywhere on the Continent; and though it be true that *T. Rumina*, for example, is found in the South of France, and its variety, *Medesicaste*, in Algiers, still this does not invalidate the general claim of the tribe to be regarded as a sub-tropical, thoroughly Eastern genus. It is, in fact, the representative in Asia Minor, Syria, and the Holy Land of *Parnassius*, in Switzerland. And *Thais Apollina* is no doubt termed so from the supposed similarity of its markings to those of the commonest Swiss species, *Parnassius Apollo*. I also caught this insect in the meadows in the vicinity of Baalbec and Shtora, where it disports itself on and among the

Purely
Eastern
species.
Genus *Thais*.

scarlet anemones, no less brilliantly-tinted tulips (*Ranunculus Asiaticus* and *Tulipa oculi solis*), Star of Bethlehem, and in the Plain of Sharon, among the variously-coloured vetches, and sundry other blossoms of the flowery plain or hill-side. Many of *T. Apollina* were in good, more in fair, condition. A perfectly fresh specimen of *T. Apollina* has a dark, gauze-like appearance over the whole of the upper wings, and a primrose tint (with the exception of the red and dark-blue of the ocelli that form the border) over the lower. In the case of a more worn individual, the gauze-like appearance is the first to go; in one still more faded, the primrose tint also, until the upper wings are nearly transparent, except for the three black spots which mark its affinity with the *Apollinidæ*. Whether or no the sexes are distinguished by the respective faintness or vividness of the markings, is more than I have knowledge in this instance to say. I was also fortunate enough to see six or seven specimens of *Thais Cerisyi* in Syria, and to capture three—two at Shtora, and one at Baalbec. I attributed its scarcity to the fact that I was too early in the field for this particular kind, but have had reason to correct this view, having been informed that I was even in the end of March and beginning of April too late, as it appears on the wing at the very commencement of the season, before *Apollina*.

Purely
Eastern
species.
Danais
Chrysippus.

Danais Chrysippus is a beautiful insect, and of striking appearance, with its wings of a golden bronze, spotted here and there with black, and its upper one having a black patch at the extremity, bordered by a transverse band of white. Its geographical distribution is a wide one, as it is found in most warm countries in the Old World, ranging from Turkey (in Europe) to Australia,—of course, with some local variations, according to the particular habitat. In fact, all species of the *Danaidæ* are fine, and notably so *Danais Archippus*, a still larger and more magnificent kind, and a native of the United States. I am led to mention this particular species (*Danais Archippus*) from the fact that it has recently been successfully naturalised in England, Australia, and, I believe, the Fiji Islands; and notices of its appearance in England were sent from time to time to the *Entomologist*. To revert to *D. Chrysippus*, all the numerous specimens that I have captured were taken at or near Cairo (and I have never seen it alive elsewhere) in December, 1883, on geraniums and other bedding plants in the public gardens; settling on the poinsettias in the Island of Roda; and flitting about the tall zinnias which grow to a height of seven feet and upwards in the gardens of Matareeyeh at the famous

Heliopolis. The effect of this fine butterfly fluttering round a scarlet poinsettia in the bright sunshine was truly gorgeous, and so excited was I when I first saw it alive and flying round the bedding plants in the gardens of the Esbekeeyeh, that I struck wildly with my net, and thus missed securing my first specimen,—so unusual is the appearance of a tropical butterfly of large dimensions when seen by an Englishman flying in its natural habitat for the first time.

The fauna of Egypt, Palestine, and Syria, &c., are neither by any means so showy nor so numerous as those of Rio and of Port Natal; nevertheless, our knowledge of tropical species from many localities is more complete. As a proof of this may be cited the fact that I took a *Ypthima*, sp. ignot, in the neighbourhood of Alexandretta, and in the direction of Issus, on April 30, 1883, which I showed on my return to Mr. Butler, at the British Museum; but he could not find that it corresponded precisely with any species of that genus contained in the National collection. I had previously (April 12) netted one or two of the same species along the road winding up the cliff above the Nahr-el-Kelb, or Dog River, Beyrout; but, most unfortunately, these were completely spoiled for specimens by getting rubbed and broken when still in the net, owing to my horse shying in consequence of some Orientals, who think nothing can be done without clamour, making a great noise on the steep and narrow path. In connexion with this subject, it may not be out of place to mention that I captured two specimens of a *Deudorix* on the 29th of November, and two again on the 1st of December, in the public gardens at Cairo. In these instances, also, the species is uncertain. Mr. Butler has compared them with those in the National collection, and finds that they approach most closely to an Indian species, but is inclined all the same to think that they are not the same, because of the wide geographical distance interposed, there being no specimens from any part of the intervening region of Arabia. Kirby enumerates twenty-nine species of *Deudorix*, by far the greater number (twenty-four) from India and the East Indian Islands, one from Australia, one from Sierra Leone, one from South Africa, one from Natal, and one from Mozambique. My specimens of *Deudorix* are about the size and of the tawny hue of our own *C. Pamphilus*; with short tails, however, and with a dusky margin round the upper wings, and round a portion of the lower. My *Tarucus Nara*, from Cairo, November 29, is the *Cupido Nara*, of Kirby; locality, India bor. according to him. My *Zizera Karsandra*, from the gardens of Gezeedeh, Cairo, December 1, is his *Cupido Karsandra*; India bor.;

Purely Eastern species, Eastern entomology only imperfectly known. *Ypthima*, sp. ignot.

Deudorix, Nov. 1, Dec., 1883.

Tarucus Nara, Cairo. *Zizera Karsandra*, Gardens of Gezeedeh, Dec. 1, 1883, Cairo.

Melitæa
Trivia,
Ephesus,
May, 1882.

Eastern
Skippers,
Pamphila
Nostrada-
damus,
Gardens of
Gezeedeh,
Dec. 1, 1883,
Cairo.

Erynnis
Alceæ,
Acropolis,
May, 1882.
Lycæna
Bætica,
Cairo,
Dec. 10,
1882.

Which
country of
those I
visited in the
East to be
regarded as
the most
productive
of
butterflies.

occ. North-West Provinces, in short. And to Melitæa Trivia, of which I took four specimens in May round the ruins of St. John's Church, Ephesus, Kirby assigns Northern and Western Asia as its habitat. In reference to Skippers, I caught six specimens of Pamphila Nostradamus in the gardens of Gezeedeh on December 1. This species is recorded by Kirby from South Europe, Asia Minor, and North Africa. Erynnis Alceæ, of which I only captured one specimen at the Acropolis, in May, 1882, is, according to Kirby, found in North Africa, North and West Asia, and in Europe. I must not omit to make mention of Lycæna Bætica, according to Kirby Cupido Bæticus, which I caught in or near Cairo on December 10. The specimens I had previously in my cabinet are labelled India, and it would seem to be widely distributed over three continents, as Kirby records it from South Europe, South Asia, as well as Africa. It was first noticed on our English coast about or nearly thirty years ago. In common with several tropical species of Polyommatus, but unlike every English one in this respect, it has short tails, similar to those of a Thecla, and is also found a long distance up the Nile, as, if my memory serves me rightly, I noticed it at Aboo Simbel, nearly 900 miles from Alexandria.

Rightly to determine which country in the East is most productive in butterflies, Egypt, Palestine, Syria, Asia Minor, Turkey and Greece ought all to be visited in successive years, and for the same period of the year,—four months, say, from the beginning of March to the end of June. Then, given equally favourable conditions of weather, a comparison might fairly be instituted, and some adequate conclusion arrived at. But if the traveller, as was the case with myself, happens to be in March in Egypt, in March and April in Palestine, in April in Syria, in May in Asia Minor and Turkey, in May and June at Athens, and in June at Corfu, the chances are that, as the summer advances, he will capture most kinds of butterflies in the country he visits last. It is needless to remark that he must bear in mind all the kinds he sees, not only what he succeeds in capturing, and that whichever country he is in, probably some of the March kinds will have disappeared at the end of May, and so on, and that not only the number of species belonging to any particular district, but the number of purely Eastern species, is to be taken into account.

Compare the accompanying rough calculation of my captures in 1882 of various butterflies in the order of the different countries as I travelled:—

Egypt	0	} Species. {	This list does not include those kinds that I saw without catching, and possibly not quite all that I caught, but the relative proportions, at any rate, are correct.
Palestine	4		
Syria	9		
Asia Minor	13		
Turkey	8		
Greece	16		
Corfu.....	6		

The reason why I captured fewer species in Corfu than in Athens, though I visited Corfu last, was because I stayed a shorter time there, and had already at Athens possessed myself of some of the kinds that I afterwards saw at Corfu.

Also, compare the accompanying table of what may be regarded as purely Eastern species:—

<i>Egypt</i> , 1883.	<i>Asia Minor</i> , 1882.	<i>Greece</i> , 1882.	<i>Syria</i> , 1882.
Zizera Karsandra	Melitæa Trivia	Erynnis Alceæ	Yphthima
Pamphila Nostradamus	(Ephesus).	(Athens).	(Alexandretta).
Tarucus Nara			
Dendorix			
Danaïs Chrysippus			

Egypt has not many species, but those she does possess are truly Oriental. This refers to my second visit there. On my first I only saw European Pieridæ, which I failed to catch.

Canon Tristram's experience of collecting in Syria will best be given in his own words:—"When last in Syria (for six months in 1881), I saw many of the genus *Hipparchia*, and a few large *Satyrids*, too, in the wooded districts between *Mons Casius* and the bend of the *Orontes*; but I had neither the time nor means for collecting, as I was travelling light, without tent or equipage. I have just looked into my cabinet of what I collected in *Palestine* in 1872, and I see *Papilio Machaon*, *P. Podalirius*, and *P. Alexanor*. *Thais medesicaste* I got, and I think in my last visit I saw *Thais polyxena* common in places. Of *Pontia* I have *P. Eupheno* very common. Also *P.* ——— allied to *P. Belia*, but with the underside of lower wing broad bands of silver, instead of blotches very common. *Gonepteryx Cleopatra*—*Colias Hyale*. I think I saw often *Colias aurora*, but only in my last visit. *Hipparchia galathea* very common. I got also what I believe to be *H. Lachesis Libythea Celtis*—North Syria. *Limenitis camilla* (?), and *Lucilla*, an *Apatura*, and a *Charaxes* (?) *jasius*. The *Polyommata* and *Fritillaries* were too numerous to attempt. For all *Rhopalocera* Mount *Casius* in July is the spot of Syria for the collector."

Experiences of others in reference to Oriental entomology. Extract from Canon Tristram's letter respecting the *Rhopalocera* of Syria and Palestine.

P. Belia.(?)

Lachesis = Titea.

From what is above stated, and is attended with circumstances of additional interest from Canon Tristram's wide

and repeated experiences of Eastern travel, and his correspondingly great knowledge of the Oriental fauna, it will be noticed that some of the species—the large Satyridæ, for example,—that he captured in Syria are probably identical with those that I caught in the neighbourhood of Athens. So, too, in reference to *G. Cleopatra*; the kinds are the same as regards us both, but the particular Eastern locality different. His longer list of Rhopalocera of Syria and Palestine may also fairly be attributed to the fact that the Canon has paid more visits, visited more districts, and later on in the season, than I have had the good fortune to do, and similarly there are some species enumerated by him in the passage I have just quoted that I have never seen alive anywhere; *P. Eupheno* and *Charaxes Jasius* to wit, *Colias Aurora* also, and *Thais Polyxena* (supposing this last butterfly to be distinct from what I know as *T. Cerisyi*), and *Libythea Celtis* also.

Extract from Canon Tristram's account of the butterflies of Palestine in the *Dictionary of the Bible*.

To proceed to Canon Tristram's account of the "Natural History of Palestine," in *The Dictionary of the Bible*, I must not fail to omit his mention of the genus *Vanessa*, the more especially as my own observation of that particular group has proved so scanty. In vol. ii., page 691, we are told: "The gorgeous genus *Vanessa* is very common in all suitable localities; the almost cosmopolitan *Cynthia Cardui* and *Vanessa Atalanta*, *V. L. album* and *V. Antiopa* may be mentioned." The *V. L. album* here recorded is the same as the *V. Egea*, of which I saw one at Philadelphia, and according to the Canon's account somewhere else, I think in a letter, *V. Io* is also plentiful in Palestine. I can fully endorse the reality and importance of his concluding observation in his article on "Palestine," when he says: "If the many travellers who year by year visit the Holy Land would pay some attention to its zoology by bringing home collections, and by investigations in the country, we should soon hope to have a fair knowledge of the fauna of a land which, in this respect, has been so much neglected, and should doubtless gain much towards the elucidation of many passages of Holy Scripture." I have also witnessed for myself the following fact, that "the Apollo butterfly of the Alps is recalled on Mount Olivet by the exquisite *Parnassius Apollinus*. This butterfly has been variously termed

Thais	}	Apollinus
Parnassius		or
Doritis		Apollina.

A synonymic list of the butterflies of the Holy Land would

be of real service, as the few particulars in which I feel myself compelled to differ from the Canon arise almost altogether from the diversity of names employed to indicate certain species.

The Rev. J. G. Wood has caused three kinds of Syrian butterflies to be figured in his illustrations of "Bible Animals," namely,—

Anthocaris glauce
Hipparchia Persephone
Papilio virgatus,

Rev. J. G. Wood's illustrations of Syrian butterflies in his *Bible Animals*.

and of these *Anthocaris glauce*, which he calls the Syrian orange-tip, is the *Belemia* of my catching above recorded—*Euchloe Belemia* according to Kirby. The butterfly that Mr. Wood calls *Hipparchia Persephone*, and which he names the Syrian grayling, is termed *Hipparchia anthe* in my collection. I never saw or caught it, however, in the East myself. My two specimens that I had before are labelled Europe as regards habitat, and Kirby assigns as its locality South Europe and Western Asia. The third species, *Papilio virgatus*, has already been fully discussed.

Of *Lepidoptera Heterocera* I have it in my power to state very little. Whether the scarcity of moths is to be attributed to the coldness of the atmosphere after the sun has set in regions where the wind blows uninterruptedly across the desert, with no intervening obstacle or shelter to break its force, or to the short duration of a Syrian twilight, or to the scanty amount of wood, and, at all events, of large timber in many places, or to all these causes combined, is a matter of opinion. Granted that there were trees of requisite size for sugaring, and in a suitable situation for pursuing that method of attracting moths, it would be absolutely unsafe to examine the trunks after nightfall in the neighbourhood of any Eastern town or village, unless attended by an armed guard. There are no evenings, as with us, at the same time close, cloudy, and damp—such as moths love—in lands where there is literally no haze or fog whatever to obscure the distant view. All that I have to state, therefore, with regard to moths seen in the East is taken from my article on this subject in the *Entomologist* for the month of January, 1886, and is as follows:—

Hypothetical reasons assigned for scanty number of moths (*Lepidoptera Heterocera*) observed in the East.

"Of moths, the number of species is very scanty, so far as my personal observations went—to wit, *Saturnia pyri*, at Beyrout; *Arctia villica*, on the banks of the Meles; *Zygæna brisæe* in the Stadium, and *Pnyx* at Athens, and *Z. carniolica* in the Pass of Daphne; *Dasydia obfuscata* (Scotch annulet),

Enumeration of moths captured in the East.

at Alexandretta; *Venilia maculata* (speckled yellow), at the entrance to the Wady Ali; and, on my second journey, *Chærocampa celerio*, at the New Hotel, Cairo, in December."

Sphinx
Nerii.

Lastly, to quote once more from Canon Tristram's article: "The caterpillar of the magnificent *Sphinx nerii* feeds in swarms on the oleanders by the banks of the Jordan."

Best method
of preserving
Coleoptera
captured in
the East.

It will, I think, be found advisable to transfer Coleoptera shortly after the specimens are taken, and, at all events the larger species, to spirits, until the traveller has the requisite leisure and space to arrange his collection on his return home. Otherwise, on the supposition that the Coleoptera are pinned in a box in the course of his journeys, some kinds (if the box be kept closed and never exposed to fresh air) are apt to snap asunder and become very offensive,—notably the *Ateuchus sacer*, or *Scarabæus* of the ancient Egyptians, from the circumstance of what constitutes its daily diet, not to particularise further, it being one of those which are popularly known as scavenger beetles. On the other hand, if the insect-box be opened for ventilation, the misfortune that befel me may be the lot of another collector. When staying at the New Hotel; Cairo, I lost the Coleoptera, &c., I had collected in the vicinity of the Pyramids from the following cause. The sashes of the French window in my bedroom were open one afternoon, and my insect-box was left open on a settee close to the window. A rat must have climbed up the stem of the banana in the front garden, thence, by the long leaves which reached the verandah, on to the parapet, and thence, doubtless by the open casement, into the room, where he proceeded to devour the contents of the box, leaving nothing but the pins strewed about, along with some stray legs and wings. The said verandah communicates with three or four apartments, and a colonel of our British force quartered in Cairo, whose room was on the same floor, had to lament the loss of his candles on that same afternoon. If it could be shown on sufficient grounds, from testimony that I or others are able to adduce, that a considerable similarity exists between the respective Coleoptera of the various countries bordered by the Mediterranean littoral, a valuable argument might be founded on this fact as establishing the connexion between the geology, botany, and entomology of a district—perhaps a more reliable argument than even in the case of the butterflies, as Coleoptera are not so apt as Lepidoptera to wing their way from land to land, and though most species have wings, they do not always—I might say in many cases, do not frequently—use them. Some kinds only fly at dusk, and it is therefore

Ateuchus
Sacer,
Scarabæus
of the
ancients.

Eastern
Coleoptera,
in connexion
with the
Mediterranean
littoral.

without any difficulty that they can be taken in broad daylight; they do not successfully elude the collector, like a startled and swift-flying Rhopaloceros insect, so that in the case of beetles, perhaps more so than in that of any order of insects, the number of those captured corresponds with the number seen. There are three places where eastern Coleoptera may ordinarily be collected,—in flowers, under stones, and on refuse; in other words, (1) when adhering tightly by their forelegs to the middle of flowers, frequently that of the variegated thistle or opium poppy, as noticed at Philadelphia, Sardis, and the neighbourhood of Athens; (2) under stones, as on the slopes of Aceldama; (3) on refuse in the road, as at the villages of Junin and Kaukab in the vicinity of the Pharpar, and near the scene of St. Paul's conversion, and elsewhere.

Three places in which to look for Eastern Coleoptera—in flowers, under stones, and on refuse.

The remainder of this paper is chiefly a reproduction, with a few additional details, of the account I forwarded on this subject to the *Entomologist* of February and of April, 1885.

During my first visit to the East I captured 38 species of Coleoptera in Greece, 34 in Asia Minor, 21 in Syria, 18 in Palestine, 15 in Turkey, 7 in Egypt. On my second expedition I only captured 8 species of Coleoptera, 5 in Egypt and 3 in Nubia, but should have brought home a greater variety from Egypt if it had not been for the above-recorded deprivations of a rat. The difference in the number of species respectively noticed in the different countries may possibly be attributable, to some extent, to the time of year when the various localities were visited; and there are additional grounds for entertaining this hypothesis in the fact that the later the period the larger the number of species found. For example, 7 in Egypt (in the month of March), 18 in Palestine (March-April), 21 in Syria (April), 34 in Asia Minor (May), and 38 in Greece (May-June). Only 13, it is true, were noticed in Turkey in the month of May, for the simple reason that a great part of my time was spent in visiting the public buildings, instead of in the open country. The genus *Oxythyrea* had a wide range, occurring alike in Palestine, Syria, Asia Minor, Turkey, and Greece. Two species of this tribe were found in great abundance in cinctella and hirtella, and for the most part, as was also the case with many of the *Cetonias*, when tightly ensconced in the middle of a flower. I never saw any kind of beetle anywhere in such countless profusion as the showy orange and black-spotted *Mylabris quadrimaculata*, on the ears of ripe corn during my return drive from Decceleia, on the 1st of June, at the close of a bright and hot day. Some few good sorts were found beneath stones; seven specimens, for example, of the rare

Which country of those I visited in the East the most productive of Coleoptera.

Wide range of Genus *Oxythyrea*.

Description
of various
species of
Coleoptera
caught in
the East.

Nebria hemprichii at Aceldama, on April 3, and *Chlænium spoliatus*, *C. vestitus*, *Anchomenus austriacus*, and such-like metallic Coleoptera, on the wet ground in the vicinity of the great Bend, or reservoir, of Sultan Selim, that had recently overflowed its boundary, on the 25th of May, at Belgrade. *Anthia sex-maculata* (variegated black and white) is the handsomest, decidedly so, of the very few species I saw in all Egypt, and was taken running about the sand-heaps that are silted up by the action of the desert winds around the clumps of tamarisk, at El Ferdane and elsewhere in the neighbourhood of the Suez Canal. *Ateuchus sacer* was found also in the desert, and at the Pyramids of Geezeh, but far more plentifully on the road to Laurium and Marathon, two months and a half later. Of the eight species of Coleoptera that I came across on my second visit to Cairo, and in my voyage up the Nile, one kind only was plentiful (*Steraspis squamosa*, one of the green metallic Buprestidæ), and of this bright-coloured beetle there were any amount, as it swarms on the tamarisks (January–March) at Erment, the ancient Hermopolis, a short distance up the river south of Luxor, and at that latter place a large number had been stored since the preceding season, in a terra-cotta gourd, for sale to tourists in December.

Identity of
Orthoptera
noticed in
the East
with those in
other parts
of the Medi-
terranean
littoral.

Respecting Orthoptera, there is comparatively little to relate; the identity of the species I came across in the East with those in other parts of the Mediterranean littoral will be best ascertained by reference to the following table:—

<i>Acridium Tataricum.</i>	
1872.	1882.
Lido.	Beyrout.
Ajaccio.	Alexandretta.
Solfatara.	Road to Marathon.
<i>Mantis religiosa.</i>	
1872.	1882.
Ajaccio (November).	Beyrout (April).
<i>Edipoda germanica</i> (red variety).	
1872.	1882.
Switzerland.	Alexandretta.
Italy.	Pharpar.
Corsica.	Belgrade.
	Road leading to Marathon.
<i>Tryxalis nasuta.</i>	
1872.	1882.
Bellagio.	Jaffa.
Lido.	
Florence.	
Ajaccio.	

Or, to go more into particulars, I discovered the red variety of *Ædipoda germanica* (or *fasciata*, as it is more correctly named) to be as widely distributed in the East as previous experience had made me acquainted with its occurrence in Switzerland, Italy, and Corsica, for I found it on the banks of the Pharpar on the 19th of April, where it took its short flights amid the corn; and again in the neighbourhood of Alexandretta, in the direction of Issus, on the 28th of the same month, as we toiled up among the myrtles, pomegranates, Portugal laurels, and styrax trees, beneath a very hot sun, to the ruins of the old castle of Merkes, two hundred yards from the shore; and, lastly, I noticed it on the road leading to Marathon, on the 5th of June, as also previously at Belgrade, on the 28th of May. *Acridium tataricum*, a locust with smoky-brown wings, likewise a common species in Italy and Corsica, was also found near Alexandretta, on the road to Marathon, and at Beyrout as well. Of *Mantis religiosa* I obtained a specimen off the orange-trees in the island of Roda, in March, and another, clinging to a bough of *Ficus elasticus*, was brought me at Beyrout, in April. There are also several grasshoppers that I collected in Palestine, Syria, Asia Minor, Turkey, and Greece, and chiefly in the last-named country, but which, if differing in kind, do not differ in their light-brown or dust-coloured hue, as well as general appearance, from our common field grasshopper at home. Specimens of a stoutly-built species were found in the classic regions of the Acropolis, Pnyx, Stadium, Lycabettus, and Pass of Daphne. I have two small specimens of the larva of a Mantis, belonging, possibly, to the genus *Eremiaphila*, and bearing out its title in its natural habitat, as it was scarcely distinguishable in hue from the desert sand of Gebel Hashab, where I discovered it on the 22nd of March. Lastly, the mention of a remarkable-looking insect, *Callimenus oniscus*, must not be omitted. It is a wingless locust, that keeps up an incessant and shrill chirp in the underwood of myrtle and cistus, &c., on each side of the roads to Laurium and Marathon. As it hushes its strain when approached, it is not always easy to detect its presence, more particularly as its ground-colour is a bright apple-green, traversed by numerous horizontal bars of black across the body. This beautiful colouring, however, is turned to brown after its inevitable consignment to a wide-mouthed phial of spirits. It, no doubt, derives its specific name of *ὄνισκος*, "the little ass," in consequence of its similarity, from a dorsal point of view, to that beast of burden. There is great accuracy and scientific truth, be it

Ædipoda germanica
(red variety).

Acridium tataricum.

Mantis religiosa.

Callimenus oniscus.

Statement
in
Amos vii. 1
in reference
to grass-
hoppers
considered.

noted, in Amos vii. 1: "Thus hath the Lord God showed unto me; and, behold, he formed grasshoppers in the beginning of the shooting up of the latter growth; and, lo, it was the latter growth after the king's mowings."

Several of the Orthoptera are not formed—in other words, do not receive their full development of wings—till late on in the autumn; nor, as far as my own observation and that of a relative go, are the grasshoppers any earlier in Corsica and the South of Europe in this respect than our English ones, although they continue on the shores of the Mediterranean much later, where I have noticed them through November, and even up to Christmas; whereas they disappear from our fields at home in or about the middle of September.

The difference between the English Orthoptera on the one hand, and those from the South of Europe and the East on the other, is that the latter are more numerous in species, and in individual number, and also in many instances larger in size. Single specimens of locusts are very rare and occasional visitors here, thus furnishing, even when they do occur, a marked distinction to the hordes which commit such widespread and utter devastation in South Russia, Cyprus, and elsewhere in the East.

Only a few
species of
Neuroptera
noticed in
the East.

Description
of them.

Libellula
depressa.
Calepteryx
virgo.

1. Libellula striolata
Sympe-
trum strio-
latum.
2. Croco-
themis erythraea.

Neuroptera, understanding by this term all species belonging to the tribe, according to the Linnæan application, are only scantily represented, as a rule, so far as my own observation goes, in the regions of the East. For example, in my tour of 1882, I only came across four species of dragon-flies, and three of these were common English ones, two of them, viz., *Libellula depressa* and *Calepteryx virgo*, skimming around the luxuriant vegetation on the banks of the River Meles (a short distance above the grotto of its Nymph, and where she is reported, according to popular tradition, to have nursed the poet Homer), on May 8. The same two species were also noticed at a later date, namely, May 25, about the wooded and stream-fed lawns adjoining the great bend or reservoir of Sultan Selim, in the vicinity of the village and forest of Belgrade; while the third and commonest kind was *Sympetrum striolatum*, likewise seen at Belgrade, and so plentiful at home, more especially on heath or common in the autumn. The fourth one, also occurring at Belgrade, was *Crocothemis erythraea*, of the same shape and size as *L. striolata* (otherwise called *Sympetrum striolatum*), but clearly to be distinguished by its bright red body from the tawny colour of the latter. During my second expedition, I have also only the occurrence of four species to report in the months of November and December, 1883, as follows:—

Libellula striolata, *Trithemis rubrinervis*, and *Crocothemis erythræa*, and all at Villa Ciccolani, public gardens, and Island of Roda, Cairo and Matareeyeh gardens, Heliopolis. *Trithemis rubrinervis* is not so common as the other two species, and, though nearly of the same size and form, has its body, if anything, more tapering in shape, is a singularly handsome kind, crimson or magenta coloured, with a blue-purple stripe down each side. I first saw it on the Island of Roda, and afterwards in the gardens of the Villa Ciccolani, as good localities as any I know of in Egypt for the capture of Neuroptera. The fourth, I regret to say, I was unable to obtain, and am, therefore, ignorant of its name. It usually flew very rapidly and high overhead, backwards and forwards, while I was forcing my way through the tall flags and thick underwood which fringes a portion of the Island of Roda, for the chance of a cast of the net. The colour of the body was lavender-blue, like that of the male of *L. depressa*, but in size it exceeded *Ceschna grandis* or *Anax imperator*, and was the largest species of any Neuroptera that I have ever seen alive. My visit to Athens and its neighbourhood in the latter end of May and beginning of June, 1882, must also be mentioned, as I then captured two species of Neuroptera, differing from Dragon-flies, being either the perfect insects of the Ant lion, or else allied to these last. The smaller, and by far the commoner of the two, had brown spotted and gauzy forewings, and the hinder wings much elongated, and very slender, in the shape of tails. It abounded everywhere, in the Pass of Daphne, the Stadium, Mount Lycabettus, &c., and was especially plentiful on the hill of the Acropolis, in the immediate vicinity of the Parthenon. Its name is *Nemoptera coa*. *Palpares libelluloides* is a rarer and much larger insect. I captured it in the Pass of Daphne, and on the hillside near the Throne of Xerxes. Its name, *Libelluloides*, is, of course, to be attributed to the fact that in the wide spread of its wings and brown spots upon them, it resembles some of the *Libellulidæ*—*Libellula quadrimaculata* in particular. I obtained a single specimen of a third kind—viz., *Myrmeleon sævus*—in the vicinity of Belgrade. This last bears a superficial resemblance to the genus *Agrion*. All these perfect insects of the Ant lion, or those species akin to them, have a slow, feeble, and wavering flight. The rare occurrence of brooks and streams, and likewise the fact that so few of the winter torrents are perennial in their flow, may possibly serve to account, to some extent, for the paucity of species of Neuroptera so noticeable in the East.

3. *Trithemis rubrinervis*.

Nemoptera coa.

Palpares libelluloides.

Myrmeleon sævus.

Enumera-
tion of
Oriental
Hymenop-
tera.
Xylocopa
violacea.
Vespa
crabro and
Vespa
orientalis.

Among Hymenoptera may be mentioned a well-known Continental species, *Xylocopa violacea*, being a bee of large size, body and wings alike almost black, with a tinge of violet, from the Pass of Daphne, in May, 1882, and two kinds of hornet—the one our own *Vespa crabro*, from the tombs of the Maccabees, Latroon, in March, and also occurring at Ephesus, Philadelphia, and the River Meles, in the month of May, 1882; the other is *Vespa orientalis*, resembling our English one in colour and markings, but more elegant in shape. This last one was swarming in December, 1883, in and about Cairo and Heliopolis, being more particularly abundant at the confectioners' and bakers' booths, on the high, mud-built walls in the vicinity of the Boulak Museum and the Ostrich Farm, and likewise found at Helwàn, Lycopolis, and on the roof of the Temple of Isis at Denderah. In this last-named place several of them were clustered on patches of clay containing cells, and which are the work of a small rust-coloured bee, *Chalicodoma Sicula*. Some of these hornets, being disturbed at our approach, began to fly about wildly, thereby rendering one's walk along the roof, at a height of, say, thirty feet from the ground without, and possibly twenty from the space within, the Temple, with no breastwork or parapet on either side, not over comfortable. *Vespa crabro* and *Vespa orientalis* might readily be taken for one another when not seen side by side.

Chalico-
doma Sicula.

With regard to the above-named bee, *Chalicodoma Sicula*, of which there are specimens from Sicily and Algiers in the National collection, the amount and extent of its labour is truly wonderful. On reference to my *Nine Hundred Miles Up the Nile*, p. 137, I find the following paragraph about the same species at the Temple of Denderah:—"Hymenoptera are as busy here with their clay cells as elsewhere. They have plastered not only the hieroglyphics, but one whole side of the exterior of the temple, as well as the outer wall of the little chapel of Isis, on the roof." Again, with regard to the celebrated obelisk of Heliopolis, pp. 83 and 84 of the same work:—"The hieroglyphics, which are similar, or nearly so, on all four sides of the monument, include the hawk, the goose, the serpent, the ibis, and the head of the greyhound, and have been interpreted to mean as follows:—

The Hor of the Sun
The life for those who are born
The King of the upper and lower land
Khepher-ka-ra
The Lord of the Double Crown

The life for those who are born
 The son of the sun-god, Ra
 Osirtasen
 The friend of the spirits of An
 Ever living
 The golden Hor
 The life for those who are born
 Khepher-ka-ra
 Has executed this work
 In the beginning of the 30 years' cycle
 He, the dispenser of life, for evermore.

The figures of these animals on the east and west sides of the monument stand out in sharp and clear relief from the granite in which they are incised, being filled up with a coating of clay cells. The north and south sides of the obelisk are completely covered by it, so that the insect architect has rendered nearly all of the ancient carving, as well as the granite itself, invisible." Once more, in reference to Lycopolis, p. 130 of the same work: "Nor must the wonderful labours of hymenopterous insects be left unnoticed that have selected the western side of the cliff, as doubtless the most sheltered, for their abode, and completely covered it in one particular spot with masses of clay cells."

Chrysis nobilis is a small bee, with blue metallic body, very much like a bluebottle in size and general appearance, frequenting the flowering shrubs in the public gardens of Cairo, in those of the Palace of Gezeedeh, and the mimosas bordering the fields in the neighbourhood of Minieh. On referring to my cabinet, I find that one specimen is named *Stilbum amethystinum*, and it is possible that, on closer examination, I may discover that I have both kinds, as this last-named and *Chrysis nobilis* are nearly-allied species, and of similar appearance. Among the wasps may be noticed two black-bodied species—*Eumenes Hottentotta*, from Cairo; and the larger *E. tinctor*, from a field to the south of Minieh, both caught in the month of December, 1883. I have a third species (probably a *Eumenes* also) from the banks of the Pharpar, in April, 1882. Lastly, I have a small portion of a tree-wasp's nest that I found on a shrub alongside the high road between Mersina and Tarsus, on the 29th of April. Judging from the size of the cells, it can only have been constructed by a small species.

*Chrysis
nobilis.*

Genus
Eumenes.

The following table will serve to some extent to show

Geographical distribution of Hymenoptera above mentioned.

the geographical distribution of the Hymenoptera above mentioned:—

Eumenes —Pharpar	} Eastern species
Eumenes Hottentotta, Cairo	
Eumenes Tinctor Minieh	
Vespa crabro	{ Tomb of Maccabees, Latroon } { Ephesus } { Philadelphia } English species { Meles }
Vespa orientalis ...	{ Cairo } { Helwán } Eastern species { Heliopolis } { Denderah }
Chalicodoma sicula	{ Heliopolis } Mediterranean littoral, found in Sicily { Denderah } and Algiers { Lycopolis }
Chrysis nobilis	{ Cairo } Eastern species, probably { Minieh }
Xylocopa violacea	{ Pass of } Continental species, generally distri- { Daphne } buted

Mention of Eastern Hymenoptera is, of course, not complete without a reference to ants, and I have been specially asked to say something about the corn-storing ants of Palestine, that have generally been supposed to lay up provisions against the winter. Though, if this be a fact, it does not necessarily follow from Proverbs vi. 8, "Provideth her meat in the summer, and gathereth her food in the harvest." Nor yet from Proverbs xxx. 25: "The ants are a people not strong, yet they prepare their meat in the summer." All that I know or saw about ants in the East may be very briefly stated. There is a large black kind, about the size of our black and red wood ant, that I noticed both in Egypt and Syria,—namely, in the public gardens at Cairo, in the desert of Jebel Ahmah behind the citadel at Cairo, and in the plain of Judeidah, and not far from the village of that name, during my drive from Damascus to the scene of St. Paul's conversion. It carries its head and tail alike cocked up aloft, and runs backwards and forwards, bearing a fanciful resemblance to an open carriage which is hooded at the back, and with shafts turned up, when pushed hither and thither in the process of being washed. There is also a much smaller species, likewise black, of which I captured a couple of specimens, on my second visit to Cairo in December, 1883, near the tomb of the Khedive's family on the edge of the desert. These two ants, when confined in a bottle, used to meet and push one another with their jaws

Eastern ants.

interlaced; but I could not observe that any injury was inflicted, although the contest ended in the larger one trotting round the bottom of the bottle with the other in its mouth. The only other fact that it occurs to me to mention with regard to the ant tribe is, that I obtained a species of *Mutilla*, Genus
Mutilla. or winged ant (thorax rust-coloured, body black, with pale yellow spots), from the banks of the Pharpar, on April, 1882, where it had settled, if I remember rightly, on a flower.

I note that the Rev. J. G. Wood makes the following statement in *Bible Animals*: "In Palestine ants abound, and the species are tolerably numerous. Among them are found some species which do convey seeds into their subterranean home; and if their stores should be wetted by the heavy rains which sometimes prevail in that country, bring them to the outer air, as soon as the weather clears up, and dry them in the sun." Any one who wishes to test the truth of his words, can easily do so by watching the first ant's nest which he finds, the species of the ant not being of much consequence.

The same writer, however, proceeds to devote two pages and a half to the most wonderful ant in the world, *Atta malefaciens*, *Atta*
malefaciens. of Texas, and other parts of America, and adds: "The economical habits of this wonderful insect far surpass anything that Solomon has written of the ant."

One of the ants of Palestine, of which a representation is given on page 621 of *Bible Animals*, belongs to the same genus as this marvellous agricultural ant, and is named *Atta barbara*. *Atta*
barbara. From its appearance in the engraving, I judge it to be the same as the species I mentioned as having observed at Cairo and on the plain of Judeidah; but have never seen it in Palestine myself. Of *Diptera*, I secured five species—two *Diptera*. from the neighbourhood of Athens (one, *Dasygogon punctatus*, on the hill of Colonos, on June 9; and the other, another kind of *Dasygogon*, from the Stadium, at the end of May); the third and fourth are, respectively, a species of *Tabanus*, or horse-fly, from the plain of the Litany, in April, and *Laphria atra*, Ephesus, in May; the fifth, likewise from Ephesus, is as yet unnamed.

Of *Hemiptera* I collected eight species, of which the five that *Hemiptera*. I succeeded in naming, and two of the unnamed also, are all red, or reddish, with black patterns on their wing-cases:—1. *Lygæus militaris*, widely distributed, as collected at Aceldama and the Valley of Jehoshaphat, Mount Pagus, the Pnyx, the Acropolis, and Deceleia. 2. *Strachia picta*, from the Stadium, and Throne of Xerxes. 3. *Pyrrhocoris Ægyptius*, from flowers close to Sardis railway-station, and also from Mount Pagus. 4. *Odontoscelis fuliginosis*, also from Sardis. 5. A

species of *Rhaphigaster* from Ephesus. 6 and 7 were collected on the summit of Boulgourloo; and 8 is one of the Homoptera. *Hydrometridæ* from Beyrout. Homoptera are solely represented by one kind—*Triecphora sanguinolenta*, from Acedama, in April; Ephesus, in May.

The CHAIRMAN (T. Chaplin, Esq., M.D.).—I am sure we are all very much indebted to Dr. Walker for his most interesting paper, and after the Honorary Secretary has read the communications that have been received, we shall be glad if any of those present are disposed to add to the information so ably given in this paper.

Captain FRANCIS PETRIE, F.G.S. (Honorary Secretary), then read the following communications:—

From Mr. Sydney T. Klein, F.L.S., F.R.A.S., F.E.S.:—

“Clarence Lodge, Willesden, N.W., March 6, 1887.

“Many thanks for your kindness in sending a proof of Dr. Walker’s paper, and an invitation to attend the Meeting to-morrow. I had fully intended being present, but regret to say that illness prevents me. I consider the paper of interest to all British entomologists, and of considerable value to the science generally, through the numerous records of captures of the same species in localities so widely differing both in respect to climate and geographical position.

“On page 119, Dr. Walker mentions that he found very few moths. This must be put down, I think, entirely to his not hunting them at night, the only time possible for catching nine-tenths of the Lepidoptera Heterocera; a light at an open window of his hotel, or a few strips of calico steeped in sugar and rum hung out of the window, would have brought them in hundreds if they were there at all. It is, however, a curious fact that there is very little information respecting moths to be found in the diaries of travellers in the East, whereas everybody has noted the existence of butterflies. I once passed a night among the ruins of Ephesus, and was surprised, as everybody must be who has been out at night in the East, at the superabundance of insect life, manifested by the continued roar caused by millions of chirps, scrapings, rattles, hummings, and cries from the country round. I have only heard such a din in the woods of Central America.”

From Mr. Hastings C. Dent, F.L.S.:—

“80, St. Stephen’s Green, Dublin, March 5.

“The paper by the Rev. F. A. Walker on Oriental Entomology is of considerable value. Such synthetical observation is very important. I regret that I know nothing personally of those littoral regions of the Eastern Mediterranean, and am away from all my collections, books, and papers, so fear I can give no remarks that will be useful in the discussion.

“Page 113. The protective colouring of the Grayling (*Satyrus Semele*) is one among thousands of such instances which, though not visible in cabinets, is seen in the field. In my book, *A Year in Brazil*, you will find under this heading how the colouring is varied with the position of the insect at rest, *i.e.*, when resting with closed wings, the protective colouring is on the *under* side, when with expanded wings, on the *upper* side.

“P. 114. The *Danaidæ* are indeed very conspicuous, generally distributed, and often abundant. In the Hawaiian Islands I noticed one of these among

the only four species of butterflies I observed there (the others were, one *Lycæna*, and two *Vanessæ*).

"P. 115. Though far be it from me to say a word against the well-known Mr. Butler, he is strong in elaborating species—often, I think, needlessly; so that the species of *Ypthima* observed need not necessarily be new, especially as Dr. Walker had collected several specimens.

"P. 116. May I venture to remark that the suggestion in the second paragraph, as to visiting those six localities in successive years, is scarcely plain. Owing to the great difference in number of species and specimens observable in different years, it would not lead to fair comparison, *e.g.*, for one person to visit, say Egypt in May one year, and Greece in May the next year. The only way would be for a series of collectors to visit all those places in the proper seasons in the same year, and this should be continued over a series of years, and the results tabulated.

"P. 125. The remarks on Dragon-flies are very interesting. They are one of the most ancient and most widely distributed of insects. In the Hawaiian Islands (where owing to the 2,000 miles which separate them from America, a great obstacle is presented to the migration of fauna of all kinds) these Neuroptera form the most important feature of its insects, and those islands have many species peculiar.

"P. 128. The black ants near Damascus, carrying head and tail aloft, are no doubt similar to a very beautiful species I observed in December last at Port Darwin, Northern Territory of Australia, only, that species was light brown and green. Its nest was formed of leaves of shrubs spun together *in situ*.

"P. 133. The genus *Mutilla* of ants is very interesting to me, chiefly owing to its being mimicked in Brazil by a *Coleopteron*.

"P. 129. I have given lengthy notes in my book, *A Year in Brazil*, on the economic habits of the species of *Atta* named *Cephalotes* and *Abdominalis*.

"I am so pressed for time that I must crave forgiveness for this very hasty line, but I hope you may deem it of sufficient interest to show to Dr. Walker, and present to him my best thanks for bringing before our Society so valuable a record of his observations. The only fault I can find is that there are no loop-holes for discussion here, and not much opportunity for debate. I should have liked some theories advanced, as to causes of differentiation, typical forms, etc."

From the Rev. A. Fuller, F.E.S. :—

"Pallant, Chichester, March 5.

"Allow me to thank the Council of the Victoria Institute through you for their invitation to be present on Monday evening to hear Dr. Walker's paper. Had I been in London I should certainly have tried to avail myself of it. I have read over the proof of the paper kindly forwarded with much interest, as it is by such detailed communications the range of species can alone be arrived at. Never having been in the East myself, I fear any comment of mine would be rather beside the question, otherwise I might add a note or two to the Swiss localities mentioned by Dr. Walker, for instance :—

"P. 111. *Aporia Cratægi*. Two on hill-side, first week, August, 1882, Pontresina.

"P. 113. *Melitæa Didyma*. Same time and place, moderately common.

"*Argynnis Lathonia*.* Four very fresh specimens. Same time and place, moderately common.

* On referring to one of my cabinets I find a specimen of *Argynnis Lathonia* labelled Pontresina, Sept. 16, 1872. I distinctly remember catching it beneath the Roseg Hotel, a little way down the road that leads to the Roseg glacier.—F. A. W.

"P. 112. Of the cosmopolitan character of *Vanessa Cardui* I might add that when in Canada two years back, I traced and captured it frequently, the whole distance from Quebec to Calgary, within forty miles or so of the Rocky Mountains.

"P. 116. The original English specimen of *Lycæna Bætica* is now in my possession, and the date of capture is marked on it, 12th August, 1859. I only name this as regards date in comparison with 10th December, when Dr. Walker caught it at Cairo."

The Rev. T. W. Fowler, F.L.S., observes, with reference to p. 129, l. 6, that "*Mutilla* is not an ant, although often thus designated." He adds:—

"P. 120, l. 7, etc. The best way to preserve insects is in sawdust and benzine with a little carbolic acid added, the insects and sawdust being packed in layers; spirit bottles are apt to get broken.

"P. 120, near bottom. As a matter of fact there is a great deal of connexion between the Coleoptera of the circum-Mediterranean region.

"P. 121, towards bottom. The genus *Oxythyrea* is much more widely spread than is here mentioned; species occur all over Africa as far south as the Cape of Good Hope; it does not, however, appear to be found in eastern Asia or in the New World."

Another Correspondent writes:—

"Kersal Cottage, Prestwich.

"I consider the Rev. F. A. Walker's paper of extreme interest, especially as giving a personal narrative, and reliable information of what actually came before his eyes. On the other hand, I hope it will not be considered hypercritical to suggest that the paper would have been rendered still more valuable, in my opinion, from a scientific point of view, had Dr. Standinger's catalogue of Macro-Lepidoptera of Europe and the East been consulted, and records of those species not personally observed, added. More than twenty-five of our British butterflies, for instance, doubtless occur in the list, as Dr. Walker (p. 109) observes, and the comparative tables of British and Eastern species would then have been rendered more perfect. As a record of personal observation, and considering the multitudinous difficulties and discomforts of pursuing any branch of natural science away from one's own country, Dr. Walker was indeed most painstaking and successful, and we cannot but congratulate him very heartily on the good results he obtained."

From Mr. A. H. Swinton, F.E.S., of Lansdown, Dane Park, Ramsgate, describing a visit to Burgos, says:—

"Near the castle-wall above the town I found a bank of dwarf elder and thistles skeletoned to tissue by the ravages of *Cynthia Cardui*, the Painted Lady butterfly. The caterpillars of the butterfly are still feeding, and yet the butterflies are hovering over the blossoms, whose pink tassels appear to be wired on the stalks. Nature teems in its birth. In our country the Tortoiseshells (*Vanessa Urticæ*) make similar capital out of the nettles. Can one longer marvel at the swarms of Belle Dames that periodically wing northward in long files?

"Tall poplar avenues at Burgos stretch out along the valley, and form cool walks and drives in the direction of the monasteries. Walking one day in their shadows, I disturbed a Large Tortoiseshell butterfly (*Vanessa Polyochlorus*), whose presence I ascribed to the existence of certain stout and sturdy elms, an Alameda being quite an unusual sight in the sunny corn. It is singular that the Earl of Sandwich should have stated to Evelyn, that before Philip II. transported these ornaments of our parks

to construct suburban walks and vistas, there were actually no elm-trees in Spain. I must, however, remark that there is an equally singular statement made by Hollingshed, to the effect that in Queen Elizabeth's time there were no asses in England, and that Spanish donkeys were then imported. Certain butterflies that appear to leap from the tree trunks to the earth and back again, are often noticed at the sunny leaf-strewn edges of these Castilian avenues. There are our own heath-frequenting Grayling and its congeners, *Hipparchia Briseis* and *Statalinus*. None of our commoner English butterflies, however, except the Meadow Browns, appear in excess in Castile. I noticed the Small Tortoiseshell on the nettles that fringe the old wall of Burgos, where a flame-coloured Cuckoo-Bee who was darting about had a perquisite of crannies, and near garden plots a few Cabbage Whites were flying.

REV. DR. WALKER.—I should like to say that I received a letter this morning from my friend, Mr. Frederick Pascoe, a well-known Fellow of the Linnæan Society, who pleads a previous engagement as the reason why he has been prevented from attending our Meeting this evening. I may add, with regard to the question of using spirits as a means of keeping beetles and other insects, that although I should not like it to be thought it does the insects any harm, Mr. Pascoe says they never do so well after they have been kept in spirits. I am under the impression that spirits injure beetles much less than they do grasshoppers, and that probably spirits are the only handy medium to which you can consign insects in the East to preserve them from decay. With regard to the great *Scarabæus*, Mr. Pascoe is inclined to keep up the old name, *Scarabæus*, and repudiates the designation "*Ateuchus sacer*," which I have given it in this paper.

THE CHAIRMAN.—As I happen to have had some experience of life in the East, and particularly in Palestine, there are one or two points that have come under my observation on which I may be permitted to offer a few remarks. One has reference to the interesting subject of ants. It is stated in the Book of Proverbs, that they are "exceeding wise," and "prepare their meat in the summer." Certain naturalists in Europe have for many years been in the habit of denying this statement, but within a recent period it has been clearly ascertained that it is actually true, and I am enabled to state from my own personal observation that there is no doubt whatever about it. In fact, it is one of the commonest things in country places in Palestine to see the ants busily engaged during the harvest season in carrying away corn, the seeds of grasses, and other things to their nests. They sometimes travel over great distances in order to do this, and nothing is more common than to see a long path, extending perhaps twenty, thirty, or forty yards, and more even than that, trodden down and worn quite bare by hundreds of thousands of ants passing to and fro upon it. They find out some place where wheat or barley, or some other grain, has fallen, or where there is a threshing-floor, and they start off in thousands to the spot, each ant carrying from it a seed of barley, wheat, grass, or whatever it may be. Another point of great interest in connexion with the proceedings of these little creatures is that it is said they are sometimes seen to bring out a store of provisions when it has been wet, in order

that the food may be dried in the sun. For my own part, I do not feel at all sure that this is so. It seems to me that what really does occur is this : when the harvest is over, and the ants have no chance of obtaining further supplies of grain, they set to work and dress the corn and seeds they have collected, taking off the husks, which they bring out and throw on the ground around their nests, so that one sees a great number of circular masses of chaff, which, if examined, are found to consist of the husks of corn and grass seeds. This is one of the instances we meet with, showing what very acute observers the writers of the Holy Scriptures were, and that there is no reason to doubt the statement of Agur in the Book of Proverbs, to which I have referred. Another question of great interest is that which is connected with another class of insects—the locusts. I have brought some of those insects here to-night, because it is not often that people in England can see them in what represents two different stages of their existence. (In the smaller bottle are some locusts quite young—probably not more than a week or two old—small, black creatures.) The locusts traverse Eastern countries in immense numbers, thousands of millions. I have seen them in a column nearly a yard broad and a mile long, and I have noticed that when they meet with any obstruction they will go on either side of it ; they do not run, but make progress by a series of jumps, and though the natives dig trenches for them, and throw earth over them in order to smother them, and sometimes pile them in great heaps and throw brushwood over them, and set fire to it, they are unable to exterminate them.* When growing they become of a yellow colour, and shed their skins. I have seen them hanging to the branches of the olive and other trees, and wriggling out of their skins, after which they grow to the size of the locusts shown in the larger bottle I have here, and it is when they have reached that stage that they do the enormous amount of damage we so frequently hear of. The account of the invasion of locusts given in the Book of Joel is accurate to the most minute particular. It is, indeed, a most wonderful description ; but there is one expression in it which I think is rather obscure to us in England. I refer to the passage :—“He hath barked my fig-tree the branches thereof are made white.” This, however, is exactly what the locusts do. They eat all the leaves off the fig-tree, and then eat the bark off the smaller branches where it is soft and succulent, and the ends are left standing out quite white, so as to give a weird appearance to the tree. They also clear the olive-tree, taking away every leaf, but not eating the bark. Another peculiarity they have is that they do not break their ranks. They stand together, perhaps eight or ten in a row, in one place, and eight or ten in another, just like cavalry, while the noise they make is said to be like that of running horses.

* In a small Blue-book just published, Mr. S. Brown, Government engineer, reporting on the locust campaign in Cyprus in 1885-86, states that the estimated number of egg-cases was 5,076,000,000 in 1883-84, while in 1885-86 the number was slightly over 249,000,000.—Ed.

In devouring the contents of a garden the noise they make is certainly very curious, and I never heard anything like it. It is a very terrible sound, because it means desolation. Each locust makes a little noise as it gnaws, and as that sound is multiplied by tens and hundreds of thousands, it produces a very singular impression. I remember one invasion of locusts, which will afford you an idea of the numbers in which they make their appearance. I had to travel a distance of some sixteen miles on horseback, and for the whole of that distance the locusts were like, snowflakes in the air, and my horse could not put his feet down without treading on them. I have thought it might be of interest to you to mention these things in connexion with what we read in the Biblical statements, because I feel from my long experience in the part of the world I have been speaking of, that the more we study the narratives in the Bible, and compare them with what is seen and recorded at the present day, the more clearly do we perceive how accurate was the observation of those who compiled the books of the Old Testament.

Mr. J. STALKARTT.—I can vouch for the singular sound produced by the locusts, as well as for the fact that when flights of those insects have once settled, the difficulty is to get them up again. I have been in the indigo districts, where they have eaten up everything on the plantations, and the difficulty of the planters is how, when a swarm appears, to keep them going so as to prevent their settling, all the fire-pans and brass instruments they have being beaten to keep the insects on the wing. They may be seen flying in the distance like a red cloud, and sometimes they go hither and sometimes thither, but, whatever else they devour, they do not like the tea-plant. They may settle in the scrub or jungle near, but they do not seem to care for the tea plantations,—I presume on account of the bitter or acrid matter in that plant. On all the other plants, as well as on the trees and grasses, they settle readily. From what we see in India as to the species of butterflies there, everything depends on the food furnished by the different districts. If in any part of the country certain plants or trees are destroyed, we do not find the butterflies that were originally there. Butterflies of particular species inhabit much the same kind of districts. There being no cabbages out there, you do not get the Cabbage Butterfly, and the same observation applies with regard to the moths. These bore into the trees, and if the trees are cut down, no more moths of the same kind are found in that district. Therefore, where there is a sameness in the grass or plants on which the caterpillars live in different parts of the world, we may expect to find the same species of butterflies. I have no doubt that Dr. Walker would derive a great deal of pleasure from a visit to some parts of India, where we have the most beautiful butterflies. In the neighbourhood of Darjeeling he might make a splendid collection of butterflies and beetles. With regard to what has been said as to swarms of moths, I may add that in India we had swarms of beetles. They fly at night, and settle on the trees, the leaves of which they eat up in a single evening. When they lay their eggs, the grubs are a great detriment to the cultivation of the places in

which they are found. The beetles burrow in the ground, and the grubs they produce are white, and of different sizes, according to the size of the parent beetle. These grubs first of all eat the roots of the tea-plants, and then they attack the upper part. The only way in which we could get rid of them was by setting women and children to dig them up and collect them. They lift up the grass as one would raise a sheet or table-cloth, and underneath they find the grubs as thick together as plums in a plum-pudding.

The CHAIRMAN.—There is no doubt that the locusts prefer some plants to others ; and in all the invasions of these insects I have known, they have gone on in regular succession, although they have always eaten the vines last. They seemed to me to have great objection to these, probably because of the acid in the leaves. The locust-trees they never ate at all, but went away and left them untouched.

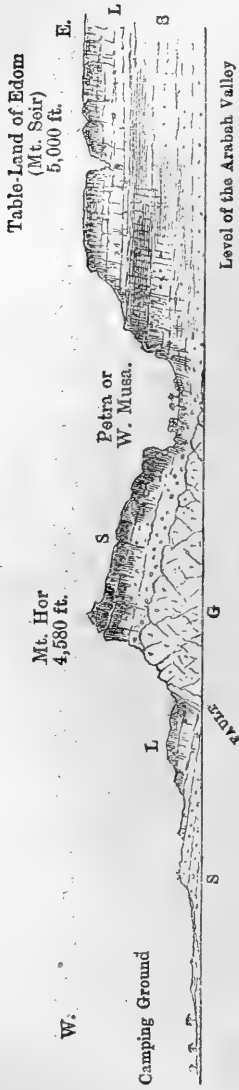
Rev. J. J. COXHEAD, M.A.—I think we ought to express our thanks to Dr. Walker for his able and interesting paper. He has handled his subject in such a way as to show how highly valuable are careful observations such as he has been able to make in Palestine and other parts of the East. What struck me most forcibly in the paper was that the commonest species of butterflies, such as those with which we in England, and Europe generally, are familiar, are more abundant in those parts of the world than any other particular species which is there met with.

Rev. Dr. WALKER.—Locusts, as far as I am aware, differ from all other insects in this respect, that they grow after they have reached the mature stage. It is a characteristic of other insects that, when no longer in the larva state, they do not increase in size ; but the locust increases from a very small size to a very large one after it has reached the perfect stage.

The Meeting was then adjourned.



GEOLOGICAL SECTION ACROSS MT. HOR, PETRA (WADY MUSA) AND MT. SEIR.



G. Granite and Porphyry, forming the foundation Rocks of the district.

S. "Nubian Sandstone" formation with a base of conglomerate.

L. Cretaceous Limestone, forming upper part of the Table-land of Edom and the Arabian Desert.

LENGTH OF SECTION ABOUT SEVEN MILES.

ORDINARY MEETING, MAY 2, 1887.

GENERAL HALLOWES IN THE CHAIR.

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

MEMBERS :—W. Edwards, Esq., C.E., Hyderabad ; Miss L. E. Loveday, London.

ASSOCIATES :—Rev. D. E. Evans, M.D., United States ; Rev. E. P. Ingersoll, A.B., United States.

The following Paper was then read by the Author :—

PETRA, THE ROCK-HEWN CAPITAL OF IDUMÆA.

By Professor HULL, LL.D., F.R.S.

AMONGST the ruined cities of the world there is probably none which carries with it so unique an interest as the deserted capital of Arabia Petræa, owing to the peculiarities of its construction, and the marvellous state of preservation in which its buildings are found after a lapse, in some cases, of over two thousand years. The ancient city of Petra lies deep amongst the recesses of the Edomite mountains, only accessible through narrow defiles or over difficult passes, and easily defensible against an attacking host :—

“ Where rocks on rocks—on mountains, mountains piled
Have form'd a scene so wondrous and so wild,
That gazing there, man seems to gaze upon
The rough, rude, ocean frozen into stone.”*

So completely hidden is this wonderful city from all outside observation, that, independently of its situation in the Desert inhabited only by Bedawins, it might easily be passed by on either side by travellers proceeding to Damascus on the one side or to Jerusalem from the head of the Gulf of Akabah on the other. It is scarcely, therefore, to be wondered at that, during the Middle Ages, Petra was lost to view for several centuries. The Mahomedan wave of conquest, which swept with such irresistible fury over Western Asia,

* *Petra*, by Dean Burgon.

overwhelmed Arabia Petræa and its capital; its commerce was destroyed, its Christian inhabitants massacred or forced to embrace the religion of the conqueror, and all that was left—namely, its palaces, temples, and tombs—remained much as we see them at the present day. Owing to the genial climate which pervades the valleys of Mount Seir all the year round, though snow and frost visit the adjoining mountains and table-lands, the rock-hewn structures come down to the present day in a state of high preservation; and, from the beauty and boldness of design, variety of style, and peculiarities in construction, cannot fail to excite feelings of the highest admiration and interest in the minds of the favoured few who have an opportunity of visiting the remote valley in which they are situated, known amongst the Arabs as the Wady Musa.* Though much has been written on Petra—

“The rose-red City, half as old as Time”—

and its surroundings, yet the interest can scarcely be exhausted, and it is hoped some account from the pen of a recent traveller may not prove unworthy of perusal.

The history of Petra still remains to be written; and probably, were such a history in existence, it would be found unsurpassed in incident by that of most of the cities of the Eastern world. Occupying the sides of a wide and deep valley, which ultimately opens out into the Arabah, with branches bounded by cliffs and precipices of sandstone under the shadow of Mount Hor, it may be supposed that it offered a secure retreat against the nomadic tribes to the more settled descendants of Esau, who gradually established their sway over the mountainous region as far north as the borders of Moab, and southwards to the head of the Gulf of Akabah. At the period of the Israelitish Exodus, Petra was the residence of kings, the successors of the “Dukes of Edom”; and when the host of the Israelites encamped for the second time after the period of the wanderings in the wilderness at Kadesh Barnea,—which presumably lay at some distance to the west of the borders of Edom,†—the embassy sent by Moses to the King of Edom had only two days’ journey in order to reach the capital of the country. The request on the part of Moses for permission to pass through the land in order to reach the table-land of Moab was refused;

* From the tradition that Moses, the Jewish Lawgiver, cleft the valley with his sword.

† Probably at the spot discovered by the Rev. J. Rolands, and described by Dr. Trumbull, 1884.

and the Israelites were then obliged to retrace their steps down the Arabah valley as far as the Wady el Ithem, near Elim (or Akabah), and, by this narrow defile through the mountains, to make their way northwards along the high road to Damascus, known as "El Derb-el-Haj," which runs at the back of the Edomite valleys, and along the margin of the Arabian table-land.

Coming down somewhat later, to the time of the Kings of Judah, we find that Amaziah revenged the affront shown to the Israelites by the terrible slaughter of the Edomites in the Valley of Salt,—probably the great plain at the southern end of the Dead Sea; and after his victory, marching southwards into the mountains, he captured the capital, then called "Selah" (or the Rock), synonymous with Petra, and changed its name to "Joktheel," or "subdued by God" (2 Kings xiv. 7). According to the usual reckoning, this was B.C. 839 years, from which we may infer that Petra had been the capital of Edom for some time previously,—that is to say, for about a thousand years before the Christian era. In the centuries immediately preceding this era, the influence and prosperity of Petra appear to have expanded to such an extent that we find it referred to by classic authors both of Greece and Rome. Strabo gives a very clear description of its position and surroundings. It is described as the metropolis of the Nabatheans, and distant from Aila (or Elath), at the head of the Arabian Gulf, ten Roman miles. (The real distance is much greater.) According to the same historian, Petra was situated in a level valley, decorated with gardens and fountains, but bound in by rocks on all sides; beyond its precincts lay the deserts, chiefly in the direction of Judæa.* In the fourth century B.C., the city was so strong as to have successfully resisted Antigonus; and, at a later period, B.C. 24, also, the invasion of Gallus, the Roman governor of Egypt; but ultimately it fell before the Roman armies, under their general, Hadrian, and became a portion of the province of Syria during the reign of Trajan, receiving the name of Hadriana, as shown by the coins of that period. This brings the history of Petra down to the commencement of the second century of our era; and it is probable that to this time may be referred many of the temples, together with the rock-hewn theatre, aqueducts, and other public buildings, of which the remains come down to the present day. The city was the great entrepôt of commerce for Central Arabia. It was

* Strabo, lib. xvi.

connected by several high roads with Damascus, with the cities of the Persian Gulf, with the harbour of Aila, and with the coast of the Mediterranean, and thus with Egypt, Palestine, and Tyre. We may gather from Strabo that spices landed at Aila in the ships of the Minæi and Gerraræi, probably from the district of Southern Arabia known as "the Yemen," were taken to Petra, and exchanged for the products of the Phœnicians. At some very early period—perhaps in Apostolic times—Christianity was introduced into Arabia Petræa; we might even hazard the conjecture that this event took place through the agency of St. Paul himself, who, as we know from the Epistle to the Galatians, went into Arabia after his conversion, and thence returned to Damascus. It is not improbable that he took advantage of this opportunity for visiting the capital of the country, and preaching to the inhabitants the Gospel he had himself received. However this may be, about the beginning of the fifth century, according to Reland,* the region extending from the borders of Arabia to those of Syria, and constituting the ecclesiastical province of Palestine, was divided into Palestina Prima, Secunda, and Tertia, the metropolis of the first being Jerusalem; of the second, Scythopolis; and of the third, Petra.† In this sense, Eusebius speaks of Petra as being a city of Palestine, at which time it was the seat of a bishop who had the oversight of the Christian populations; and there can be little doubt that during the fourth and fifth centuries Christianity had been embraced by a large proportion of the population of Arabia Petræa, especially amongst the more settled inhabitants. This brings us to the consideration of the religious history of the people of this region.

Going back to the earliest ages of Arabian history, it seems clear that the Semitic races, occupying the region between the Caucasus on the north and Southern Arabia on the south, had dispossessed the prehistoric races, whose remains we recognise in the dolmens and stone circles which are so abundant in the table-lands of Moab and to the east of the Jordan valley. According to Le Bon‡, Arab tradition points to two divisions of the Arab race; the first descended from Kachtan (the Joktan of the Bible), who now occupy the fruitful district of the Yemen, in South-Western Arabia; and the second from

* *Palestina ex Monumentis veteribus illustrata* (Nuremberg, 1616).

† In a MS. in the library of the Patriarchate of Jerusalem, a fourth Province, that of Bostron or Arabia, is mentioned. Palmer's *Desert of the Exodus*, Appendix, vol. ii. p. 551.

‡ Dr. Gustave Le Bon, *La Civilisation des Arabs* (1884).

Ishmael, the son of Abraham, who now constitute the nomadic tribes, and whose territory extends through Arabia Petræa, and the table-land east of the Jordan Arabah valley. Esau, the son of Isaac, married into the family of Ishmael, and settled in Mount Seir (Gen. xxxvi. 8), which ultimately became the possession of his descendants; and thus was established a double family relationship between the nomadic descendants of Ishmael and the more settled inhabitants of Mount Seir. Thus we may, with much certainty, refer the early history of Petra (then called "Selah") to the time of Esau, or of his immediate descendants, the Dukes of Edom, about B.C. 1700. The Edomites were doubtless at first Monotheists, worshipping the God of Abraham; but Assyrian inscriptions belonging to the seventh or eighth century B.C., together with those of Safa, afford evidence that at a later period the Arabs, including probably the Edomites, were polytheists, and erected statues to their gods. An Assyrian inscription recounting the return of Hassar-haddon from an expedition into the Arabian Desert, states that the Arab King X. arrived at Nineveh with numerous presents, petitioning humbly for the restoration of their gods, and so effectually that the monarch restored the images, together with the Arab Princess Tabura, who had been captured, and who returned to her own country along with her gods. The deities ultimately became so numerous (being, probably, chiefs of distinction) that on the authority of Le Bon, when the images were collected together in the ancient temple of Mecca called the Kaaba, the very Pantheon of Arabia, they amounted, in the time of Mahomet, to three hundred and sixty in number, collected from various tribes, thus constituting a bond of unity between all the Arabian populations, which became of great service to Mahomet in his work of unification. The Kaaba still remains. Tradition carries its foundation back to the time of Abraham, the father of the race; and Mahomet, when preaching the doctrine of the One God, had only to point out to the Arabs that it was the God of Abraham, the founder of the Kaaba, whom he proclaimed.

The transition from the worship of the Invisible God to that of the heavenly hosts, especially of the sun, is easy amongst an untutored people. There is reason to believe that at a very early period the worship of Baal was general throughout Edom and Moab.* Amongst the most ancient of

* Baal signifies "Lord," and, according to Prof. Robertson Smith, is not a proper name; but is applicable to the God of any tribe or locality.—*Contemporary Review*, April, 1887.

the ruins of Petra is the supposed "Altar of Baal," of which an excellent representation is given by an American traveller, Mr. Edward T. Wilson.* It consists of a circular basin, cut on the surface of an isolated rocky platform, and in a conspicuous position. A perforation in the centre of the basin communicates with an underground cavern, into which the blood of the sacrifice may be supposed to have flowed away. When, in the reign of Trajan, A.D. 105, Petra fell under the Roman sway, and became the capital of the province of Palestina Tertia, it may be supposed that some of its magnificent structures became temples of the gods of Rome. To what extent Christianity gained a footing in Petra is uncertain. From the *Excerpta ex Græca Notitia Patriarchatæum*† it may be inferred that the settled inhabitants of Arabia Petræa had generally embraced the Gospel, and that there were a large number of villages and churches scattered over that region, of which Petra was the metropolis. By the close of Mahomet's life the whole of Arabia Petræa had been brought over to Islamism, and the only representative of Christianity which has survived to this day is the Greek convent of St. Katharine, at the foot of Mount Sinai. The stream of commerce which had flowed through Arabia became diverted by the events of the seventh century, and Petra, the fountain-head, fell into decay, and has ever since lain desolate, except when the Bedawin condescend to pitch their tents amongst the ruins. The fellahin of the Wady Musa at the present day are of a decidedly Jewish cast of countenance. Islamism has even less influence with them than with the Bedawin themselves. According to Professor Palmer, they are the sons of Leith, a lineal descendant of Kacab, and a branch of the Kheibari Jews who resided near Mecca, and played an important part in the early history of Islam. The Kheibari are still found in large numbers about Mecca and Medina, and are much dreaded by the Haj caravans, as they invariably rob and murder unarmed travellers. Intending visitors to Petra should, in the first instance, come to terms with the head sheikh Arari. On an occasion subsequent to our visit to the city (in December, 1883), I had an interview with this redoubtable chief near the shore of the Dead Sea, and I was favourably impressed by his conversation and

* *The Century Magazine* (New York), Nov. 1885.

† In the *Vatican*, edited by Luca Holstenio (1704). Eusebius in the *Onomasticon*, says, "Mount Hor in quo mortuus est Aaron erat juxta urbem Petram." This is a sufficient identification of the Mount known amongst the Arabs as "Jebél Haroun."

bearing. He had faithfully kept his promise upon receiving a present of £5 to protect our party from attack when marching towards our camping-grounds at Es Safieh, and he assured me that he was friendly to English travellers, and did not wish them to be put to any annoyance while passing through his territory, nor that they should pay more than what was just and reasonable for right of way.*

In recent times Petra has been visited by Burckhardt (1812), Leon de Laborde, Robinson, Wilson, Dean Stanley, Palmer, and Drake; within the last few years by Dr. Strong, Mr. Edward L. Wilson, and the members of the expedition sent out to Arabia Petræa in 1883 by the committee of the Palestine Exploration Fund. De Laborde, who spent several days in the Wady Musa, made an excellent map of the valley and its branches, and has left us a graphic account of his visit and dealings with the Arab inhabitants.

As regards the architectural ruins of the Wady Musa, it would be useless to attempt to give anything like a detailed description within the limits of this paper. A better idea of their style and former magnificence may be obtained from a study of the beautiful drawings of David Roberts, or those in *Picturesque Palestine*, and of Mr. E. L. Wilson, already referred to. The predominating style is that known as Greco-Roman, but superadded to these are evidences of the influence of Persian and Egyptian art amongst the earliest structures, and of Christian art amongst the latest. What is specially remarkable is the total absence of Saracenic sculpture or decoration, showing how in the case of Arabia Petræa, as throughout the Sinaitic Peninsula, the Mahometan power was essentially destructive, rather than constructive, as was the case in Egypt, Persia, India, and elsewhere. Mecca and Medina having been constituted the sacred shrines of the Prophet, his followers were probably determined that no other city in Arabia should be permitted to become a rival. Hence Petra shared the fate of Feiran, and of numerous other Christian towns and villages in the Peninsula.

Of all the tombs and temples in Petra, the Khazneh is unquestionably the gem. When first seen through the narrow chasm, called the Sik, which forms the channel to the stream and the entrance to Petra from the East, the Khazneh appears like a beautiful vision. The delicate rose-tinted façade, supported by its graceful columns, lighted up with

* The account of this interview, as also of the visit to Petra and Mount Hor, will be found in the author's *Mount Seir, Sinai, and Western Palestine* (1884).

a blaze of sunshine, being set off in high relief when seen from the deeply-shaded recesses of this narrow cleft. This temple, like others, has been hewn out of the face of the solid sandstone cliff; and from the arrangement of the upper part of the façade above the portico into nine spaces or niches, containing originally as many figures, Professor Palmer came to the conclusion that this "mysterious excavation" is nothing but the Museum of Petra,—not what the Turks would call an "Antiquity House," but the "Philharmonic Institution of the place."

What constitutes the special wonder of Petra is the fact that with few exceptions its public buildings are hewn out of the living rock. Elsewhere I have hazarded the view that Nature herself first suggested the adoption of this plan, as the massive cliffs and vertical faces of sandstone which line the sides of the Wady Musa naturally assume, in some cases, the forms of artificial structures.* However this may be, all the great temples and tombs are hewn from the stone *in situ*, of which, besides the Khazneh, may be cited "the Temple of the Urn," another great temple surmounted by two tiers of Corinthian columns, and the Dier (or Convent). The Roman Theatre, though peculiarly exposed, is in a condition of remarkable preservation; but the hand of man, earthquake shocks, the rains, and torrents from the mountains are slowly wasting the wonderful and beautiful structures which adorn the Wady Musa, and which through nearly two decades of centuries have in some instances come down to our time as monuments of the taste, industry, and power of the Idumæan inhabitants.

"And this is Petra—this the lofty boast
Of Edom's once unconquerable coast!
These the gay halls through which in days of old
The tide of life so rapturously roll'd;
These the proud streets where wealth with lavish hand,
Pour'd the rich spoils of every Orient land;
All that the seaman's timid barque beguiles
From Cush and Ophir, Tarshish and the Isles;
Afric's red gold—Arabia's spicy store—
And pearl and plume from India's farthest shore!
How changed—how fallen!—all her glory fled,
The widow'd city mourns her many dead.
Like some fond heart which gaunt disease has left
Of all it lived for—all it loved, bereft;
Mute in its anguish! Struck with pangs too deep
For words to utter, or for tears to weep."

* The art of fashioning the rock *in situ* was not uncommon in very ancient times in India, Persia, and other Asiatic countries.

The formation of this remarkable valley is intimately connected with the geological history of Arabia Petræa and Palestine. Down to the close of the early Tertiary epoch, known as the Eocene, the whole of this region formed a part of the bed of the ocean; the only lands within a circuit of several hundred miles around being the summits of the Sinaitic Mountains, which probably rose above the surface in the form of an archipelago of islands. But during the succeeding Middle Tertiary epoch, known as the Miocene, all this was changed. The crust over the part of the globe bordering the Mediterranean of the present day, which for a lengthened period had been at rest, or was only slightly subsiding, gave way to the irresistible strain due to contraction, the result of the process of secular cooling. The strata were bent, fractured, and displaced; some portions relatively elevated, and thus converted into dry land, while others were more deeply depressed. In this way, and at this period, the regions of Northern Africa, Arabia, Palestine, and Syria were converted into land areas, and their outline, together with that of the adjoining seas, roughly defined. Amongst the leading lines of fracture and displacement (known technically as faults), one was produced of over-mastering influence in the formation of the physical features of the region now under description. This fracture, known as "the Jordan-Arabah fault," has been traced at intervals from the head of the Gulf of Akabah northwards along the base of the Edomite and Moabite Mountains, and along the line of the Jordan Valley to the western base of Hermon, and thence (recently by Dr. Carl Diener) into the Valley of Cœle-Syria; a total distance of over three hundred miles; how much further its influence is felt in the stratification is not at present known. Everywhere on approaching this leading line of fracture the strata are displaced, having been elevated along the eastern, or lowered along the western, side. Adjoining this line, the depressions of the Arabah, the Jordan, the Litany, and the Orontes have been produced, partly by rain and river erosion, partly by actual displacement of the strata; while the table-lands of Edom, Moab, and of the Syrian Desert have been elevated along the Eastern side.

Concurrently with the structural changes in the position of the strata, numerous valleys descending from the table-lands on either side began to be hollowed out by streams descending into the great Jordan-Arabah depression. Amongst these is the Wady Musa, or Valley of Petra. The stream which flows along this valley, generally as a gentle rivulet, fringed with oleanders, tamarisks, and reeds, takes its rise in springs, which break out at the base of the cretaceous limestone-

terrace forming the margin of the great Arabian plateau, which here rises to a level of about 5,000 feet above the sea, and, having cut its channel deep into the underlying "Nubian sandstone," ultimately emerges on the Arabah plain, and flowing northwards, unites with the River Jëib a few miles to the south of the Dead Sea, into which the waters pass. The streams of Edom, generally tiny and feeble throughout the greater part of the year, descend with great force and impetuosity when replenished by the thunderstorms which burst, from time to time, upon the mountains during the three or four winter months of the year. From this cause they have cut down their channels to extraordinary depths, especially when they traverse the soft sandstone of which the central parts of the range of Mount Seir are mainly composed, and which breaks off in grand precipices along the master-joints and faults which traverse the rocks in various directions. This sandstone rock (known as "The Nubian Sandstone of Russegger"), two or three thousand feet in thickness, with its base on very ancient volcanic crystalline rocks, and surmounted by the white cretaceous limestone lining the sides of the valley in a series of noble cliffs, vertical walls, or successive terraces, afforded an admirable opportunity for the construction of a city, unique because cut out of the living rock itself. The stone, compact, moderately hard and uniform in texture, coloured moreover with ever-varying shades of orange, red, and purple, disposed in bands and wavy folds, which give the surface the appearance of some gorgeous Eastern robe, formed a suitable material for the skilled masons and architects of the period. As we gaze on those noble specimens of a bygone art—sometimes clinging, as it were, to the sides of the precipitous valley—we ask ourselves what was the *modus operandi* adopted in their construction? Did the architects commence from below or from above, in the work of hewing and shaping the rock-faces standing up before them, or frowning down upon them so forbiddingly? I venture to reply, "from above"; first, and chiefly, for greater security against accidents from falling blocks; and, secondly, because it was always possible to add to the vertical height of the building, when this was required, simply by cutting down deeper below, while from the natural slope of the face the builders were limited in an upward direction. Above all things, it was necessary that the crowning portion of the fabric should be complete and entire, and this could only be easily accomplished by commencing at the top and working downwards. In a few cases the holes for the insertion of the timber scaffolding are still visible. We may, therefore,

suppose that the design of the intended building having been roughly drawn on the face of the rock, the sculptors began their work at the top and completed it at the base, in a manner the opposite of that rendered necessary where hewn stone is used. It has been suggested that the Nabatheans were the descendants of the Rechabites, who were commanded by their father neither to build houses, sow seed, nor plant vineyards for ever. I do not know that there is much foundation for this view, but it seems to gain some support from the absence of domestic architecture in the Wady Musa. The tombs, temples, and palaces seem to constitute nearly the whole of the structures. The inhabitants were either troglodytes or dwellers in tents, perhaps both. That the architects and builders were visitors from Greece or Rome, following in the wake of the merchants and traders of the West, can scarcely admit of a doubt; their names, their very countries, are unknown to us, but their works remain, splendid monuments of a bygone art and civilisation.

The CHAIRMAN (W. N. West, Esq.).—I am sure we are all greatly obliged to Professor Hull for his most interesting paper, and I have to tender him the cordial thanks of the Meeting.

Professor HULL, F.R.S.—Permit me to thank the Chairman and those present for the kind manner in which my paper has been received. It has been suggested to me that it might be of some interest if I were to give a short *vivâ voce* description of the manner in which the Expedition got into Petra on the occasion of which I have spoken, at the end of the year 1883. Our party had gone up the Arabah valley from the head of the Gulf of Akabah, and under the guidance of the brother of the chief of the Allowin, who undertook to conduct us safely, not to the Dead Sea, where we wanted to go, but to Gaza,—though this was afterwards overruled, a little additional money payment having overcome his scruples as to taking us down to the Dead Sea. On getting to the valley which leads up from the great valley of Arabah towards Petra we conceived the idea that we might accomplish what the late Professor Palmer achieved, namely, the ascent of Mount Hor, and that we could do this, and get down into Petra, without being observed by the Arabs. However, on arriving at the foot, we found that the whole of the mountain was very carefully guarded by the Arabs, and that to ascend Mount Hor without detection would be impossible, inasmuch as our lives would have been sacrificed if we made the attempt. We therefore made a virtue of necessity, and pitched our camp at the entrance to the gorge. It was not long before we were visited by a party of the Petra Arabs, with no fewer than four of their subordinate chiefs. Unfortunately, Arari, the

head chief, was away at Damascus, so that we were delivered into the hands of four chiefs instead of one, and, consequently, had to make terms with that number instead of with the head only, as would otherwise have been the case. We were received, of course, with all that affected delight which is so becoming on such an occasion. No doubt they had pretty clear visions of dollars to come which were exceedingly pleasant, and when we had pitched our tents we had a grand conference. The Arab chiefs came to our tents, and squatted around, and we sat about and commenced the discussion of terms. We stated that we wanted to visit Mount Hor (or, Aaron's Mountain), and also to pass through Petra. They said we might visit Petra, but for a Christian (they did not use the phrase "Christian dog"—they were more respectful than that) to desecrate the Mountain of the Prophet was a thing that could not be permitted on any terms. I then said we must visit Mount Hor as well as Petra, or we should not proceed at all; and upon this the Arabs held a conference, the result of which was that they gave up their point as to Mount Hor, and said we might make the ascent. It will thus be seen that, after all, the question of desecration did not bear so heavily on their consciences that their scruples could not be overcome by a certain amount of "bakhsheesh." The question of terms lasted the whole of the evening and late into the night. It was Saturday, and I am sorry to say that on the following day, Sunday, up to about noon, we had to keep up that colloquy with the Arabs as to terms, and a most annoying business it was. No sooner had one point been settled than they started another. I suppose there are no people on the face of the earth who are such wonderful adepts at making a bargain as the Arabs. At last everything was apparently agreed to—the amount to be paid, and the number of camels and horses for our party—and we were writing out the terms, while our head conductor, who kept the purse, opened his box, and, bringing out the dollars, began to count them out on the floor, when, to our astonishment, a new demand was made, the Arabs saying we must pay an additional twenty-five per cent., or some such considerable sum, which was to go to the head chief, who was then at Damascus. We were so disgusted with this that we determined to have nothing more to say to them. I gave directions to strike the tents, and put up our baggage, in order that we might at once march off, and leave both Petra and Mount Hor. I need not say that this was a terrible disappointment to us all; still, there is a limit to human endurance, and in our case that limit had been reached. Well, we packed up, and struck down the road towards the Arabah valley, the Arabs getting up in great dudgeon and riding back towards Petra. But they did not go far before they halted, and came back after us, until, when we had gone five or six miles towards the Arabah valley, they came up with our rear guard. They were evidently repenting the loss of all the dollars they had so nearly had within their grasp, and they requested to be allowed to speak with Major Kitchener, who understood Arabic, and who at once held a conference with them. The result was that they came to the terms on which we had originally agreed, and which

we had determined to stick by. And here I may say that a great deal of injury is done by those travellers who give way to extortionate demands. If people would only have the firmness to resist these demands, and give only what is fair and reasonable, their action would have an excellent effect upon the Arabs in the interest of all future travellers. The result was that we camped in a sort of amphitheatre of rocks, and spent the night, and started off for Petra next morning at four o'clock, long before dawn. It was a very beautiful sight, when the sun began to illumine the sky, the rays being thrown back on the whole of the great plateau on the western side of the Arabah, lighting it up with the most wonderful colours, reflected in gold and silver from the heavens. We divided ourselves into two parties, one of which was to ascend Mount Hor and go down into the Wady Musa, or Petra, while I was myself to cross to Petra only, as it was too much for me to make the ascent. Major Kitchener was one of the party which ascended Mount Hor, in order to make a number of observations wherewith to connect the triangulation of Southern Palestine to the north and the mountains of Sinai to the south; and this he accomplished. The Arabs of Petra, when they found we were leaving, supposed we had gone for good. They had come down on the previous day from the table-land of Edom, where they were tending their flocks, with the view of fleecing us completely; but, on seeing us march back towards the Arabah, they thought we were really off, and went their way towards the hills. The consequence was that next day, when we visited Petra, it was deserted, and we came off without any of the usual annoyances to which travellers in that region are exposed. Our party ascended Mount Hor, and came down to the valley. We were able to visit many of the wonderful temples, tombs, and palaces of the Wady Musa, and returned late in the night to the camp we had left in the morning. I may add one fact that came under my notice, which is that in that region the air is so pure and clear, as Dr. Chaplin, who knows it well, will bear me out in saying, that one is constantly deceived as to the size of objects which appear only a short distance from the observer, and it is found that they are much larger than one would suppose, judging from one's experience in England.

A VISITOR.—Do any of those temples date back to the time of the Edomite occupation?

Professor HULL.—I think the tombs do, but the temples are all Greek or Roman, indicating that the architects were, at any rate, acquainted with Grecian and Roman art and architecture. Some of them have points of resemblance to the Persian architecture, and others to that of Egypt, as seen in the sloping of the pilasters, and so on. But no one can say how far they go back, except that the date must have been several centuries before the Christian era.

A VISITOR.—Are there any traces in the tombs and caves of their having been used as places of sepulture?

Professor HULL.—Yes; there are no sarcophagi, but there are the ledges on which the bodies were placed.

A VISITOR.—Are there any signs of their having been used as dwelling-places ?

Professor HULL.—That is a point on which one is somewhat puzzled. One does not see where the inhabitants resided—possibly in tents. Perhaps I may be allowed to say with reference to the Biblical prophecies regarding Edom, and Petra its capital, that there is no city or country mentioned in the Bible as to which the prophecies have been more literally fulfilled. If we go back to the time of Isaac, there is one great fact that lies patent before us ; the case of the blessing which was conferred on Jacob the younger son, and withheld from Esau, the elder son. In the first place, we know, as a matter of fact, that the descendants of Jacob are living at the present day; scattered all over the world, and are numbered by millions. On the other hand, there are no representatives of Esau, as far as we know, living at the present moment : they have entirely disappeared. It will be in the recollection of all here that, when the Patriarch was moved to add to the blessing he had conferred on Jacob, by conferring a blessing on Esau, he said,—“By thy sword shalt thou live and shalt serve thy brother, and it shall come to pass when thou shalt have the dominion that thou shalt break his yoke from off thy neck.” This prophecy would seem to have been literally fulfilled in this way, that in the great battle of the Valley of Salt, at the southern end of the Dead Sea, the Israelites were victorious over the Edomites, of whom there was a tremendous slaughter, and the victors occupied Petra ; consequently in that way the descendants of Jacob had the dominion, but Esau had a terrible revenge, for when Jerusalem was sacked by the armies of the Assyrians, the Edomites were present, and took part in the capture and sack of the city. It is in reference to that that we find in the Psalms the pathetic words,—“Remember, O Lord, the children of Edom in the day of Jerusalem ; who said, Rase it, rase it, even to the foundation thereof.” There it was that Esau broke the yoke of Jacob from off his neck. With regard to Petra, there are several prophecies in the prophetic books of the Old Testament referring to that place, which are seen to have been literally carried out by its present condition. It was to be desolate and without inhabitants, and to be the abode of owls, vultures, and wild beasts ; all this is literally fulfilled. It would be worth while to go over all the passages in the prophetic books referring to Edom and the Edomites, and compare the actual condition of that country and its people with the prophecies concerning them, as originally uttered.

Mr. S. R. PATTISON, F.G.S.—Professor Hull seemed to speak with some little doubt in reference to one point, namely, where and of what character were the dwellings of the inhabitants. Of course, at the time of Solomon, Petra must have had a large population—probably a trading and industrial population. But where are their dwellings ? And the same question may be asked of almost every people of great antiquity. In all probability they were principally built of what we call “cob,” or mud, in Devonshire. In the south of Spain, and in most countries where there is a lack of stone, the dwellings are manufactured of some such material, and doubtless the rainfall

and other meteorological influences to which they are exposed accounts for the manner in which they have disappeared. Let us take the case of our own forefathers. All their habitations have gone except those we find dug or hewn out in the form of caves. No doubt the caverns found in the hills and rocks have served at all times alternately as residences and as tombs. This must have been the case in all countries where the population has lived at the base of sandstone and limestone cliffs. This, I think, is the only way in which we can account for there being no traces of the dwellings belonging to the former population of Petra. Of course, it may be suggested, from the social condition of this people in ancient times, that a vast majority of them were in a servile condition, and I am afraid were very badly lodged. Moreover, I do not think they can have been possessed of the structural advantages of the present day; and consequently we must not expect to find cottages equal to the dwellings of our modern artisans and labourers. All we can tell is that their dwellings were of a perishable character. It is a marvellous thing that all people appear to have been influenced by devotional feeling, and in all places were accustomed to dedicate their best things to the worship of their God, and therefore their most elaborate structures, their most beautiful carvings,—whether we find them in the forests of America or the temples of Villafranca, or in any other part of the world where any measure of civilisation has prevailed,—and the best and most ornate of their edifices, are those that have been erected to the worship of God, in that way testifying to the intuitive religious sense which recognises the existence of a Superior Being.

MR. T. CHAPLIN, M.D.—I think it must be admitted that these old-world matters are much more intimately associated with many of our modern ideas and with much of our more recent history than we are sometimes apt to imagine. Personally I feel exceedingly indebted to Professor Hull for the interesting and able paper he has put before us. In making a few remarks upon the subject, I ought to premise that I have never been to Petra myself, although I have been very near it, but from time to time I have been in intercourse with people coming from that remote part of the world. It is interesting to remember that in the barbarous times which succeeded the death of Alexander the Great, when the Asamonean family rose in power, the invasion of Idumæa took place, and the country became subject to the Jews. Antipater, who afterwards became Prefect of that district, was the father of the famous Herod, who built the Temple of Jerusalem which existed at the time of our Lord. Christianity prevailed in that district in the earlier centuries of the Christian Era, and a Bishop of Petra still exists, although he has no clergy to superintend and no flocks to look after. I remember him as a very venerable and amiable man, and his office is one that possesses a certain interest through his being what is called in Jerusalem the “Fire Bishop,” by which is meant that he is the officiating Bishop on the day after Good Friday, when the remarkable ceremony of the Holy Fire takes place, the pilgrims who assemble at the Holy Sepulchre believing that fire comes miraculously from the tomb of our Lord. Another

point of great interest is the existence of a tribe of Jews in the neighbourhood of Khaiber, to which allusion has been made. I have seen some of these, and had one under my professional care in Jerusalem for a long time. I tried to make something out of him, but he was too ignorant. He always said he was a Jew, but he looked more like a genuine Bedouy. Indeed, he spoke of himself rather as one of the children of Israel than as a Jew. He stated that his tribe were the men of Israel, and that is an expression used by all the Arabs with reference to the Jews as well as to the Israelites. The man was so ignorant that he could not even repeat the Jewish profession of faith, so that I had great doubts whether he was a Jew at all; and I think that, if these people really are Jews, they have entirely given up the Jewish religion. He told me the tribe to which he belonged has the right of collecting a tax or toll from the Mahomedan pilgrims who come down from Damascus on their way to Medina and Mecca; but I very much suspect that that tax or toll is not given voluntarily, but is exacted from the strangers by these so-called children of Israel whenever they get a fitting opportunity. Another point on which I would say a word is in reference to the dwellings of the ancient inhabitants of Petra. Professor Hull's paper concludes with an allusion to the Rechabites, who were commanded not to build houses. I do not understand that, although these rocky excavations in Petra have evidently been made with the greatest care, there is any evidence that they were used for human habitations, and it seems to me to be a question whether the people who lived in Petra did not reside in huts or tents. I think Josephus relates that one Scarus, a Roman general, invaded Idumæa and besieged Petra, burning all the place around, though he could not have burned Petra itself. So that I conclude that the inhabitants of the district were accustomed to live in houses that might be consumed by fire. With regard to the discovery at Petra of what is called the "altar of Baal," that is a matter of great interest. I must say, I have my doubts as to its having been an altar of Baal. We know that, in countries where it is quite certain Baal was worshipped, the altars that have been discovered are very different from that which exists at Petra, and, as far as I am aware, no altar, that can be shown to have been an altar, has ever been discovered in any part of the world resembling this one. I should be rather inclined to imagine that this may have been a magazine for corn, such as exists in many districts near to Petra, where corn is stored in order to preserve it from decay.

The Meeting was then adjourned.

ORDINARY MEETING, MARCH 21, 1887.

D. HOWARD, ESQ., VICE-PRES., CHEM. SOC., IN THE CHAIR.

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

MEMBERS:—W. Dunbar, Esq., C.E., M.T.E., South Africa; S. M. Tweddill, Esq., South Africa.

ASSOCIATES:—G. B. Buckton, Esq., F.R.S., Surrey; G. C. Bompas, Esq., F.G.S., London.

Also the presentation of the following work for the Library:—

“The Mineral Springs of Keswick.” By J. Postlethwaite, Esq., F.G.S.

The following Paper was then read by the Author:—

KRISHNA, AND SOLAR MYTHS. By the Rev. RICHARD COLLINS, M.A., late Principal of Cottayam College, Travancore.

HAS the human apprehension, or idea of the Divine, described as anthropomorphism, crystallised, in more national philosophies than one, into the same theory of some local Divine Saviour manifested in a human person or character? This would seem to be the hypothesis of not a few of our modern writers. Thus it is quite fashionable to represent Jesus Christ as the Semitic development of this idea, parallel with, for instance, the Hindu developments of Krishna and Buddha. Again, some have not hesitated to represent the story of Jesus Christ as eclectic, shining with borrowed rays, for which it is much indebted to Hindu intuitions or speculations. Lately an attempt has been made to intensify and centralise this anthropomorphic theory, by representing Krishna, Buddha, and many others, together with Jesus Christ himself, as parallel national adaptations of an original myth of the Sun-God. This view is taken in a series of articles in a publication called *Knowledge*, where Mr. Richard Proctor sums up the three following features as everywhere presented by the adaptations of the ancient solar myth: “First, the Sun-God was announced by a star; secondly, he was born in a cave; and, thirdly, sacrificial offerings were presented to him.”

The Egyptian Osiris and Horus, the Persian Mithras, Adonis, Apollo, Bacchus, Krishna, Buddha, and Jesus Christ, are cited as examples. They are also represented as all "virgin-born." It is, however, to be remarked that Mr. Proctor adds in a note, relative to Buddha, that "of course, it must be understood, that these details gathered only in long later ages around the record of Gautama." That little note contains the whole gist of my argument: was it not in "long later ages" that Krishna, too, as well as others, was surrounded with features similar to those which characterised the history of Jesus Christ? If so, how did those features arise?

2. It is not my object here to enter into the whole question of these adaptations of the sun-myth, and the invariable accompaniments, according to Mr. Proctor, of the announcement in each case of birth by a star; of the date of birth being the 25th of December, the winter solstice; of the virgin-mother; of the birth in a cave; of the presentation of gold, frankincense, and myrrh, &c. I must take the case of Krishna alone. Still, it is worth observing, by the way, how freely and wildly the reins have been given to this sun-myth theory; so that with some theorists the whole of the Bible, which is, in fact, a small library of books written by different hands at intervals extending over more than 1,500 years of the world's history, is, nevertheless, but one prolonged national Semitic cryptograph, if we may so call it, or series of cryptographs, or allegories, of the solar-myth. Thus "Samson," Mr. Proctor says, "is unmistakably a solar myth." His name may mean "like the sun." And Delilah, "the languishing one," represents winter. "The hero's hair, as in all sun stories, represents the sun's rays. The Philistines are the clouds, which darken (or blind) the sun when his rays have been cut off in winter. The destruction of the Philistines represents the triumph of the sun, when at spring he returns to the glorious part of his course, over the clouds of winter, by which till then he had been, as it were, imprisoned." "In the same way," Mr. Proctor says, "the story of Jonah loses its absurdity, when we recognise Jonah as identical with the Oannes of the Chaldeans, the Winter-God or hero, issuing from the great fish which represented the gloom and cold of winter." So far I have quoted Mr. Proctor. But by others the whole Bible is represented as but astronomical allegory. The twelve tribes are the twelve signs of the Zodiac; so are the twelve apostles, and Elisha's twelve yoke of oxen. Moses is Aquarius, or Neptune, whose dwelling is where the sun rises at the equinox, therefore he is said to be "drawn out of the water." Esau is Hercules in the lion's skin—another

version of the Sun-God. The four archangels are the four seasons, and the twenty-four Elders the twenty-four hours. Elisha, whose name is "God that Saves," like Samson, is still another version of the Sun-God. It is obvious how easy it is to transform pictures in this way. Why should not David also be the Sun-God?—indeed, he may be so represented by some of these allegorists for anything I know—his harp, like the lyre of Apollo, picturing the music of the spheres, the delights of summer, the merry songs of the summer woods; Saul, the scowling and gloomy winter, seeking with his deadly javelin to pin the sun to the winter solstice, but not quite killing him? Why, also, should not Solomon be the Sun-God under still another aspect—the Queen of Sheba and her retinue being nothing else than the moon, with her retinue of stars, approaching till lost in the beams of the glorious orb of day, and so quelled by his overpowering brightness that "there was no more spirit in her"; but again receiving "of his royal bounty," so that she "turned and went to her own land, she and her servants"—that is, of course, to be manifested again as queen of the night? And, at this rate, may not future philosophers, in the ages to come, turn even the stories of Julius Cæsar and Napoleon Bonaparte, and perhaps a whole host of heroes, and even statesmen, into solar myths also? Cæsar, so named from his hair, which, as in the case of Samson, was but an emblem of the sun's rays, was the "hairy-headed one"—perhaps the "red hairy-headed one"—or the bright-rayed Sun-God. Napoleon Bonaparte was a Greek-Latin Sun-God; to the Greek the "Lion of the forest," meet emblem of the king of day; to the more domesticated Latin, the "Dispenser of good." Both marched out, overpowering the European Philistines, or the clouds, till themselves overpowered by the weather; the latter most markedly bearing the characteristics of the Sun-God in his approach to the utmost bounds of day at the winter solstice, quelled by the snows and storms of winter, and forced back again, to arouse the southern nations once more with his fire. Future criticism may show, too, that the legend of his being born in Corsica is only a relic of the cave-birth myth, and the adoration of shepherds common to all Sun-Gods in their infancy; for is not Corsica (the very name of which is indicative of pens, sheepfolds, or stables), a land of caves, which are to this day the resort of the mountain shepherds? And so any history may be converted into astrological allegories and solar-myths without much difficulty. Nay, it is impossible to exaggerate the licence that belongs to such a system of allegorising as this.

3. But let us confine ourselves to the case of Krishna. He especially is claimed as one of the most prominent of the Hindu embodiments of the sun-myth, or as a prior Hindu development of certain religious ideas, which subsequently received a fuller Semitic development in the person of Jesus of Nazareth.

Our simplest way will be to investigate the history of Krishna: and that, so far as we can, chronologically.

Krishna is seen, in what would appear to be the original conception of him, in the Mahâbhârata. He is introduced in the early part of that long Epic poem as a relative of the heroes of the great war which it describes. There is much that is puzzling, and apparently inconsistent, in many of the records of his actions; as, for instance, that he gave up the whole of his own army to fight for the Kauravas, and yet showed a strong spirit of partisanship afterwards towards their kinsman opponents, the Pândavas, whom he ultimately aided as Arjuna's charioteer. This is hardly like the work of a great poet. Shortly before the war he attended a council of chiefs of the Pândavas and Kauravas, as a mediator between them; and then it was that, for the first time, I think, he showed himself as the Supreme Being. Duryodhana, the chief of the Kauravas, had plotted to seize and confine Krishna, since Krishna had previously suggested that he and three other chiefs of the Kauravas ought to be made prisoners (the same Duryodhana to whom he had given his army). Krishna, however, knew of that plot; and thus addressed Duryodhana: "O Duryodhana, perchance it was because you thought I was alone in this city that you thought to bind me; but behold all the gods and divine beings, and the universe itself, are present here in me." And at that moment all the gods issued from his body, and flames of fire fell from his eyes, nose, and ears; and the rays of the sun shone forth in all their radiance from the pores of his skin. And all the Rajas closed their eyes from the brightness of his presence. And there was a great earthquake, and all who were there trembled with great fear. After this Krishna threw aside his divinity, and became a mortal as before." (I quote from Mr. Talboys Wheeler's translation.) The whole account of Krishna's connexion with these warriors of the Mahâbhârata bristles with inconsistencies; and this extravagant picture of his divinity is quite unlike anything to be found in early Hindu imagery, but is quite akin to much that is to be met with in what is certainly much more modern. There is no longer the poetry of personification of the grand or mysterious in nature, but sheer childish exaggeration, to strike the hearer with awe—

marking a deeper degradation of religious thought, though intending to picture the deity incarnate. A similar description, though with much more detail, which I shall shortly notice, occurs in the "Bhagavad-Gîtâ," evidently the work of the same brain. It is well to observe that the whole history of Krishna is interpreted by the later scholiasts in a mystic sense—as, for instance, in the Gîtâ-Govinda; and the figure here, however ancient may be the original legends of the war between the Pândavas and Kauravas, is of a distinctly modern character; and by modern I mean later than—to take the earliest date—the third century of the Christian era. Mr. Talboys Wheeler's inference, from studying the whole of Krishna's connexion with the events related in the Mahâbhârata, is, I think, conclusive, that the Brahmans either introduced Krishna into the poem, or so modified his history as to exhibit him as divine for the furtherance of their own objects. Mr. Telang, who has translated the "Bhagavad-Gîtâ," and some other episodes in the poem, for *The Sacred Books of the East*, holds a contrary opinion. Any one interested in this question should read Mr. Talboys Wheeler's notes on the "Mahâbhârata," as well as Mr. Telang's Introduction to the "Bhagavad-Gîtâ." A discussion of the many points raised would be out of the question in this paper.

4. The Bhagavad-Gîtâ, or the Divine Song, is the great episode of the Mahâbhârata, which describes the divine character of Krishna. I have already said that Krishna became the charioteer of Arjuna, the leader of the Pândavas against their cousins, the Kauravas. When the two armies are at last ranged in battle array, and the great warriors have sounded their conchs, and Arjuna has raised his bow, a strange pity suddenly takes possession of him. Addressing Krishna, as he contemplates "fathers, grandfathers, preceptors, uncles, brothers, sons, grandsons, companions, fathers-in-law, and friends," he says, "seeing these kinsmen, O, Krishna, standing here desirous to engage in battle, my limbs droop down, my mouth is dried up, a tremor comes over my body, I do not perceive any good to accrue after killing my kinsmen in the battle." He casts aside his bow and arrows on the battle-field, and sits down in his chariot, his mind agitated by grief. Krishna then entreats him to "cast off his base weakness of heart," and in the Bhagavad-Gîtâ, or divine speech or song, seeks to strengthen his heart by religion. In this long poem, Krishna explains to Arjuna, with the authority of Deity, his solution of the religious and philosophical problems that were evidently debated at the time when the poem was written. Many of these are questions that entered into

the Sâṅkhya, the Yoga, the Vedânta, and the Buddhist systems. Whether these systems had already been formulated—as in the Sûtras, for instance, of Patanjali—it is difficult to say; but the terms are used as denoting distinct methods of teaching. Thus Krishna says, in chapter iii. of the Gîtâ, “In the world there is a two-fold path—that of the Sâṅkhyas, by devotion in the shape of true knowledge; and that of the Yogins, by devotion in the shape of action.” It is debatable here whether he refers to the Sâṅkhya and the Yoga, as explained in the written Sûtras, or only to the principles so called, which were afterwards systematised. But this is a subject to which I shall revert. Certain it is that the writer of the Bhagavad-Gîtâ exhibits an eclectic philosophy. This would be natural at a time when the doctrines of the several schools of metaphysical thought were widely discussed, as no doubt they were in the early centuries of the Christian era. The motive principle was “emancipation.” How were the evils and miseries of life to be met? To solve this great question, body and soul were studied, alike by Yogins, Vedântists, and Buddhists, both in their moral and physical aspects, together with their environments. The writer of the “Bhagavad-Gîtâ” culls what he approves from teachings which are to be found, as I have said, in all these philosophical systems, but with the evident object of adding a new doctrine of his own. It is this new doctrine which has for us a special interest. It is not only that the “senses must be under control,” that man must be “self-restrained,” that there must be no “attachment,” that “desire” must perish, that “self must be subjugated,” that the devotee should constantly devote himself to “abstraction,” “in a secret place, alone . . . fixing his seat firmly in a clean place, not too high nor too low . . . fixing his mind exclusively on one point . . . holding his body, head, and neck even and unmoved, steady, looking at the tip of his own nose, and not looking about in all directions, with a tranquil self, devoid of fear” (all of which is in accordance with Patanjali’s system), in order the better to attain to complete union with the Supreme Being; but it is in order to concentrate his mind on Krishna himself, “regarding him as the final goal.”

5. Here, then, Krishna, who is introduced in the Mahâbhârata as a relation of the Pândavas and Kauravas, claims to be the Supreme—in other words the Supreme is described as incarnate in the person of the man Krishna. I believe I am correct in saying that this is the first time that the distinct idea of incarnation is to be found in the Hindu writings. On this idea

is based the new teaching of the Bhagavad-Gîtâ—namely, entire devotion to the person of Krishna. Strangely blended with the Yoga philosophy, yet as often setting even it aside, this is the peculiar doctrine of the poem. Thus, to quote Mr. Telang's translation, chapter vi., "He who has devoted his self to abstraction, by devotion, looking alike on everything, sees the self-abiding in all beings, and all beings in the self. To him who sees me in everything, and everything in me, I am never lost, and he is not lost to me. The devotee who worships me abiding in all beings, holding that all is one, lives in me, however he may be living." Arjuna fears lest he should not attain the consummation of devotion, and to him Krishna replies: "The devotee working with great efforts, and cleared of his sins, attains perfection after many births, and then reaches the supreme goal. The devotee is esteemed higher than the performers of penances, higher even than the men of knowledge, and the devotee is higher than the men of action: therefore, O Arjuna, become a devotee. And even among all devotees, he who, being full of faith, worships me with his inmost self intent on me, is esteemed by me to be the most devoted." Here the worship of Krishna is placed above even the perfection of works which yet are allowed. Krishna further enforces devotion to him to be "the chief among the sciences, the chief among the mysteries, the best means of sanctification." He says, "Whatever you do, O son of Kuntî, whatever you eat, whatever sacrifice you make, whatever you give, whatever penance you perform, do that as offered to me. . . . Those who worship me with devotion (dwell) in me, and I too in them. Even if a very ill-conducted man worships me, not worshipping any one else, he must certainly be deemed to be good, for he has well resolved. He soon becomes devout of heart, and obtains lasting tranquillity . . . my devotee is never ruined. For, O son of Prithâ, even those who are of sinful birth, women, Vaisyas, and Sûdras likewise, resorting to me, attain the supreme goal." Then he adds the principle of "love": "The wise full of love worship me . . . To these . . . who worship with love, I give that knowledge by which they attain to me. And, remaining in their hearts, I destroy, with the brilliant lamp of knowledge, the darkness born of ignorance in such men only, out of compassion for them." Such sentiments find no place, so far as my knowledge goes, in the Vedic writings. He enforces his authority by claiming to be "the beginning, and the middle, and the end of all beings." And when Arjuna desires him to "show his inexhaustible form" to him, Krishna tells him, "You will not be able to

see me with merely this eye of yours. I will give you an eye divine." Then, "if in the heavens the lustre of a thousand suns burst forth all at once, that would be like the lustre of that mighty one." There the son of Pându then observed in the body of the God of gods the whole universe (all) in one, and divided into numerous (divisions). Then Arjuna, filled with amazement, and with hair standing on end, bowed his head before the God and spoke, with joined hands: "O God, I see within your body the gods, as also all the groups of various beings; and the Lord Brahman seated on (his) lotus seat, and all the sages and celestial snakes. I see you who are of countless forms, possessed of many arms, stomachs, mouths, and eyes on all sides a mass of glory the effulgence of a blazing fire or sun groups of gods are entering into you. Some, being afraid, are praying with joined hands, and the groups of great sages and Siddhas are saying 'Welfare!' and praising you with abundant (hymns) of praise All these sons of Dhritarâshtra, together with all the bands of kings (*i.e.*, the warriors of the Kauravas) are rapidly entering your mouths Some with their heads smashed are seen to be stuck in the spaces between your teeth. As the many rapid currents of a river's waters run towards the sea alone, so do these heroes of the human world enter your mouths blazing all round. As butterflies, with increased velocity, enter a blazing fire to their destruction, so, too, do these people enter your mouths with increased velocity (only) to their destruction. Swallowing all these people, you are licking them over and over again from all sides with your blazing mouths." Such is the Hindu writer's picture of the manifestation of the divine in the human. There is the mingling of judgment with mercy, because in the history of the Mahâbhârata it is Krishna's office to conquer the Kauravas. But the chief theme of the Bhagavad-Gîtâ is the "unbroken happiness" of faith in him. There would appear, too, to be the *claim* of novelty: "O Arjuna, being pleased with you, I have by my own mystic power shown you this supreme form which has *not been seen before* by any one but you. . . . I cannot be seen as you have seen me, by means of the Vedas, not by penance, not by gift, nor yet by sacrifice; but by devotion to me exclusively, I can in this form be truly known, seen, and entered into. He who performs acts for (propitiating) me, to whom I am the highest (object), who is my devotee, who is free from attachment, and who has no enmity towards any being, he comes to me." Besides the "bhakti," there is much in the Gîtâ that is seldom, or never, found in the same connexion in

earlier Hinduism, though parallels may be found in Buddhism. Thus, there is special emphasis laid on "absence of enmity towards any being," "hating no being," "being friendly and compassionate," "being forgiving and contented." There is also the praise of "purity" of heart as well as body. He who exercises such virtues, in common with many emphasised also by Buddha, is "dear to Krishna." But then immediately follows the great point of the poem:—"Those devotees who, imbued with faith, and (regarding) me as their highest (goal), resort to *this* holy (means for obtaining) immortality, as stated, they are extremely dear to me." Similarly, when speaking of those who have "transcended the qualities," (that is, the bodily senses and their actions), he adds, "he who *worships me* with an unswerving devotion, *transcends these qualities*, and becomes fit for entrance into the essence of the Brahman; for I am the embodiment of the Brahman, of indefeasible immortality, of eternal piety, and of unbroken happiness." After an evident reference to perhaps more than one of the Upanishads, and a reference to the Sankhya system, he still draws up all the threads in devotion to himself: "dedicating in thought all actions to me, be constantly given up to me. Placing your thoughts on me, you will cross over all difficulties by my favour." And he concludes the song with a recapitulation,—“Thus have I declared to you the knowledge more mysterious than any mystery. Ponder over it thoroughly, and then act as you like. Once more, listen to my excellent words—most mysterious of all. Strongly I like you, therefore I will declare what is for your welfare. On me (place) your mind, become my devotee, sacrifice to me, reverence me, you will certainly come to me. I declare to you truly, you are dear to me. Forsaking all duties, come to me as (your) sole refuge. I will release you from all sins. He who, with the highest devotion to me, will proclaim this supreme mystery among my devotees, will come to me, freed from (all) doubts.”

6. The first point of interest is the fact that in the Bhagavad-Gîtâ we have a doctrine distinctly new in Brahmanical teaching—that is, the incarnation of deity. Equally new, too, is the doctrine of the "bhakti," the personal devotion to, and faith in, the deity so manifested, overriding every other doctrine. The Vedic deities, however much they may have been clothed with human attributes, were never incarnate. When did the idea of the Deity dwelling in human flesh first become a part of man's belief? With the Hindus not before the story of Krishna in the Bhagavad-Gîtâ. With other Eastern nations not at all, so far as I can reach

historical evidence as to the centuries before Christ. With the Jews themselves not till after the resurrection of Jesus Christ. However clearly their ancient prophecies declared it, when read in the light of the life of Jesus, it does not appear that the Apostles during His lifetime had apprehended the truth that He was "God manifest in the flesh." Nor had the Jewish Rabbis ever so interpreted the prophecies as to the Messiah. Divine, indeed, they expected Him to be; but they had not in the least apprehended the doctrine of Christianity, that the Messiah must be "very God and very man."

7. How, then, did the Hindus first reach the idea of the Deity incarnate in the man Krishna? Had they embraced this doctrine before the Jews saw it in the person of Jesus Christ? This is a question of overwhelming interest in the history of religions, because the whole question of Jewish belief in reference to the Messiah, whether illustrated by the teaching of the Rabbis, or the attitude of the Apostles themselves before the resurrection, seems to imply that there is something in human nature which forbids the conception of a true incarnation before the actual fact is fully before the eyes of men. It would, I suppose, be impossible to absolutely prove that the human mind could not originate the idea of an incarnation of the Deity; but it seems in the highest degree improbable. The heathen poets had, indeed, often described the gods as coming to men in human form—as we read, for instance, in Homer and Ovid. They had also endued men with divine powers, and the men of Lystra said of Paul and Barnabas, "The gods are come down to us in the likeness of men." But this seems to be a very different conception from that of the incarnation of the Supreme Spirit in a human person.*

8. Perhaps the only actual proof that this picture of Krishna was subsequent to the history of Jesus Christ is the strictly chronological one—when was the Bhagavad-Gîtâ written? Mr. Telang thinks that "the latest date at which the Gîtâ can have been composed must be earlier than the

* Very different, too, are the "stories of god-descended persons among the Greeks," quoted by Mr. Spencer as parallel to the story of Jesus Christ in the Gospels (*Ecclesiastical Institutions*, page 702). "Æsculapius, Pythagoras, Plato," did not claim to be "very god and very man;" nor have they any claim to divine descent, except in accounts written long after their actual existence; in the case of Æsculapius, for instance, by Cicero; and in the case of the two latter by Diogenes, Laertius, and others, long after the commencement of the Christian era. Æsculapius is not a divinity in Homer, but simply the "blameless physician." Even in his fabled descent from

third century B.C." His reasonings, however, are not very conclusive, though ingenious. Several of his dates are considerably in advance of Professor Max Müller's. It is well known that the chronology of the early Hindu books is a very difficult subject; and is one which, in reference to early religions, would perhaps better repay investigation than any other study to which the Indian student can at the present time devote himself. Professor Max Müller has expended much labour on it, the result of which we have in the notes on his *India: What can it Teach Us?* and elsewhere.

9. The fact is, it is impossible to prove that the Gîtâ was written prior to the Christian era. Mr. Telang thinks differently; but, as I have said, I do not think that his reasoning is conclusive. I have not space to follow it in detail, but confine myself to one or two points. Mr. Telang lays great stress on the unsystematic character of the teaching of the Gîtâ, compared with the systematic, orderly, and exhaustive method of the Yoga-Sûtras, which were the work of Patanjali. On this he bases the conclusion that the Gîtâ was the work of a more speculative age than that of Patanjali, when religious conclusions had not been systematised: that in this respect the Gîtâ is of the same character as the Vedic Upanishads; and that therefore the poem is the work of an age prior to that of Patanjali. For instance, he gives as an illustration a passage from the Gîtâ, exactly parallel to one in Patanjali's Yoga-Sûtras, one of which must have been quoted from the other—the passage in the Gîtâ is a saying of Krishna's, that "the mind may be restrained by practice (abhyâsa), and indifference to worldly objects (vairâgya)." He observes that Patanjali follows out the thought by systematic reasoning, whereas the writer of the Gîtâ drops the subject after the bare recital of the aphorism. But if he quotes Patanjali, this is just what we should expect. He quotes, as most men do, the main thought, which is enough for his

Apollo there is no real parallel to the incarnation of our Saviour, and the doctrine of the New Testament.

It is worthy of notice that Mr. Spencer is entirely silent in the *Ecclesiastical Institutions* as to the absolutely historical character of the New Testament, existing, as it does, by the side of monuments as well as acts, the origin of which it records, and which it would have been impossible to impose upon the world after the time of the Apostles themselves. We get very near to Christ in the Apostles, who, as I suppose few sceptics would deny, were His actual companions, some of them probably his relatives. Their testimony as to Him is very different from the legends as to Pythagoras and Plato, reported, 600 or 700 years after their careers had closed, by Diogenes, Porphyry, and Iamblichus.

purpose. I think here we have a distinct instance of a quotation from Patanjali, though Mr. Telang thinks that the writer of the *Gîtâ* is throwing out hints, which Patanjali afterwards adopts and systematises. But, again, it is not in a poem that we expect to find an exhaustive philosophical system. We should hardly go to *Paradise Lost* or the *In Memoriam* for detailed and scientifically-argued systems of divinity, political economy, or social science, though there is something on all these subjects to be found in them. The *Bhagavad-Gîtâ* is a poem, and the method is evidently eclectic; and when the writer mentions the *Sânkhya*, the *Yoga*, the *Vedânta*, it appears to me more likely that he refers to the *Sûtras* than merely to the beliefs as they were discussed previous to their systematisation by the philosophical writers. It is, of course, true that the terms *Sânkhya*, *Yoga*, and *Vedânta* were in use before the *Sûtras* were written; but I judge from the parallel between the *Gîtâ* and the *Yoga-Sûtras* mentioned above as quoted by Mr. Telang, of which the most rational explanation seems to be that it is a quotation from Patanjali. Now, the date of Patanjali is still a debated question, no doubt; but Professor Max Müller places him after the third century A.D. It should also be noticed, that in one place Krishna says, "I am the author of the *Vedântas*," where, Mr. Telang says, the reference may be to the latter portion of the *Vedas*; but, nevertheless, it looks like a reference to the *Sûtras*, so-called: while in another place the word *Brahma-Sûtras* occurs, which is a common name for the *Vedânta-Sûtras*, though Mr. Telang holds that it does not refer to the *Sûtras* at all in this place, but only to instruction about the *Brahman*.

10. Mr. Telang bases another argument for the very early composition of the *Bhagavad-Gîtâ* on its "style and language." He observes that it does not show the love for "compounds" "presented by what is called the classical literature." This is, of course, a question on which only those well acquainted with Hindu literature can judge. But I believe it is doubtful whether in this respect the *Gîtâ* is much more simple than the writings of *Kâlidâsa*, and *Kâlidâsa* is put by Mr. Telang in the fifth century, and by Professor Max Müller in the sixth century A.D.

11. With regard to the references to the *Vedas*, and the somewhat "disparaging manner," as Mr. Telang observes, in which they are treated in the *Gîtâ*, I cannot see that that necessarily indicates antiquity, though the *Upanishads* treat many *Vedic* questions in much the same way. The object of the *Gîtâ* is to extol Krishna, in comparison with whom everything

must yield. This method of treatment might suit the third century after Christ, or even the tenth, as well as the age of the Upanishads.

12. Again, Mr. Telang seeks to prove that there are quotations in the Vedânta-Sûtras from the Gîtâ, and that the Vedânta-Sûtras are older than Pânini, the great grammarian, whom he places in the fourth century B.C. But both the fact of quotation and the dates are so involved in difficulties that I believe they are all very debatable, and I believe Professor Max Müller would place the Vedânta-Sûtras after the third century A.D. He says: "The philosophical Sûtras were, and are still, supposed by many scholars to belong to the centuries preceding our era. All I can say is, I know, as yet, of no sound arguments, still less of any facts, in support of such assertions." (*India*, p. 352.)

13. While we acknowledge, therefore, the extreme difficulty of fixing historical dates to many of the Hindu books, it must be allowed, I think, that there is no valid reason forthcoming at present for placing the Bhagavad-Gîtâ before the commencement of the Christian era.

14. While, however, we cannot at present fix the exact date of the Gîtâ, there are many bits of circumstantial evidence which seem to point to the conclusion that the story of Krishna in the poem was written after the beginning of the Christian era, and by one who had received some knowledge of the incarnation and teaching of Jesus Christ.

15. In this connexion it may be observed that the worship of Vishnu as the supreme god would seem to belong only to quite the latter phase of Hinduism. The Aryans first worshipped the sun; next Indra, the god of rain, becomes the chief deity adored—the natural result, as Mr. Talboys Wheeler well suggests, of life in a tropical climate, where the rain is even more precious than the sun. When the worship of Vishnu as the supreme spirit really superseded that of Indra we cannot definitely say, but it seems to belong to the more metaphysical age of Hindu thought, and is not fully developed till we come to the period of the Purânas. It is only in the accounts of Krishna that are found in these writings—as in the Bhâgavata-Purâna—that he is described as taking part in the overthrow of Indra. In the Bhagavad-Gîtâ he is once or twice addressed as Vishnu. The doctrine of the avatâras, or incarnations, of Vishnu are also only first developed in the Purânas. Thus the legends of the *Fish*, the *Tortoise*, and the *Boar* are found in the Satapatha Brâhmana; but it is only in the—much later—Purânas that they are described as incarnations of Vishnu.

16. Still more striking is the character of the revelation made by Krishna. He preaches a new faith, personal devotion to him, as the embodiment of the divine. He speaks of it, as I have before shown, as the chief among the sciences, the chief among the mysteries, the best means of sanctification. This mystery he sets above "the Vedas, penance, gifts, and sacrifices." It is to be a new creed, controlling all previous creeds. The language in which this new creed is conveyed is in itself remarkable:—The devotees, who worship Krishna, "dwell," he says, "in him, and he in them": they are "never ruined": even "those who are of sinful birth, women, Vaisyas, and Sûdras, resorting to him, attain to the supreme goal." Other quotations I have given above. Whence did the writer of the Bhagavad-Gîtâ derive these ideas of incarnation, sanctification, love, faith, the last overtopping and setting aside every previous Hindu rule of the religious life? Every one will allow, I think, that these are novel doctrines, of which there are no discernible germs in the Vedic literature. So remarkable an array of novelties of faith and practice could scarcely have been the production merely of the philosophical mind: in short, they bear evidence of having been derived from some foreign source; and they have the strongest resemblance to some doctrines which are peculiar to the revelation of Jesus Christ. Moreover, their connexion in the Gîtâ is incongruous: in many parts of the poem the current Hindu methods for attaining perfection and emancipation are laboriously set forth; the doctrine of metempsychosis is stated; and yet personal devotion to Krishna is made in one passage to render all these doctrines null and void. Still further, there is the most complete incongruity between some of the doctrines enunciated by Krishna, such as sanctification, forgiveness of sins, love, &c., in connexion with the worship of the incarnate deity, and his own character, as described in other portions of the Mahâbhârata. One scene is particularly repulsive, where, while he pronounces forgiveness of sins, he is described as standing to watch some dancing-girls, the skill of one of whom he rewards by telling her that if she will visit him, he will give her whatever she asks of him. Some of the accounts of these rewards to the forgiven would not bear transcription. His conversation with Bhima on the same occasion is also most repulsive from a moral point of view; while at the same time it is stated that Krishna had many thousands of wives. In the professed histories of Krishna's life, which were, no doubt, all written after—some long after—the Bhagavad-Gîtâ—as in the Harivamsa, which is

generally regarded as a later addition to the Mahâbhârata; the Vishnu-Purâna; the Bhâgavata-Purâna; and the comparatively modern Gîtâ-Govinda—the incongruity between the exalted doctrines of the Gîtâ and the character of Krishna is much more strongly portrayed: for in those productions he is exhibited, morally, under still darker shades. In the midst of his immoralities, however, he is still represented as doing works of mercy, some of which bear a strange resemblance to the works of Christ, and, as in the case of the doctrines noticed in the Gîtâ, forcibly suggest the idea of adaptation. Thus, in the Mahâbhârata, he is described as laying hold of the hand of the dead body of the son of Jayadratha, when, upon his saying, “Arise!” “by the will of the Almighty the dead man instantly arose.” Earlier in the epic a woman, described as “of infamous character,” is made to say, “Every day I behold the divine Krishna, and therefore all my sins are forgiven me.” Can this be a debased echo of Christ’s mercy to “publicans and sinners,” and to the Magdalene? On a journey to Hastinâpur, as he came near to the city, “multitudes of Brahmans, with clasped hands, besought him to forgive their sins:” and one said, “What an auspicious day is this, in which men behold your face to the cleansing of all their sins.” In the Bhâgavata-Purâna, there is a very singular account of his curing a hump-backed woman. She prays Krishna to allow her to anoint him with saffron and sandal; he took compassion upon her, and “placed his feet upon her feet, and his two fingers beneath her chin, and raised her up, so that she became quite straight, and by the touch of Krishna she was rendered young and beautiful.” As Mr. Talboys Wheeler remarks: “The similarity between this story and the two events recorded in St. Luke, xiii., and St. Mark, xiv., is too striking to be passed over.” The incongruity, however, between this act of mercy, and the character of Krishna, as set forth in the Purâna, is as great as it can well be; for he is described as afterwards rewarding this restored woman by a visit, the nature of which must be passed over in silence.

17. It is this incongruity between the higher teachings of the Bhagavad-Gîtâ and the other portions of it, as well as between those teachings and the character of Krishna, that strikes one as indicating a foreign source for those higher teachings; that suggests that these germs of thought, which we know of only as originating in their integrity with the Christian religion, may, or must, have been thence borrowed by the writer of the Gîtâ, to give a fresh glory to his doctrine. For, further, these are the very doctrines of Christianity that

we should expect to be received by a Hindu. The doctrines of the cross, the atonement, the vicarious sufferings of Christ, which were "to the Jews a stumbling-block, and to the Greeks foolishness," would be equally foolishness to the Hindu, and could not be accepted by him unless he became an absolute convert to Christianity. They could not be in any way adopted as a portion of Hinduism. It is remarkable, however, that there is a weird and most impressive picture drawn near the close of the Mahâbhârata, after the great war was over, totally different from anything that could be suggested by the Hindu doctrines of transmigrâtion of souls, or absorption into the deity after death. The Pândavas, who had survived the war, were lamenting their friends, husbands, sons, and kinsfolk, whom they had lost in the great war, when, while bathing in the Ganges, the river "began to foam and boil," and suddenly the great chiefs who had perished in the war, "in full armour, seated in their chariots, ascended out of the water, with all their armies arrayed as they were on the first day of the Mahâbhârata All appeared in great glory and splendour, and more beautiful than when they were alive enmity had departed from among them widows, orphans, and kinsfolk were overjoyed, and not a trace of grief remained among them widows went to their husbands, daughters to their fathers, mothers to their sons, and sisters to their brothers, and all the fifteen years of sorrow which had passed since the war were forgotten in the ecstasy of seeing each other again. Thus the night passed away in the fulness of joy; but when the morning had dawned, all the dead mounted their chariots and horses, and disappeared." May not this be an echo of the Christian description of the resurrection? I would suggest that these gleanings from the Christian story, if such they were, were in all probability obtained, not from a study of the Christian writings, but from what was orally taught. This is, of course, only a suggestion of probability; I have no kind of proof to offer that such must have been the case. If so, however, it would, perhaps, further account for the fragmentary and partial knowledge that we seem to encounter.

18. With regard to the position taken by Mr. Proctor, which I mentioned in the early part of the paper, that the history of Krishna illustrates the Sun-God myth, in that he was born in a cave, that his mother was a virgin, &c., I do not find, in what must be the earlier accounts of Krishna's birth, that such was the case. His mother, Devaki, was the wife of Vasudeva, who was his father. The birth was not in a cave, but in an ordinary dwelling. He was, moreover, the eighth

son of Vasudeva and Devaki. There are, however, even in what seem to be the earliest accounts of him, probable gleanings from the Bible story gathering about the legends of his infancy. For instance, the raja Kansa, the father of Devaki, being warned that a son of Devaki would be his destroyer, when he heard the child was born, "ordered that all the worshippers of Vishnu, young and old, should be slain; and commanded his warriors to make search for all young children throughout that country, and to slay every male child that possessed strength and vigour." To avoid such danger, Vasudeva took the babe Krishna, as soon as he was born, in a basket used for winnowing corn, across the River Jumna to Gokula. On crossing the river, the waters of which were very high, the babe "stretched forth his foot, and the waters were stayed, and became shallow and fordable." At Gokula, Krishna was exchanged for the daughter of Yasodâ, the wife of a cowherd named Nanda, and so was saved from the evil designs of Kansa. Here it was in the house of Nanda that Krishna was brought up. Some have thought that the name Goshen suggested Gokula, both words meaning a cowhouse; but I do not think that we need suppose that the writer of the Purâna was learned in the literal meaning of Egyptian names. It may, however, be added, as perhaps worth notice, that the tribe of the Yâdavâs, to which Krishna belonged, although by marriage he is made to be related to the Kauravas and Pândavas, who were Kshatriyas, was a tribe of shépherds or cowherds.

19. Krishna is introduced in the Mahâbhârata, together with his elder brother Balarâma, as a Prince of that Yâdava tribe; and his royal city is said to be Dwâraka. They are there called "the amorous Krishna and wine-drinking Balarâma." Krishna afterwards describes himself in a speech as being, with his family, "equally related to the Pândavas and Kanravas." There is no tracing of his pedigree in the course of the poem proper. The Purânas heighten the picture of divinity according to Hindu ideas. Thus the Bhâgavata-Purâna says the marks of Vishnu were discerned on Krishna at his birth; the Vishnu-Purâna that he descended, adored by the gods, and entered into the womb of Devaki, that he might become the saviour of the world. And in this way, each succeeding story, as in the case of the later Buddhist accounts of Gautama, adds fresh adornments to supplement the meagre notices of his origin as found in the Mahâbhârata, with the object, as it seems to me, of approximating the divine character of Krishna as nearly as possible, according to the demands of the Hindu

imagination, to the divinity of Christ, as preached by the Christians.

20. If, on the other hand, supposing it to be granted that the Bhagavad-Gîtâ was written previously to the commencement of the Christian era, we seek, as many have done, for doctrines there that may have been appropriated by the New Testament writers, waiving, of course, for the moment, all the evidence for the truth of their record, how much is it possible to find that could have been appropriated? There are, indeed, ideas and expressions which have a resemblance to Christian ideas and expressions. There is the idea of incarnation. But could the picture of the charioteer, with the universe in his stomach, have been the germ of such a picture of the incarnate God as we have in the New Testament? We can only express astonishment that any sane mind could ever have given birth to such a suggestion. The truth is, that there is only one point common to the two pictures, the person of Christ, and the person of Krishna, and that is the bare fact of the incarnation of the Deity. Then there are the doctrines of forgiveness, faith, love, and union through faith with the divine; but these are set among speculations as to the soul and its environments, where they are plainly seen to be additions, unconformable to the other doctrines of the poem; they exist, like parasites on the forest trees, beautiful enough in themselves, but, having no roots in the common ground, they stand among the words of Krishna without reasons for their existence, or ends to be accomplished: while they are most utterly, as I have shown, incongruous with the character of Krishna, as set forth in other parts of Mahâ-bhârata.

The same doctrines in the New Testament are placed between antecedents and consequents, which both illustrate and enforce them; they form perfect parts of a perfect whole, and are fully explained both as to their reasons and ends. Moreover, they breathe the very essence of His character who enforced them. To try to build up the edifice of Christian doctrine from the isolated likenesses to some of its teachings which we find in the Bhagavad-Gîtâ, is like trying to build a house of sand, though it be true that every grain of sand is a stone in miniature.

21. With regard to the other accounts of Krishna in the Purânas, and elsewhere, they are so evidently subsequent, and some of them long subsequent, to the commencement of the Christian era, that the question of indebtedness, if there be any, solves itself.

22. It will, of course, be asked—and this is a matter of great

interest and importance—what grounds have we for believing, even allowing that the Bhagavad-Gîtâ was composed after the first century A.D., that the Christian story had taken any hold upon India? I may here refer to what I have already suggested on this point in a former paper on Buddhism; but it will be well to note one or two points here also in evidence.

1. There is a fair amount of evidence that St. Thomas was the Apostle of India: namely, the tradition of the Christians that still exist on the Malabar coast; their early connexion with Edessa, and the fact that they still own the Patriarch of Merdin; the account in the Syriac document called *The Teaching of the Apostles* (*ante-Nicene Library*, vol. xx.), that “Thomas was the guide and ruler of the Church which he had built in India, in which he also ministered there;” the *Acts of Thomas*, of which, though it is apocryphal, we should observe that the writer had nothing to gain in sending the Apostle to India, but much to gain, if the Apostle whose name he forged was well known, at the time he wrote, as having been the Apostle of India.

2. Then there is the testimony of Eusebius, that Pantænus, the predecessor in the chair of the catechetical school at Alexandria, and tutor of Clemens Alexandrinus, found a gospel of St. Matthew in India, when he went there as a missionary in the second century.

3. There are also the Christian crosses at Madras and Kottayam, with Pahlavi inscriptions; and the royal grants to early Christians inscribed on copper-plates, which also contain signatures in Pahlavi characters, showing that the Christians had in the early centuries of the Christian era already attained a position of considerable importance. The connexion between India and Persia is too long a subject to dwell upon here; but it was evidently very early, as in the sixth century the Indian *Panchatantra* was known in Persia. The Christian influence of Persia, too, may have been greater than is often supposed; for, if Mr. Thomas’s translation of the Hâjîâbâd inscription is correct, even Sapor I., in the fourth century A.D., must have been favourable to Christianity, if not a Christian himself (*Early Sassanian Inscriptions*).

23. It is worth mentioning, too, in connexion with Persia, that in the history of Manes, or Mani, there is a singular illustration of how the story of Jesus Christ was adopted by other religions. Manes identified Christ with the Persian Mithras, giving Christ the character of Mithras, and Mithras the character of Christ; so that, as in the case of Krishna, Christ was degraded by the attributes of Mithras, and Mithras exalted by the attributes of Christ.

24. It may also be added that Max Müller shows that India may have been much more indebted to the outside world than has often been thought, in the early centuries, by proving that "the knowledge of Greek astronomy, and even of Greek astronomical terminology, came to India not later than the fifth century." He quotes the actual Greek names of the zodiacal divisions in their Sanscrit corruptions, as given by Varāhamihira, who died in 587 A.D. (*India*, p. 526). This, too, should help to diminish any previous scepticism as to the possibility of Christianity also having reached and influenced the Hindu by that time.

25. In conclusion, then, there is, so far as I can discern, no indication in the early accounts of Krishna of the fact postulated by Mr. Proctor, that the Hindus were adopting the universal sun-myth theory, the chief characteristics of which all over the world, and in all time, according to Mr. Proctor, were that the God was born of a virgin, his birth-place a cave, the herald a star, his presents gold and frankincense, &c. None of these peculiarities belong to the Krishna of the Bhagavad-Gîtâ. The only title that he has to be ranked as a sun-god is that he represents Vishnu, whose *tri-vikrama*, or three steps over the heavens, is explained as denoting, to quote Professor Monier Williams, "the threefold manifestations of light in the form of fire, lightning, and the sun, or as designating the three daily stations of the sun in his rising, culmination, and setting."

26. The addition of the name "Jezeus" to Krishna, which I find in one of Mr. Proctor's articles in *Knowledge*, as also in a published lecture, by a Mr. H. J. Browne, delivered at Melbourne in 1884, has no warrant from any Hindu book that I am acquainted with; it bears no resemblance to any of the many names by which Krishna is commonly denoted in India, and it is not possible for it to be a transliteration, or even an approach to a transliteration, of any imaginable combination of letters, either in Sanscrit or the dialects of South India. I have been curious to trace its origin, but have so far failed. It looks like an extremely modern attempt to assimilate the name of Krishna to that of Christ Jesus. But at present I must acknowledge it to be a puzzle.*

* Mr. Proctor writes, in reply to a question as to the authority for the name of Jezeus, "Like my correspondent, I am *unable to understand* the modern use of this epithet, which I have *used as I found it*, supposing it might be a form of one of the 'thousand names of Krishna'—with some of which I am not familiar. . . . *Knowing absolutely nothing as to the real source of the epithet*, but recognising it as an impossibility in connexion with any Indian language, I venture the suggestion that *it may have*

27. But we do not wonder that Mr. Proctor seems somewhat shaky about his authorities, when we read that, "in each case" of the many avatars of Vishnu, "the new-born God had a virgin mother." The first avatar was a *fish*, the second a *tortoise*, the third a *boar*, the fourth a *man-lion*, the fifth a *dwarf*. Whether these were *lusus naturee*, or whether we are to understand a virgin fish, a virgin tortoise, and a virgin pig, we are not told. A virgin mother of a dwarf would have been feasible. But these strange facts are not to be found, I believe, in the Hindu books. Neither are many other of the supposed facts, by which the theory of the universal adaptation of the solar myth, as the origin of all religious worship, is supported, to be found in what ought to be taken as the proper authorities. When the solar-myth does appear—and we do not question that the worship of the sun did greatly affect early religion—it appears as a degradation of the true, or an addition to the past, as when Manes identified Christ with Mithras, and placed his dwelling in the sun. And wherever we can really find the distinct account of a virgin-mother, birth in a cave on December 25th, a herald star, songs of angels, and presents of gold and frankincense, &c., at the birth of a professed incarnation of Deity, it will be in the romancing that took place, as in the later accounts of the Buddhists, for instance, after the commencement of the Christian era.

28. It must remain—at least, for the present—an open question whether Krishna was a purely imaginary person, or whether such a name occurred in the original legends of the war of the Mahâbhârata, as denoting the charioteer of Arjuna. If the latter, it is to be observed that the Yâdava tribe, to which, in the Purânas, Krishna is said to have belonged, is traced in the Mahâbhârata to Yadu, the son of a Kshatriya râjah, Yayâti, and Devayâni, the daughter of a Brahman. Now the names of Yadu and Turvasu, brothers, are both mentioned in the Rig Veda as ancestors of the Âryan race. The name Yadu is, therefore, a very ancient one. On the other hand, the tribe of Yâdavas, which is said to be historical, would appear to have been a nomad tribe of Vaisyas—the third, or lowest, caste of the Âryan people. Here, then, the descent of the tribe from the son of a

been borrowed from some ancient Latin writing, in which, because of the close resemblance between the story of Krishna . . . and that of Christ, Krishna is called Jezeus. . . . But I should say the chances must be very heavy against this guess being correct."—(*Knowledge*, Dec. 1886.) The italics are my own. Mr. Proctor here does not say *where* he "found" this epithet Jezeus applied to Krishna.

Kshatriya father and a Brahman mother would seem to be an invention. There is, again, the peculiar way in which Krishna is also made a relation of the Pândavas and Kauravas, which is very mysterious. There is, moreover, a difficulty about Krishna's *raj*, which is put, in the Mahâbhârata, at Dwâarakâ, in Guzerat, 700 miles to the south of the site of the great war, and the capital of the Pândavas. Yet between these distant places communications are kept up between him and the great chiefs of the Mahâbhârata. The destruction of Dwâarakâ, too, after the war, with nearly all the Yâdavas, and the death of Krishna himself by a passing hunter, are equally strange.

29. Is it not more than probable that Krishna is an altogether imaginary person, introduced to give a new doctrine gleaned from the Christian story, as to the means of union with the divine? It is difficult to hide the suspicion that the very names, Krishna, Vasudeva (the divine Vasu), Devakî (the divine lady), and Yadu, may have been suggested by the names in the Christians' account of Christ, the tribe of Yâdavas being further suitable as a shepherd tribe, though ennobled, according to Hindu ideas, by the mythical descent from higher castes. These words are not mentioned as adaptations, but only as suggested. Krishna, meaning dark or black, may not have been an altogether uncommon name: there are still tribes in India who call their children by names indicating personal peculiarities: the Rishi Vyâsa, the composer, or compiler, of the Mahâbhârata, was also called Krishna-Dwaipâyana (the *Island-born* Krishna)—there may have been many Krishnas; but if the name here was suggested by the name *Christ*, there is a difference of only one letter. Vasu, again, contains the same sounds inverted as Yoseph, or Yusaph. Devaki I have already explained; and Yadu is a singular echo of Yahudah. It may be merely a coincidence that the different names thus echo one another; but if so, it is a very curious coincidence, and is not noticed here for the first time.

30. It should, further, not be overlooked that Krishna is the younger brother of Bala-Râma, who sometimes shares with himself the honour of being the eighth and last past avatar of Vishnu in the Hindu Pantheon. Why should such a discrepancy, or at any rate peculiarity, anywhere occur in Hindu mythology? The sixth and seventh avatars of Vishnu are both Râmas. The sixth avatar is Parasu-Râma, Râma with the axe, the great hero of the Brahmans against the Kshatriyas. The seventh avatar is Râma-Chandra, the glorious Râma, the great hero of the Kshatriyas against

the southern aborigines. The eighth avatar is sometimes also a Râma, Bala-Râma, the strong Râma, or, as he is also called, Râma-Halâyudha, Râma with the plough. May this last not originally have been the great hero of agriculture and peace that followed the long days of war? In any case, Krishna follows him in birth, though in most legends he is placed alone as the eighth avatar of Vishnu. Is not this very suggestive of the comparatively late advent of Krishna on the tablets of Hindu mythology, though it is confessedly difficult, so far, to define chronologically the exact periods to which these legends refer? Krishna seems to have *supplanted* Bala-Râma as the eighth avatar. It is also significant, that the next avatar is Buddha, who must have received this rank long after the expulsion of Buddhism as a schism from India—a consummation which is generally placed at about the eighth century of the Christian era; and that the last avatar is yet to come—that of Kalki—who is to be the destroyer of the wicked, and the liberator of the world. Whence can this idea have arisen but in the wake of revelation?

The CHAIRMAN (Mr. D. Howard, V.P.C.S.).—We have to thank Mr. Collins for a very interesting and valuable paper. The study of these ancient religions is undoubtedly one of great interest, and it is also one which now-a-days is being carried on with great vigour, although very often with a strange forgetfulness of elementary teachings as to the proper methods of investigation. You can only obtain sound inductions by duly ascertaining facts; and yet there are many who write and speak as if the *Light of Asia* were the safest authority for the history of Buddha, or other equally untrustworthy guides were the best verification for the sun myths with which they deal. It is invaluable when those who have opportunities of really studying the philosophy of different nations, whether in India or elsewhere, give us the benefit of their researches.*

* BUDDHISM AND THE VEDA.—Sir Monier Monier Williams, Boden Professor of Sanscrit in Oxford University, speaking lately at Oxford, urged that Christians had no reason to shrink from a comparison with other religious systems. He said:—"To translate the Veda or the Koran into other languages the Hindoos and the Mohammedans consider simply desecration. It is the *sound* and *intonation* of the Sacred Sanscrit and of the sacred Arabic, which is of primary importance and primary efficacy; the *sense* is merely secondary. Millions and millions who know nothing of Sanscrit are obliged to hear and repeat the Veda in Sanscrit, and millions who are wholly ignorant of Arabic are obliged to hear and repeat the Koran in Arabic. Think of what would happen if no Christian in any part of the world were allowed to hear, read, or repeat his Bible except in Hebrew, or Greek!" Further, he found "no such revelation of our nature and needs in

In the paper we have just heard, Mr. Collins has given us a history of the Krishna myth, which is of exceeding value. He holds that this Krishna myth in all probability took its rise from evident and flagrant imitations of the Gospel histories; and on this point it is very interesting to study the Apocryphal Gospels to see how in them the incongruities and extravagances of thought, which cling to the supernatural, attach themselves like a parasite, even around the history of our Lord Himself. It is to the accurate and minute verification of these early writings and their meanings that we must look for any information as to the real rise of religious thought among the different nations of the earth. And there is another point, that it is not sufficient for us to read the translations, however accurate, of these early writings; we ought to be able, more or less, to throw ourselves into the habit of mind and thought of the people themselves. It is not enough to read the Vedas or any other of those ancient writings; we must read them, as far as possible, as the original writers, as well as those for whom they wrote, understood them. I do not say it is easy to do this; but this, I think, is the only method by which our researches can have any real value. It is difficult for us even to throw ourselves into the feelings of the writers of the Old Testament, and it must necessarily be more difficult for us to form other than a vague idea of the mind of Homer, or the actual facts about which he wrote; when we go back to the most distant ages and the habits of thought most distant from our own, it becomes more difficult still; and we are exceedingly apt to read what was then written in a sense that would profoundly amaze the authors of the books themselves. I trust that after the Honorary Secretary has read some communications that have been received, those present who have studied these subjects, will give us the benefit of their experience.

Captain FRANCIS PETRIE, F.G.S. (Hon. Sec.).—The following communications have been received:—

the Veda as in the Bible. Again, Sanctify this life and all its trials, says our Bible; Get rid of the troubles of life, says the Veda. Sanctify the body, says our Bible; Get rid of the body, says the Veda. Sanctify your daily work, says our Bible; Get rid of all action, says the Veda. Rest not on any merits of your own, says our Bible; Rest on your own merits alone, says the Veda. Get rid of sin, says our Bible; Get rid of misery, says the Veda. Moreover, the historical element is wholly wanting both in the Veda and the Koran. Then note one other very remarkable feature. Progressive development marks our Bible. The light of Revelation is gradually unfolded till the perfect illumination of the Epistles and the Revelation of St. John is reached. The very reverse is the case in the Veda and the Koran. In these the earliest utterances contain the greatest light, the later become darker and darker." After a *life-long study* of the religious books of the Hindoos, Professor Monier Williams said he felt compelled to express publicly his opinion of them. "They begin with much promise amid scintillations of truth and light and occasional sublime thoughts from the source of all truth and light, but end in sad corruptions and lamentable impurities."—ED.

“7, Norham Gardens, Oxford,

“March 20, 1887.

“DEAR CAPTAIN PETRIE,

“I have read Mr. Collins' paper with much interest. The subject is extremely difficult, and the literature connected with it very large. I cannot enter into details. I can only say that, looking at the question from a purely historical point of view, I see no channel through which the Krishna story could have influenced Christianity, nor *vice versa*. The points of similarity are, no doubt, puzzling at first sight; the points of difference, however, are far more numerous. We must wait and be satisfied that we cannot make out everything. The chief point is a critical study of the original documents. What is the date of the Syriac document called ‘The Teaching of the Apostles?’

“The name *Yezesus* was invented, I believe, by Jaccoliot, and is a mere corruption of *Yadu*. I answered Jaccoliot once (*Selected Essays II.*, p. 422; also *Introduction to the Science of Religion*, p. 24), but these books hardly deserve notice.

“Yours sincerely,

“F. MAX MÜLLER.”

The Cambridge Professor of Sanscrit, writes:—

“Cambridge, March 15.

“MY DEAR SIR,—I thank you for sending me the copy of the Rev. R. Collins' interesting paper. I am sorry that I cannot come up to London next week to attend the Meeting.

“I may perhaps mention that it seems to me not unlikely that the name *Jezesus*, referred to in p. 174, may be a corruption of the Sanskrit word *Isa*, ‘Lord.’ *Isa* properly belongs as a title to Siva; but it is sometimes used of Krishna (or Vishnu), as *e.g.* in the Vishnu Purāna (Wilson, Hall's ed., vol. v. p. 43). *Isas* would be the nominative. It is a mere casual coincidence, if this is the name meant.

“I remain, yours sincerely,

“E. B. COWELL.”

Dr. Leitner, Vice-Chancellor of the University of the Punjab, writes:—

“Krishna is a half-historical character, and the coincidences of his life and that of Christ are too vague to justify the least connexion with, much less the derivation of any of the Krishna myths from, the narrative regarding Christ, or *vice versa*.”

Dr. Edersheim writes:—

“8, Bradmore Road, Oxford, March 20.

“DEAR SIR,—I am greatly obliged by the courteous invitation of the Council to be present at the reading of the paper, of which you have been so good as to send me a proof. I much regret that a literary engagement prevents my coming to town on Monday. I should have much liked to express my sincere appreciation of the paper, and my entire concurrence in the views of its able and learned writer. If my opinion is worth anything on these subjects, I can only state that, so far as my reading has gone, it has led me to precisely similar conclusions, and it confirms those advocated in the paper to be read before the Institute.

“Believe me, yours with much regard,

“ALFRED EDERSHEIM.”

Professor Douglas writes :—

“King’s College, March 21.

“DEAR SIR,

“Living out of London as I do, besides having my hands very full of work, I find it difficult to attend evening meetings; and as the subject for discussion this evening is not one to which I have paid more than passing attention, I fear that I should not be able to throw much light upon it. But this much I may say, that nothing is so deluding as Oriental chronology, and before it would be possible to assert that the myths relating to the births of Krishna and Buddha were current prior to our era, it will be necessary to go far more critically into earlier chronology than as yet we have been able to do. Confucius may be added to the list of those sages who are said to have been born in caves, and whose births were announced by heavenly portents. But so far as he is concerned, I have no hesitation in assigning the origin of the myth to a date after Christ.

“Faithfully yours,

“ROBERT K. DOUGLAS.”

Professor Terrien de Lacouperie, Ph.D. Litt.D., writes :—

“62, Chesilton-road, Fulham, S.W., London,

“March 21.

“DEAR CAPTAIN PETRIE,

“I lecture this afternoon at the Royal Asiatic Society, and I am afraid for this reason I shall not be able to be present at your interesting Meeting to-night.

“The Rev. Richard Collins’ paper on Krishna and Solar Myths is a healthy contribution to unbiassed knowledge, with which I am glad to agree in its main lines.

“I have not the books at hand, but I think that the combination Jezeus Krishna was put forth by M. Louis Jacolliot, formerly a French magistrate in India, who wrote unsuccessfully several volumes in view of showing that Christianity was a clever adaptation of Hindu views, ideas, and books.

“Yours truly,

“T. DE LACOUPERIE.”

Rev. H. M. M. HACKETT.—I would have felt some trepidation in rising to speak on this paper, but for the letter which has just been read from Professor Max Müller, because, after carefully reading what Mr. Collins has written, I came to conclusions very different indeed from those at which he has arrived—conclusions which I did not then adopt for the first time, but which had been the result of many years’ work in India. In the first place, I am quite ready to believe in the possibility of Christian notions having filtered from various sources into Hindoo religions in ages that have passed since the coming of Christ, because I have myself seen some strange instances of this in remote villages, where stories of Christ had been repeated and believed as having reference to persons who are supposed to have lived in the neighbourhood—stories that have evidently been derived from Scripture. The theory which the author has put forward is an old

one. The Rev. Dr. Bauerjea was the first to broach it, and the objection I have to it is that it is not proved. There are three points that are necessary to its establishment : first, a late date must be given to the Gîtâ ; secondly, an early date must be given for the spread of Christian influence or knowledge in India ; and, thirdly, similarities must be proved between the Krishna myth and the history of Christ. In section 9 of the paper the author says :—“ The fact is, it is impossible to prove that the Gîtâ was written prior to the Christian era ” ; but, on the other hand, I say it is impossible to prove that it was *not* written prior to the Christian era. So long as we are content to engage in the work of destruction it is not necessary to substantiate our own theory ; but, when we begin to substantiate a theory of our own, we must have a basis for it, and we must be able to prove it. We must remember that many scholars agree that the Bhagavad-Gîtâ was written before Christ. Professor Hunter, in his *Indian Empire*, says there is an allusion to the Mahâbhârata in the work of Dion Chrysostomos, 75 A.D., which would mean that the Bhagavad-Gîtâ itself must have been written some time before that. In paragraph 15 of the paper, we read that “ In the Bhagavad-Gîtâ he (Krishna) is once or twice addressed as Vishnu. The doctrine of the avatâras, or incarnations, of Vishnu, are also only first developed in the Purânas. Thus, the legends of the *fish*, the *tortoise*, and the *boar* are found in the Satapatha Brâhmana ; but it is only in the much-later Purânas that they are described as incarnations of Vishnu.” There is indeed a vast gap of eight centuries between Christ and the Purânas, during which Vishnu was growing into importance. But upon what grounds does Mr. Collins fix the date of the Bhagavad-Gîtâ at any particular point between the two ? Then, the author of the paper says : “ When the worship of Vishnu as the supreme spirit really superseded that of Indra we cannot definitely say, but it seems to belong to the more metaphysical age of Hindu thought.” If we were searching for the metaphysical age of Hindu thought, we ought to look for it in the age succeeding the introduction of Buddhism. So much for the first point. Mr. Collins’ arguments have not very plainly established his own theory that the Bhagavad-Gîtâ was written in the third century after Christ. As to the next point, the necessity of establishing an early date for Christian influence in India. In section 22 of the paper we have the arguments, which, I suppose, are familiar to us all, especially that about St. Thomas as the Apostle of India ; and the further statement as to Pantænus, the tutor of Clemens Alexandrinus, finding a Gospel of St. Matthew there in the second century. Both of these are connected with the coast of India, whereas the Bhagavad-Gîtâ has for its scene Upper India ; and how this shows that Christian influence was brought to bear on Upper India and beyond the coastline I am at a loss to see. In the 24th section of the paper we find the dates put very late indeed—587 *Anno Domini*—to show connexion with the Grecians in the sixth century, and also with Persia, on the supposition that some of the Christianity was derived from Persia. But what a difference there is between the sixth century and

the third, when, as stated here, the Bhagavad-Gitá is supposed to have been written ! But, after all, the real point at issue is the third, namely, What are the similarities between the Krishna myth and the history of Christ ? It certainly seems to me that these similarities are by no means as great as many persons seem to imagine. I believe the best answer to all these theories to be that which Mr. Collins makes in the 2nd section of his paper, where he shows how we may find myths in almost anything. I am here reminded of the various theories adopted to find the number of the Beast, 666, in the names of historical personages, by which it would not be difficult to prove any given person to be the Beast. But let us consider a few of these supposed similarities. In the first place, we have to deal with the idea of incarnation. I do not think that enough stress has been laid on the fact that the Christian idea of incarnation is absolutely unknown even at the present time in India. I allude to the Christian idea of the incarnation of Christ as perfect God and perfect man. In the 5th section of the paper Mr. Collins says :—"I believe I am correct in saying that this is the first time that the distinct idea of incarnation is to be found in the Hindu writings." I suppose he means incarnation in the human form, because, as he remarks a few pages further on—"The legends of the *Fish*, the *Tortoise*, and the *Boar* are found" as far back as "the Satapatha Bráhmána." These legends are related as distinct incarnations of Brahma, who is alleged to have come down and assumed these forms. Surely, here was the idea of incarnation many years before Christ: I am delighted, however, to see that Mr. Collins, at the conclusion of his paper, sets aside those absurd ideas with regard to the similarity of the Krishna myths with the account of Christ from His being born of a virgin, and in a cave, and so forth. Of course, there is not the smallest foundation for assertions of this kind, as Mr. Collins has clearly shown. It was only the other day that I took up a tract, written by Mr. Bradlaugh, and headed, *Who was Jesus Christ?* in which it was ignorantly stated that Krishna was born of a virgin mother. This shows the evil of allowing statements of such a nature to pass uncontradicted, and I take it that part of the work of this Society is to show that assertions of this kind are unhistorical, and without a vestige of proof. Turning to a book with which I was familiar in India—*Isis Unveiled*—by Madame Blavatzky, I find her idea, which runs through the work from beginning to end, to be, that religion is one, and all these myths are one. Where she gets some of these ideas, I do not know. Her imagination is certainly called into play when she says that there are credible traditions that Krishna died on a cross, and explains by saying that he was nailed to a tree by an arrow, and therefore was crucified. These theories are so curiously absurd that they do not need a single word of refutation ; but still, it is necessary to refer to them to show that they have no foundation. With regard to the similarity between the names of Christ and Krishna, it merely comes to this, that they spell Krishna with the letters Chr instead of Kr ; but the only theory that could stand is that as the name of Krishna existed before that of Christ, these stories were grafted upon Krishna,

but certainly not that the name was derived from Christ. Turning once more to Mr. Collins' paper, I notice that at the beginning of section 16, he says, speaking of Krishna :—"He preaches a new faith, personal devotion to him, as the embodiment of the divine." In my opinion, that paragraph is the strongest of all with regard to the similarity in teaching, but it is not conclusive, because in the writings of the Hindoos every god is made to claim fealty to himself, and to ask people to believe in him rather than in others. As to the idea of forgiveness, that, of course appears in the Vedas, in which there are prayers for forgiveness. With regard to the sentence in section 6 of the paper,—“Every one will allow, I think, that these are novel doctrines, of which there are no discernible germs in the Vedic literature,”—that remark, I think, may stand. Turning to the miracles mentioned on the latter part of the same page, they are, doubtless, very striking indeed, as showing a resemblance to the works of Christ ; but after all, what are they but mere coincidences, such as we might readily imagine in the lives of two persons embracing a great many events, both of them believed by their votaries to be deities. In section 29 of the paper, I think the similarities are decidedly very curious. For instance, we have “Yadu,” as “A singular echo of Yahudah,” and “Vasu” as being like “Yoseph,” or Joseph, inverted. There can be no doubt that these similarities are remarkable ones ; but having said that, we have said all. If we were to proceed to base theories on them, and to derive Christianity from them, or to go from them to Christianity, I agree with Professor Max Müller, and do not see what grounds we have for doing so. I would say, in conclusion, that the one thing as to which I am confident, as far at least as my own opinion is concerned, is that the origin of the Krishna myth is not attributable to Christianity in any way whatever, although it is just possible that stories may have been carried into the Krishna myth from the history of Christ. But “the truth is,” as Mr. Collins states in the 20th section of his paper, “That there is only one point common to the two pictures, and that is the bare fact of the incarnation of the Deity.” I am afraid that, speaking on the spur of the moment, I have not put my opinions as clearly as I should have wished ; but I have not had time to put my thoughts into writing. I may add that I read the paper with the greatest pleasure, as it shows a great amount of thought and learning. I must apologise to the author for having differed from him ; but I suppose it is right for us to express our opinions where we do differ from those who favour us, as Mr. Collins has done, with the results of their studies on particular subjects. I have here, if any one wishes to see them, two diagrams of Krishna, painted by Hindoos of Benares, and showing how he is regarded by the people of that part of India.

PROFESSOR ODELL.—I should like to ask this question of the last speaker. How ought it to affect our faith in Christ, if we are to suppose that Krishna and others taught some of the sublime doctrines of Christianity ?

REV. H. M. M. HACKETT.—I think it ought to confirm our faith in Christ, because it confirms our faith in God, as showing that He has not left Himself without a witness in all the nations of the earth.

Mr. W. ST. CHAD BOSCAWEN.—I agree with Mr. Hackett in saying that the connexion between Krishna and Christianity demands from us the Scotch verdict of “not proven.” We know that a school of thought has been gaining ground in England and America, which connects Buddhism and Christianity,—a school which has been chiefly guided by a work Mr. Howard mentioned, Arnold’s *Light of Asia*. I have recently heard a paper read on that work in connexion with the work of Christianity, and I must congratulate Mr. Collins, who has had a long experience in India (as also had the gentleman who read the paper I refer to), on the fact that he has not fallen into the errors which were undoubtedly apparent in the paper recently heard. But I think that the more practical way of looking at the subject is to take account of the points with which the author of the paper has dealt in relation to a number of Indian myths. There is one, for instance, which has reference to the placing of the child Krishna in a basket and sending it over a river. This is common to half-a-dozen other mythical personages, between whom we cannot establish the slightest connexion. I may mention Sargon, King of Babylonia, and the same story is told of Moses, of Romulus, and of the Greek hero, Perseus, while it appears in five or six other forms which I cannot at the present moment remember: however, it is well known that the water-baby is quite a common feature in mythology. Again, we have the birth of the hero from a virgin as a common allegation, and we are not supposed to show that every such myth is to be connected with Christianity. In fact, I think there is just as much risk in making these comparisons on the one side as on the other. The paper is written from an Indian point of view, of which I know very little, but it seems to me that the endeavour to establish the introduction and influence of Christianity in India as having a bearing on the form of the Indian religions is somewhat weak. The solar myth, we know, has been applied to Biblical heroes as well as to other heroes, and the most formidable attack of all was that on which Dr. Goltzieder based his celebrated work, *The Mythology of the Hebrews*, a good deal of which we cannot believe, though there is much in it that we must highly value. A great deal that was there advanced was founded on an essay by a German student, perhaps one of the most powerful essays that has been written on the solar myth. It relates to the myth of Samson, as it is there put, and the story of Samson presents a remarkable resemblance in name and general character to a well-known Oriental story, which Dr. Steinthal made out. The essay is a very valuable one; but the danger is dealing with similarities without being able to prove any historical connexion, because if you are proving influence, one way or the other, you must prove it historically. I must say I am not sorry to find that the condition of the chronology of Indian literature is almost as difficult and perplexing as that of other nations. Mr. Budge, of the British Museum, recently discovered a document, which contains many of the clauses of the Nicene Creed. The document was taken from the Temple of Ammon, and is of a very early date, the 18th or 19th Dynasty, and yet it contains clauses of the Nicene Creed.

It would be very hard to prove any connexion between that document which has lain hid in the Egyptian tomb for all these years, and the Nicene Creed, as drawn up so long afterwards. There is hardly any old poem in the Vedic literature to which you can turn, in which you do not find such similarities. It is reasonable to suppose that religious thoughts and feelings which are the outpourings of human minds and hearts, often find expression to a certain extent in the same form, and actuated by the same influences, so that we may frequently find similarities where it would be very difficult to prove the slightest connexion.

THE AUTHOR.—There has been so formidable an array of objections to my paper that I am afraid I shall not be able in the time at our disposal to reply even to a tithe of them. There are, however, one or two points that have struck me somewhat differently from the rest. I think the description of Krishna as a perfect man, and also as the embodiment of the will of the Supreme Being, is very different from all the pictures, as far as I have studied them, both of Hindooism and the heathenism of other nations. There was no idea more common than that the Gods descended in human form; no idea more common than that which made man divine; but when we come to Krishna, and consider his person and teaching, we have such an evident resemblance in his most prominent features to the more prominent features of the Saviour's nature and teaching, that we feel there must have been some reason for it. If the similarity is merely the result of philosophic thought or of man's imagination it would seem wonderful indeed; but we have, further than this, the fact that there are a great many similarities in other directions, as Mr. Boscawen has remarked; and I would ask, how is it that so many of the heathen gods, according to the latest descriptions of them, are so very like the Saviour oftentimes in His manifestations, and very often, also, in His teachings,—why, for instance, should there be the wonderful idea of birth from a virgin in so many cases as Mr. Proctor affirms? We shall find that a great number of these histories were written only for the purpose of upsetting Christianity; as, for instance, in the notorious history of Apollonius of Tyana, by Philostratus, to gratify Julia Domna, as also in the transformation of the Persian Mithras by Manes. There is one particular point to which attention ought to be specially directed, and that is the incongruity between the character of Krishna and his teachings as developed in the Gîtâ. There is also the same incongruity between the teachings of Buddha and the history of his character, as given in the latest Buddhist writings.

MR. BOSCAWEN.—There is just one thing I should like to add. I do not quite see the force of Mr. Collins' argument with regard to these similarities. If they are to be traced to the influence of Christianity, how does he account for the resemblances which we know are to be found long before the time of Christ? I do not know whether he has read the *Speaker's Commentary*, in which some remarkable resemblances are stated by one who has no bias on the side of Assyrian studies, and he finds a curious similitude between Merodach of the Babylonian literature, and the Messiah of the Hebrew

writers. Merodach is the "healer" who goes between the Gods and men, and is assumed to be the nearest approach between man and God that has ever been found in the Assyrian inscriptions. This and other resemblances which are very striking, are all belonging to a period before the time of Christ. I would, for my own part, repudiate any attempt to establish that the Hebrew Messiah was an echo of Merodach; in the Babylonian inscriptions we frequently find these resemblances.

The CHAIRMAN.—It seems to me that the question is whether certain minute points of resemblance—minor points of similarity—do not show historical connexion? That certain wide similarities may appear in different myths of independent origin, there is no doubt; but one can hardly refuse to say that in certain particular cases there are similarities that can hardly be accidental. Each case must, or ought to be taken and investigated by itself. It is a moot point as to which of these two classes this history belongs; but we must not say that, because Mr. Collins thinks these idylls of the life of Krishna copied from the life of Christ, therefore all similarities of history must have been derived one from the other.

Mr. BOSCAWEN.—What I think is, that if we adopt the view put forward by Mr. Collins, other people may use the same argument in the opposite way.

The CHAIRMAN.—With regard to what has been said about the Nicene Creed, it is exceedingly possible that Athanasius derived many of the expressions he used from secular sources.

Mr. BOSCAWEN.—I saw the manuscript I have mentioned, and it is a strong argument in your favour.

THE AUTHOR.—As far as my own belief is concerned, I am of opinion that throughout the whole of the time before the Christian era there was a continuous knowledge of an early Revelation from God, and that would account for almost everything we want to account for, and I say that we have in the case of Krishna some particular facts and teachings which are, in a very special way, similar to the facts and teachings of Christianity. If the two do not belong to each other, how have they come to display this similarity, and how is it that these teachings of Krishna are so very distinct from everything in Hindooism previously?

Mr. STALKARTT.—The question seems principally to turn on a chronological question about which there can be no certainty, namely, whether this book or that was written first. We know that the Hindoos are very fond of making evidence. They make evidence for the courts. They will lay evidence twenty years in advance, and it is impossible to rely on any Hindoo chronological table, unless you have evidence on which you can base your decision.

The Meeting was then adjourned.

THE AUTHOR'S REPLY.

WITH regard to the date of the Bhagavad-Gîtâ, I have not placed it in the third century of the Christian era, but "after the third century"; that is, I have spoken of the third century as the most remote date probable. And here I think I am in good company, for I believe Professor Max Müller places it in what he calls the "Renaissance period of Indian literature," the commencement of which he gives as about 300 A.D.; and Sir Monier Williams speaks of it as, at all events, "a comparatively modern episode of the Mahâbhârata" (*Religious Thought and Life in India*, p. 63). It is perfectly true, as Professor Douglas says, that "nothing is so deluding as Oriental chronology"; what is to be noted, however, is, that recent researches have somewhat modified not a few dates once pretty widely received. Mr. Fergusson's papers on Indian chronology in the *Journal of the Royal Asiatic Society* are, for instance, a case in point. And no doubt Professor Max Müller is on very sure ground when he speaks of the "blank in the Brahmanical literature of India from the first century before to the third century after our era" (*India*, p. 86, *et seq.*).

It may not be out of place to remark that there is a passage near the end of the Bhagavad-Gîtâ, which may, I think, indicate that it was written at a time when Vaishnavism was seeking by a party, and perhaps more or less secret, propagandism to supplant Buddhism. The passage I refer to is as follows:—"This [namely, the teaching of the Gîtâ]* you should never declare to one who performs no penance, who is not a devotee, nor to one who does not wait on [some preceptor], nor yet to one who calumniates me" (Telang's Translation, p. 129). It has, indeed, by some been supposed that the reference is to the Saivites. But would not the "performer of no penance," the "non-devotee," the "calumniators of Vaishnavism," seem rather to point to the Buddhist than to the Saivite? At all events, this remarkable passage, when its actual reference becomes more clear in the light of a more perfect historical knowledge of Hinduism, should afford us some clue to

* Prohibitions as to certain classes of learners are found at the close of other books also, e.g., *Aitareya-Aranyaka*, iii., 2, 6, 9.

the date of the poem. If, as I suppose, the reference be to the Buddhist, when the antagonism, which ultimately led to the expulsion of Buddhism from the continent, was probably at its height, this passage must be referred to a time some centuries below the commencement of the Christian era; while if, according to the other supposition, the dreaded enemy were the Saivite, the origin of the passage might be even more modern.

With respect to another subject, frequently expressed, that the doctrine of the Gîtâ is only a natural development of germs of religious thought already exhibited in earlier Hindu writings, especially in the Upanishads, which are generally regarded as the latest of the strictly Vedic writings, it seems to me to be a theory which cannot be substantiated. I cannot find in the Upanishads any adumbration of the special character of the Gîtâ. The Upanishads may be broadly said to be meditations—and often most charmingly illustrated meditations—on the Universal Spirit, as manifested throughout nature, and especially in the persons of gods and men; and the nearest approach that I remember to have remarked to the teaching of Krishna is the saying of Indra to one who had *reached his heaven*, “Know me only; that is what I deem most beneficial to man, that he should know me” (*Kaushîtaki-Up.*, chap. iii.). But I cannot persuade myself that this is a germ pregnant with the “mysteries” of the “divine song”; nor can it lead up to the doctrine of the manifestation of the divine in the human, which is the specific doctrine of the poem.

The real character of Vaishnavism, as distinguished from earlier Hindu religious thought, needs to be carefully studied. The new phase in Vaishnavism is the worship of a personal God, originating from the incarnation of Vishnu in the person of Krishna; and this is at the real root of Vaishnavism, and plainly discernible in its branches, through its many subsequent entanglements. The thesis of Vaishnavism, and some of the most prominent parts of its construction, are so manifestly of the same nature as the thesis of Christianity, and some of its most prominent features, that it is difficult indeed to believe that they have arisen without any connexion whatever between them. And to suppose—a supposition that we know to have been made—that Christianity itself has borrowed some of the gems of Vaishnavism, and has rescued them from a setting of fable and immorality, to give them a fresh setting in the midst of the divine light of purity; nay, to claim—and the claim has been made—that they are themselves the very germs and parents of that divine light in the midst of which they glow in the Christian Scriptures, is to make a

supposition in defiance of all ordinary reason. But the fact of such theories having been mooted shows how strong the conviction has been of some real connexion between the two. And I cannot see the ultimate "danger" that is represented as attending the discussing the nature of such apparent connexion. That Christianity is the real source from which Vaishnavism received its new doctrine of the worship of a personal God, seems to me historically consistent. The only remaining supposition possible is, that both are indebted to some early, and more perfect system; this is apparently a not uncommon view of the case: but where, then, is the more perfect original from whence both Christianity and Vaishnavism have derived their leading thoughts? One position, indeed, remains from which my argument might be broken; and that is the denial of the fact that there are so many actual parallelisms between Vaishnavism and Christianity as I have stated. And this we must leave to the judgment of the individual student, who will study Vaishnavism as it develops about the person of Krishna, from the Mahâbhârata on through the Purânîc period. The quotations that I have given from the Mahâbhârata and Gîtâ are only samples of many, the limits of a paper forbidding more detailed statements. And these are not to be taken as mere coincidences, but in connexion with the origin and peculiar character of what is called Vaishnavism. Since writing this paper I have had the pleasure of reading Sir Monier Williams' *Religious Thought and Life in India*; and his conclusions with regard to Vaishnavism are so similar, as it seems to me, to what I have advanced, that I venture to quote some of his remarks. He says (pp. 96 and 97), "Vaishnavism is, like Saivism, a form of monotheism. It is the setting aside of the triune equality of Brahmâ, Siva, and Vishnu in favour of one god, Vishnu (often called Hari), especially as manifested in his two human incarnations, Râma and Krishna. 'Brahmâ and Siva,' said the great Vaishnava teacher Madhva, 'decay with their decaying bodies; greater than these is the undecaying Hari.' And here, at the outset of an important part of our subject, I must declare my belief that Vaishnavism, notwithstanding the gross polytheistic superstitions and hideous idolatry to which it gives rise, is the only real religion of the Hindu peoples, and has more common ground with Christianity than any other form of non-Christian faith. Vedism was little more than reverential awe of the forces of nature and a desire to propitiate them. Brâhmanism was simply an Indian variety of pantheistic philosophy. Buddhism, which was a product of Brâhmanism, and in many points very similar to Brâhmanism, gained many followers by its disregard of caste distinctions, and its

offers of deliverance from the fires of passion and miseries of life ; but in its negations and denials of the existence of both a Supreme and human spirit, was no religion at all ; and in this respect never commended itself generally to the Indian mind. Saivism, though, like Vaishnavism, it recognised the eternal personality of one Supreme Being, was too severe and cold a system to exert exclusive influence over the great majority of the Hindu peoples. Vaishnavism alone possesses the essential elements of a genuine religion. For there can be no true religion without personal devotion to a personal God,—without trusting Him, without loving Him, without praying to Him, and, indeed, without obeying Him. Who can doubt that a God of such a character was needed for India,—a God who could satisfy the yearnings of the heart for a religion of faith, love, and prayer, rather than of knowledge and works ? Such a God was believed to be represented by Vishnu.” And again (page 140), “The idea of devotion (*bhakti*) as a means of salvation, which was formally taught by the authors of the Bhagavad-Gîtâ, Bhâgavata-Purâna, and Sândilya-sûtra, was scarcely known in early times. The leading doctrine of the Vedic hymns and Brâhmanas is that works (*harma*), especially as represented by the performance of sacrifices (*yajûa*), constitute the shortest pathway to beatitude, while the Upanishads insist mainly on abstract meditation and divine knowledge as the true method.”

It should be observed that this worship of a personal deity in devotion, faith, and love, which is the essence of Vaishnavism, originates in the Bhagavad-Gîtâ, in the descent, or avatâra, of Vishnu in the person of Krishna. The other avatâras, or manifestations of Vishnu, are of subsequent development : that is, though the Râmas were historically before Krishna, they were only long afterwards deified. Moreover, the common heathen idea of Gods visiting the earth in human or other form, like Euripides' Bacchus, and numberless other instances, such as those found in Homer's *Od.*, ρ, 484, Ovid's *Met.*, viii. 626, or such as the fish, tortoise, and boar of the Satapatha Brâhmana, belong to quite a different line of thought. How are we to account for this new departure of Vaishnavism from the earlier Hindu systems of religious teaching ? Could the “religious need” of India have itself produced the idea of the personal God it required ? I believe I am indebted to Bishop Temple—though I write from memory—for the aphorism, that while we may allow of a development of religion under suitable influences, we cannot allow of evolution from the spontaneous conclusions of the human mind. The latter is the heresy of the day in which we live. That the central thought of Vaishnavism

is an improvement upon earlier Hinduism seems to be allowed on all hands. Its approach to some of the central thoughts of Christianity is emphatically noted by Sir Monier Williams. Must not this change of religious thought and practice which is at the root of Vaishnavism have come from without? This will be found to be always the case in great religious changes; just as Rammohun Roy and Keshub Chander Sen were indebted for their innovations to Western lore. I cannot believe that, as one of my critics seems to suggest, God was "witnessing" to India by revelations to the writer of the *Bhagavad-Gîtâ* of some wonderful but disjointed truths, to be put into the mouth of the Krishna of the *Mahâbhârata*. But I can believe that some echoes of the Christian story, such as recommended themselves to the mind of the Brahman teacher of the period, should find their way into the religious mind of India. I know of no really valid reason against the *Bhagavad-Gîtâ* having been written long after the third century, though I know that this is not the popular view of the case. And with regard to the probable early influence of Christianity in India, it is a subject that has received too little attention, especially in the matter of search for remains, because it has not been believed. There is no evidence that Pantænus visited only the west coast of India, where the Syrian Christians remain to-day. There is the Christian cross, with Pahlavi inscription, like those on the western coast, at St. Thomas, near Madras, indicating an early Christian settlement on the eastern coast also. Some of the first Roman Catholic missionaries describe other Christian crosses, though unknown at the present time, probably destroyed. Early Christian crosses have also been found in the Nizam's territory. That there is no body of Christians there now is not in evidence. It has been the same in China. In Shensi, in China, there is the now well-known stone with Christian inscription, but no vestige of Christianity around. It is said to have been erected in 781 A.D.,—that is the date, according to Chinese chronology, on the stone itself,—and it records an Imperial proclamation in 638 A.D. authorising the dissemination of Christianity through the Empire. It is a fair inference that this Imperial edict was not issued in the very infancy of Christian preaching in China. The Persian and Syrian Christians were early about in the world. At the Council of Nicæa, A.D. 325, a Bishop signed himself "Metropolitan of Persia and the Great India." Here, again, it has been doubted whether "India" may not have meant Arabia, or any portion of, or the whole of the East; but Megasthenes, 600 years before, must have known that the world would understand him when he named his book *Indica*.

There is, surely, very strong presumption, amounting, I should say to demonstration, that Syrian and Persian Christians (often called Nestorians, though I doubt whether that term is always correctly applied) were busy in the farther East during the very early centuries after the Christian era. Pantænus, in the second century, was not the first preacher in that part of India, wherever it was, that he visited, for he found a Hebrew, or Syro-Chaldee, gospel of St. Matthew, which had already been brought there: this being the version used by what has been called the "Hebrew party" in the Church, as distinguished from the "Hellenic party"; and is the version which we should suppose, if one of the Twelve, or any of their immediate disciples, visited India, they would be likely to bring with them.

With regard to the date of the document called the "Teaching of the Apostles," it was brought to light by Dr. Cureton, and placed by him in the Ante-Nicene period. I regret that I cannot here give his reasons for assigning this early date to it, as I have not been in possession of the book since my return to England. The document, annotated if I remember rightly, is to be found in the *Ante-Nicene Library*, vol. xx.

In particular, I should wish to emphasise most strongly the fact, already stated, that I do not quote mere casual coincidences or similarities,—though all such, wherever found, must have some explanation if it can be reached,—but similarities which are parts, and integral parts, of two great wholes, two great systems, both aiming at approach to God, and that by a new phase of religious faith, the one by steps of absolute perfection, the other by steps exactly similar in their main design and intention, but coarse and imperfect in their work, laid in rubbish, and running into inaccessibility.

A great deal might be written upon similarities in other directions; but in a brief paper it is not possible to touch other than salient points. Take the instance given by Mr. Boscawen of Merodach, the "healer," "who goes between the gods and men." I should be disposed to claim this as on my side of the question. Why should not Merodach be an echo of an earlier revelation? in which, for my part, I most firmly believe. So, with regard to the expressions in the document from the Temple of Ammon, which are the same with some of the clauses of the Nicene Creed; they may be vestiges of an early Divine worship, some of the very expressions of which may have become traditional, and embodied in early Christian teaching; just as the first clause of the Lord's Prayer had been common among the Jews for ages. Christ came

not to destroy, but to fulfil the Law, or earlier revelation. It is just the case of the rebuildler of a ruined house using some of the old material.

The ancient heathen systems are degradations of what was once the worship of God by Divine appointment, and cannot but contain some recognisable vestiges, degraded though perhaps the vestiges themselves may have become. In the same way, when a new revelation was added in confirmation and expansion of the old, its echoes may be expected to be found when they are properly sought for (as, for instance, they are found in the Korān), perhaps in wider tracks than even those traced by the inventors of Krishna's and the embellishers of Buddha's histories. A man who believes in the evolution of religions from man's inner consciousness will not care to see this; but for others, my own belief is that this light will become more and more evident.

I am not able to believe that the Hindu could sit down and deliberately think out a true antidote to some of the deepest religious needs of his nature, namely, a human manifestation of the Deity, all-comprehensive in his acceptance of those who should offer him the homage of entire acknowledgment, devotion, faith, and love; these are foundation-stones in Christ's revelation of Himself; and in their connexion with a human manifestation of God absolutely new to Hinduism, as, indeed, to the rest of the heathen world. The picture in itself would be perfect, were it not spoiled by the person of Krishna himself. However historical the original of Krishna may have been, he (the historical Krishna) did not shine as a thousand suns, or exhibit the universe in his body, or go through the cities healing the infirm, raising the dead, restoring deformed women, receiving harlots on their confession of faith, and preaching forgiveness of sin to all who sought it from him, he himself the grossest picture the Hindu has ever drawn of human weakness and immorality. The beauties of the picture do not belong to it. They belong only to the perfect God-man. Even a knowledge, however supposed to have possibly reached the Hindu, of the previous prophecies as to the Messiah could not have suggested such individuality in the features of the picture. I cannot avoid the conviction that the original is only to be found in the veritable history of Christ. And on chronological grounds I fail, I confess, to see the difficulty that some express. In point of fact, there is, after much study by many minds, no reliable evidence for giving the Bhagavad-Gîtâ an earlier date than that of a possible communication of the Christian story in India. So far as the argument founded on supposed quotations from the Gîtâ in other early

documents has gone, there is not a single instance that appears to me conclusive. One instance I have discussed in an early part of the paper.

One word may be said as to the unfairness of denying to the Jewish race, during their captivity at Babylon and dispersion elsewhere, any influence in a religious sense on surrounding nations. This is too long a subject to be dwelt upon here, and I do not at all think myself that it would explain anything in the Bhagavad-Gîtâ; but it may, perhaps, ultimately be found to explain a good deal in other directions.

I would venture upon the suggestion, that the doctrines of the Gîtâ may indicate a possible attempt at a compromise with Buddhism in some of its most attractive features, with the object of defeating it by setting up a rival system containing some of those features even more vividly portrayed, as gleaned from Christian doctrines.

I may add that I do not think that sufficient notice has been taken of the very artificial way in which Krishna's history and the intricacies of his genealogy, indicating a design on the part of the writer in preparation for the "mysteries" of the Bhagavad-Gîtâ, is introduced into the Mahâbhârata.

ORDINARY MEETING, APRIL 4, 1887.

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

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

ASSOCIATES :—Rev. J. S. Phillips, D.D., United States ; Rev. H. M. M. Hackett, India ; Miss E. S. Mitchell, England.

HON. CORRESPONDING MEMBER :—W. Johnson, Esq., England.

MR. S. R. PATTISON, F.G.S.—Before reading my paper I will take the liberty of prefacing what I have to put before the Institute, by a few geological details, which may tend to a better appreciation of the facts hereafter dealt with. The geological facts I wish to submit, relate simply to the successive strata in which fossil coral-reefs are found in this country. It may be a matter of surprise to those who were not previously acquainted with the circumstance, that such things as coral-reefs are to be found in England—I mean inland, and not upon the coast—and in order to show where they are to be found, for the benefit of those who have not previously thought about the matter, I must refer to the geology of the country. Starting from London we will take a straight line towards the west, but from that straight line we must diverge as occasion may demand ; nevertheless, the general direction will be due west towards the Welsh coast. We first of all travel over a good deal of that which we are upon now, namely, the London clay, which occupies what is pretty much in the nature of a plain, resting on a kind of basin and having some gravel spots here and there, at different intervals. When we get below Reading we lose the tertiary strata and come to the chalk, of which the cuttings of the railway lines soon furnish evidence. The chalk rises from under the clay, beneath which it runs in a sloping direction, and, having come to the surface, it forms moderate hills and valleys, until we come to the neighbourhood of Swindon, at which point we find, rising from beneath the chalk, a formation that is known as the oolite, and which begins with Portland stone and ends with that troublesome Box tunnel, which is cut through Bath stone. These are the oolites. Then we come to the blue limestone—the hard limestone—which is found in the neighbourhood of Clifton, Bristol, and elsewhere, which forms a saucer, so to speak, whereon the coal formation rests. This is the carboniferous limestone, which still slants towards London, underneath the other formations. Then we must

diverge a little, and on doing so we find ourselves in the presence of rocks that are called Devonian, consisting principally of reddish-coloured limestones, slates, and shales, such as are found in the neighbourhood of Torquay and North Devon, and which extend into Cornwall. This is the Devonian strata, and below the Devonian we still pursue our way, across country, right into Wales, where we find a vast heaping up of mountain chains and other formations which are known as the Silurian, all still sloping inwards. Below these, again, we have an even grander mass of rocks called the Cambrian, and, dispersed amidst these, both, the Silurian and the Cambrian, exhibit also volcanic matter. The interpretation of this state of things must, of course, be, that each of these formations (proceeding westward), is beneath the other. I shall have to deal with four of these groups particularly, and, consequently, I have left out the minor layers, or strata, as not having anything to do with the subject of this paper. This brings me to that which I have put before you in the form of printed matter, and here I have to begin in a backward direction from that in which we have already travelled from London. We begin in fact where we just now left off, namely with the great Cambrian rocks :—

PEDIGREE OF THE CORAL-REEFS OF ENGLAND.

By S. R. PATTISON, F.G.S.

WE propose to refer to the principal reefs of fossil coral in England, and examine their contents, and read the lessons they teach on the subject of Evolution.

CAMBRIAN ROCKS.

The fine hilly district which stretches from the Irish Channel to the hills of the Welsh border, is principally composed of coarse slaty rocks, which were named Cambrian by the veteran geological chieftain, Professor Sedgwick. In these we find a few fossil corals, and abundant remains of creatures classed by naturalists as Hydroids and Bryozoa (or moss animals), but no reef builders.

These Hydroids are the lowest corals, and Bryozoa are the lowest tribe of Molluscs. The former are lower by one step than the corals proper, and are so numerous in some of the Cambrian strata that whole floors and beds of limestone have resulted from their decay, although the creatures are individually extremely minute (Graptolites). They are of the same class as the true corals; yet no one who

observes the structure of both could for a moment consider the one as the progenitor of the other.

SILURIANS.

Travelling thence eastwards, and passing the great volcanic region of Snowdonia, we find ourselves in a mountainous country of slate and sandstone, which was the theatre of the wanderings and wars of the ancient Silures, who contested the Roman advance. Sir Roderick Murchison, the explorer of this district, named the prevalent system of rock here, Silurian, and the appellation, having been found convenient, has been applied to rocks of the same kind all over the world.

Extending our journey towards Shrewsbury, through Wenlock, the traveller has by his side, for about thirty miles, a ridge of hills remarkably uniform, showing, wherever opened, limestone rock. On visiting any one of the numerous quarries on this hillside, the limestone is seen to be principally composed of rough blocks of fossil coral, embedded in shale and limestone. A very short study convinces the beholder that he is on a coral-reef of the old ocean, and that its growth and aspect must have been altogether like the description given of the great live reefs now existing in the Pacific Ocean. There are 102 specimens of corals in these strata, of which the more numerous belong to the genera *Favosites* (honeycomb coral), and *Halysites* (sea-stone, of which the chain-coral is well known), *Monticulipora* (little-mound pores), and *Syringopora* (pipe-pores). All these forms are absolutely unknown to any preceding platform of life in the geological scale; they burst at once on the stage. There are no traces of direct ancestors, nor shall we find, as we ascend, that they leave any successors displaying their exact form and fashion.

Many genera of creatures are the same as in the succeeding rocks; but not one species. We can, however, perceive at a glance, that the old corals were as large, beautiful, and elaborate as any of the modern ones.

Whence came these curious creatures, or rather tribes? Were they emigrants? There is no evidence of this. Were they descendants of any previous form? The facts forbid the assumption. Like Minerva springing from the head of Jupiter, they rise up fully armed *cap à pied*.

DEVONIANS.

Diverging southwards on our journey—or, rather voyage across ancient oceans—we come to the rich marbled rocks cut

through by the South Devon Railway. These are seen in the ascent westward from Newton Abbot; and, spreading out, they form the exquisite bay of Babbicombe and the headlands and heights of Torquay. They display great beds of coralline stone, which furnish the workers of the district with beautifully-veined "Devonshire Marble."

There are found here about fifty-two specimens of corals, and they all exclusively belong to this epoch of life; not one of them is to be seen in the preceding Silurian, and not one of them passes into the subsequent Carboniferous strata.

MOUNTAIN-LIMESTONE REEFS.

Again setting sail, we soon arrive at another reef. It might reasonably have been expected that the shallow islands on which grew the tropical vegetation now forming our coal-beds would be accompanied seaward by corals, which would assimilate them to the islands of the Northern Pacific. This is the case. Thus we have an interrupted reef extending from Somersetshire to Northumberland, along the line of which coralline strata are inter-stratified with shales (compressed mud), and grits (compressed sand).

The common corals of the great coal-limestone are *Lithostrotion*, *Lithodendron*, *Syringopora*, *Lonsdalia*, *Zaphrentis*, and *Cyathophyllum*. There are altogether in the British area one hundred and forty-four species of Carboniferous limestone corals, not one of which reappears in the next overlying formation, nor in any other.

JURASSIC REEFS.

Our next stopping-place will be on the yellow Bath building-stone, extending from Whitby to Weymouth. The geological formation is called the Oolite (its grains being similar in shape to small eggs or roe), or the Jurassic, from its prevalence in the Jura Mountains. It is a series of sandbanks, now converted into freestone; mud, now turned into shale; and limestone, due principally to shells, and sometimes corals. In many places along the line it is evident that these former sandbanks were anciently crowned with coral formations.

These are so prevalent in one entire series that the rock is named the Corallian.

Mr. Etheridge enumerates not less than two hundred and thirty-six species of coral which have left their marks in the Jurassic rocks of England.

CRETACEOUS CORALS.

We will very briefly refer to these. In the English chalk there are several small corals, mostly of single growth. In the sandy commons between the Great Western line and the town of Faringdon, in Berkshire, there are very numerous small excavations, which disclose beds of exquisite sponges and Polyzoa, but no corals. On the summit of Haldon, in South Devon, are remains of a small coral-reef in the Lower Greensand.

There are seventy-six species of corals enumerated from the Cretaceous strata, not reef-builders.

TERTIARY CORALS.

Still higher up, or more recent, in the early part of the Tertiary period, vast coral-reefs are found, of which the remains are now visible in Central and Southern Europe, in Egypt, Syria, Arabia, and parts of India. In our own island we find in the Suffolk Crag numerous beautiful Polyzoa, some sponges, and but very few corals, and those only of the single kinds.

Now, having given a cursory sketch of the dwelling-places, we must glance at the dwellers.

The coral-animal may be described as a tiny sea-anemone, which secretes within itself a stony cell having upright partitions. The building rises up as it grows, and when the creature dies, the little cell and its ribs become visible. In one group of corals, called tabulate corals, there are horizontal plates as well as vertical; in the other there are vertical plates only. The latter group is called Rugose, or wrinkled corals. The little Polyps (as the animals are called), are of several kinds; many have a tendency to live together in colonies. In the live coral we find only a small bag of animated substance open at the top, but more or less closed at the lower end. The inside of this bag has the power or property, by vital chemistry, of extricating and fixing grains of carbonate of lime from sea-water.

The reef-corals comprise :—

1. All the Star-corals (*Astræidæ*).
2. All the Mushroom-corals (*Fungaciæ*).
3. Certain of the Eye-corals (*Oculinidæ*).

4. Some of the Flower-corals (*Cyathophyllidæ*).
5. Madrepores, Brain-stones, and Free corals.

Among those genera which characterise successive rock-formations are the following :—

Lower Silurian	}	Zaphrentis.
		Heliolites, &c.
Upper Silurian	}	Halysites, Favosites.
		Monticulipora, Aulopora.
		Syringopora, &c.
Devonian	}	Cyathophyllum, Heliophyllum.
		Acervularia.
		Strombodes, Stromatopora.
		Favosites, &c.
Carboniferous	}	Lithostrotion, Lonsdalia.
		Cyathophyllum.
		Amplexus, Syringopora.
Jurassic	}	Montlivaltia, Astræa, Isastræa.
Coralline Oolite		Theosmia, Thamnastræa.
Cretaceous		Parasmelia, Syndelia, Stephanophyllia.
Eocene		Cup-corals.
Pliocene		Cup-corals.*

LESSONS OF THE REEFS.

Have the corals anything to say on the subject of Evolution,—the great natural history question of the present day? Do they show by their structures that they were evolved from previous forms, that they changed with the ages in conformity with law, or must we say to those who thus express themselves,—

“There are more things in heaven and earth, Horatio,
Than are dreamt of in *your* philosophy”?

Regarding their succession, do we find the survival of the fittest, or proof of the change of one form into another by slow modification under the action of their surroundings? Surely they can tell us something about these matters; they have lived long, and passed through many revolutions, their features are fine enough to preserve traces of all the vicissitudes to which they have been subjected, and their forms are as definite as geometry itself. Our conviction is that

* For full information see the works of the accomplished leaders in this department, Professor Duncan, Dr. Nicholson, and Mr. Tomes; and Mr. Etheridge's volume of *Phillips's Geology*.

among the enormous number of recent corals displayed in the British Museum of Natural History, and the number of fossil corals figured or described in the sumptuous publications of the Palæontographical Society*, there is no appearance whatever of any change or transformation from one species to another. The imaginary lines of descent, sometimes glibly laid down, so flattering and so fascinating to young philosophers, have no counterpart nor foundation in Nature.

The beautiful and often slender marks which divide the species from each other are more permanent and rigid than steel. To attempt to gloss over this absolute differentiation appears to me to be a task rather of the imagination than of science.

We have before noticed that coral-life burst upon the stage all at once; it continued in existence from that epoch until to-day.

The present reef-corals are classed by zoologists as all entirely different in species from the fossil corals; the fossil corals of each stratum differ, too, from those of others. We see at once that there has been frequent change, and it may be said progress in form, but not evolution. In order to be more fully persuaded of this, we will examine the subject more closely, for at a little distance the pyramid of life (which is arranged like some of the Egyptian pyramids in a gigantic staircase), looks like a smooth inclined plane, and it is not until we get near enough that we see the distinct steps. One of the leading differences is in the case of the Palæozoic corals, in which the vertical divisions are arranged in four plates and in multiples of four, whereas in the modern the plates are six, or multiples of six. This is constant, and not a mere variation, for there has been no recurrence to the old type.

The amplitude of the lists of Silurian species, and the great number of localities quoted, give pretty full evidence that the search for intermediate forms between existing fossils and some supposititious ancestor is a hopeless pursuit.

Nor can we find ancestors of the modern or of the Palæozoic corals in rocks still older than the latter; for, if we could throw back the creation of corals into the previous Laurentian age, and if we then found them in myriads, and traced them back even to the Eozoon, we should find no pedigree with any pretensions to minute verification or proof.

* Edwards and Haines' and Duncan's *Fossil Corals*.

The ancient *Cyathophyllidæ* were most important in size in Palæozoic times; but (with the exception of one doubtful form*) they have all become extinct. Yet, from their magnitude and perfection, if descent with variation were a good law, it seems inconceivable that a family so strong to the last should have completely died out, unless by virtue of some other law unknown to the naturalist.

The Carboniferous corals are also equally distinguished from the preceding Devonians by remarkable differences. The great majority of the Carboniferous genera are new.† We no longer encounter the feathery form of the *Favositidæ*; but we have a grand display of the almost universal *Lithostrotion*—a form which carries in its face the evidence of equality in size and beauty with any modern structures.

The great rough corals of the older formations cease altogether before the opening of the Jurassic coral-beds.

At first the Rugose corals bear the bell; next, the *Tubulosa* and *Tubulata*; and, during Oolitic days, the *Aporosa* and *Perforata*; and, after them, in the Cretaceous, the *Perforata* and *Millepores*.

It must be stated also that many species of reef-corals are liable to a considerable amount of variation; but these do not render classification difficult, nor occasion any confusion of species, nor necessitate new names. The degree of sunshine, the angle of growth, the condition of the water, all occasion variations; but, with all allowances which can be made, the evolution pedigree is radically defective,—it has too many blanks and loose statements to be seriously brought forward as evidence of heirship.

The reefs which we have been surveying proclaim that each platform of organic life, in regard to its antecedents, had a distinct separate beginning.

The late Dr. Wright, of Cheltenham, the shrewd and indefatigable explorer of life of the Jurassic period, and the skilled collector of the fossils of the Cotswold Hills, writes the following matured conclusions from the life-history of corals:—

“1. The genera and species of each of the great groups into which zoologists divide these animals have had a limited duration in time and space, no genera of the Palæozoic epoch having been found in any subsequent epoch, and no new living germs having been discovered in rocks older than those of the Jurassic period.

* Dana, p. 57.

† Nicholson, p. 175.

"2. There is no evidence of any gradual development having taken place in the class from a lower to a higher type of coralligenous structures. The old corals of the ancient reefs appear to have been as highly organised and as elaborately constructed as the modern corals now building reefs in our tropical seas.* The Cretaceous corals belong chiefly to families now existing, but there are still remaining here a very few instances of the old forms of tabulate corals, hardly distinguishable from Silurian species."

The life-history of fossil corals, therefore, so far as it can be gathered from the remains of their edifices, teaches us that there has been no transformation of those creatures by effluxion of time alone.

The facts prove the simultaneous introduction of whole platforms of organic life by some means unknown to science. There is a record which states this to have been effected by acts of direct creation. Science, with an admission of its helplessness, must bow before this. We must say with Goethe:—

"None resembleth another, yet all their forms have a likeness.

Therefore, a mystical law is by the chorus proclaimed.

Yes; a sacred enigma."

Sir William Dawson, the accomplished President of the British Association in 1886, says:—"It is certain that, up to this time, the origination of the living being from the non-living is an inscrutable mystery. No one has witnessed this change, or has been able to effect it."

That Evolution is an unsupported theory is admitted by an eminent French scientist, who is, nevertheless, a favourer of the doctrine. Speaking of the coral-reefs, he says:—"The first corals, *Halysites* and others of the primitive genera, differ too widely from those which have succeeded them to allow us to consider them as their progenitors."† But he adds the gratuitous supposition that, alongside of the germs which we do find, lived others which we do not, which contained small modifications whereby the change took place,—a supposition unscientific and improbable to the last degree, considering the complete overhauling which the fossil-bearing beds have received.

Dr. Claus, the learned evolutionary physiologist, admits the insufficiency of this theory to account for the facts, and tries

* *Proceedings of Cotswold Naturalists' Field Club*, p. 120.

† *Les Enchaînements du Monde Animal*, par Alfred Gaudry, p. 78.

to gain a victory, not by the prowess of his own troops, but by the alleged weakness of the other side.

He says:—

“However well grounded we admit the theory of selection to be, we cannot accept it as in itself sufficient to obtain the complicated and involved metamorphoses which have taken place in organisms in the course of immeasurable time. If the theory of repeated acts of creation be rejected, and the process of natural development be established in its place, there is still the first appearance of organisms to be accounted for, and especially the definite cause which the evolution of the complicated and more highly-developed organisms has taken to be explained.”*

He further says:—“It must be admitted that we are entirely ignorant of the molecular basis of a living organism, and it exists under conditions the nature of which is, as yet, unexplained.”†

This is not, however, a question to be settled by authority; and the fact that the authorities are, as we have seen, clearly conflicting, relegates us to the facts themselves.

So far as we can discover, difference of form is occasioned by difference of structure and arrangement in the soft parts, so that difference in species may be all traced to permanent difference in the tissues of the living animal.

These differences are manifested from the very first. The forms of the Spermatozoa, the very start of individual life, are distinctly different in each family. With more perfect vision and instruments we should doubtless find differences where we now only see similarities, and the vision of identity would vanish. It is the same if we trace the nucleus in the egg. The peculiar nature, the very essence and character of things is in and at their beginnings.

However development may be promoted by favourable surroundings, yet the act of the exercise of life is the act of the life itself. The faculty in the living coral (whatever it may be called) which determines the precise fashion which every molecule secreted from the sea-water shall assume, makes it to differ from any other form in the world above or below it. The influence of environment modifies individuals temporarily, but never transforms them. At least, we have no instance of any disposal by the creature into an absolutely new form.

The difficulties of evolution, in this case, seem to be very

* *Claus*, vol. i. p. 179.

† *Claus' Elementary Book of Zoology*, vol. i. p. 9 (translated by Sedgwick).

great in view of the existence among the reef-corals of individuals associated together in a gelatinous mantle, penetrated by threads which are connected with the individual polyp, so that all contribute in common to the maintenance of the colony. The coral-animal being one of the radiate creatures in which there is symmetry between two or more segments, any differentiation in any part necessitates a twofold or fourfold change in the entire structure—a circumstance which renders specific change without renovation almost inconceivable.

Taking into consideration the facts referred to, and looking on a fragment of old Silurian *Halysites* (Chain-coral); and a superb lump of Devonian *Cyathophyllum*; a stone from a Carboniferous reef, *Lithostrotion*; and a mass of exquisite *Astræa* (Star-coral) from the Oolite,—we submit that there has been change without advance, and similarity apart from any parentage. The alterations were not made by any internal property, nor by any evolutionary process known to science.

Until further advised, I must be content to be ranked among the “scientific ‘Rip Van Winkles,’ who have been asleep for the last quarter of a century;” and, in spite of the eminent biologist and still more eminent writer in the February number of the *Nineteenth Century*,* express my belief in the existence of a vital force in living bodies behind and above all other activities.

Science alone is helpless and dumb before causation; we must either retire from the task in despair, or look up to God, and say with the Psalmist, “O Lord, how manifold are Thy works! in wisdom hast Thou made them all: the earth is full of Thy riches” (Psalm civ. 24).

The CHAIRMAN (Mr. H. Cadman Jones).—I am sure I may return the thanks of the Meeting to Mr. Pattison for his very interesting paper.

Captain F. PETRIE, F.G.S., (Hon. Sec.).—Two communications have been received. The first is from the President:—

“Lensfield Cottage, Cambridge,

“4th April, 1887.

“I think the case against evolution has been overstated. The limits of species are very uncertain; and it is constantly a matter on which naturalists have differences of opinion whether so and so are to be regarded as distinct species or only varieties. The only logical ground we

* Page 203, February, 1887.

have to go upon in declining to regard two forms as belonging to the same species, is the absence of reasonable evidence of transition. But our knowledge about this is very imperfect; and thus our ignorance tends always to the multiplication of species. We have abundant ground for refusing assent to the notion of transmutation when we take remote forms, and I do not think it is desirable to insist on the distinct origination of each of what naturalists regard as distinct species.

The second is from Mr. Hastings C. Dent, C.E., F.L.S.

“Dublin.

“I have seldom perused a paper read before the Victoria Institute which has given me greater pleasure. It is very convincing as to successive creations of groups and Persistence of Type.

“Owing to my not having studied corals specially, and so being unable to grasp, in the generic and specific names, the predominance of certain families of corals in the earliest and latest times, I should be very glad if Mr. Pattison would tell me whether there is, as it appears from the paper, a similarity in this group of Actinozoa to that of the Crustaceans, which I described in the latter part of a paper on ‘Evolution and Degeneration, the Crustacea and Man,’ a copy of which I sent to the library of the Victoria Institute some five years ago. In the Crustaceans the original important families of Trilobites and Eurypterids, which became extinct, are now represented in importance (commercially at least), by the Malacostraca, which are of a comparatively recent origin; and I gather from the paper that a similar predominance exists at the present time of a comparatively lower type, or later group, of corals from the original form. If this be so, the fact is of great importance to those who are contending against evolution.

“The Persistence of Type is, I think, the point to be adhered to especially, and it may be well summarised in those sentences on page 201.

“We have before noticed that coral-life burst upon the stage all at once; it continued in existence from that epoch until to-day.

“We see at once that there has been frequent change, and it may be said progress in form, but not evolution.’

“Species *per se*, are rather misleading; as now-a-days, especially, certain existing forms are designated by one naturalist as a species, by another as the variety of a species; some scientists apparently considering that the appearance of approximately the same form at widely separated portions of the globe, must necessitate its being a separate species. But in dealing with genera we have less difficulty, less fear of our position being assailed.

“Monsieur De Quatrefages remarks*—‘Races and isolated varieties of a very variable species are taken for species so long as such specimens only are known; they are brought back to their specific type when one has been able to collect the intermediate forms which unite them. But to state the frequency of a fact which was thought rare or exceptional, is not to explain it’ (p. 188).

“I have been much exercised, *e.g.*, in the specific determination of existing Lepidoptera, not only by the diverging opinions of English and German entomologists; but even by those of English specialists.

“When entering upon the origin of species, and derivation of genera, we must bear in mind that the theories of Buffon, Lamarck, St. Hilaire, Darwin, &c., on derivation, presented themselves to those scientists as probable, from the most careful consideration of the facts of varieties and new species

* Charles Darwin. . . . “Étude sur le Transformisme.” Paris, 1871, p. 181.

appearing of which the transitions were palpable. The error was in arguing from the particular to the general; that is, in saying that if L produces M, then A must have been the ancestor of L, which is absurd.

“Mr. Pattison scores a strong point in his extract from Dr. Wright’s paper (p. 203).

“‘There is no evidence of any gradual development having taken place in the class from alower to a higher type of coraligenous structures. The old corals of the ancient reefs appear to have been as highly organised and as elaborately constructed as the modern corals now building reefs in our tropical seas.’

“I think it is quite sufficient for the author’s purpose to have proved that in existing genera there is no proof of evolution in corals, and that the most ancient are as elaborate in organisation and construction as are those that at present exist; while it is also important to note that while elaborated in number of genera and species, there are yet remnants in later days, of old generic forms, thus proving Persistence of Type; and from finding no instances of the metamorphosis or transmutation of corals into other Actinozoa we may take our standpoint on—at least—the lowest grounds, in asserting that the intricate systems of organic beings move in collateral spirals, either ascending (numerically), practically stationary, or descending and degrading; and that though there are degraded and low forms in many orders which nearly approximate similar forms in other orders, yet there is no proof—but rather the contrary—that the lowest forms of closely connected orders had originally some yet lower common ancestor from which both sprang.

“Let us adhere to the grand, yet simple words of that much-maligned Gen. i. ‘Whose seed was in itself, after his kind,’ and we shall not err. These words are truly elastic, yet most dogmatic and definite.

“I wish the author had given us his theories as to the cause of the tropical heat in these latitudes which allowed for the gigantic coral beds in England, that cover so large an area, and form such an important part of the deposits in these localities in those bygone ages. I believe a minimum heat of water of not less than 66° Fahr. is necessary for the existence of corals.”

MR. R. J. HAMMOND.—The description Mr. Pattison has given of those old coral reefs is so charming that it will long remain on the retina of my mind; but, although this is the case, I cannot help thinking there are certain loose expressions in the paper which it would be well to have put in a more definite form. On page 200 of the paper we have the *Syringopora* mentioned in connexion with the Upper Silurian series, but the author goes right through the Devonian rocks without alluding to that order, and then, coming to the Carboniferous strata, we get to the *Syringopora* again. Of course, Mr. Pattison does not consider there have been two distinct creations of the same creature. Doubtless, he would say the creation is to be dated to the Upper Silurian, and that the order existed through the Devonian, although it is not mentioned in connexion with that series. In fact, it must have lived through that epoch because we come upon it again in the Carboniferous series. I would put it to Mr. Pattison whether, as this particular order is not mentioned in the Devonian period, other creatures may not have been passed over in a similar manner? Then, again, on page 202 he quotes Dr. Wright, the author saying, “No genera of the Palæozoic epoch have been found in

any subsequent epoch ;” but to my mind that statement seems to be almost contradicted by what Dr. Wright says afterwards :—“The cretaceous corals belong chiefly to families now existing, but there are still remaining here a few instances of the old forms of tabulate corals, hardly distinguishable from Silurian species.” Of course, to the scientific mind there may be some mode by which these two statements can be reconciled ; but to me they certainly appear to have a contradictory tendency. It seems almost an invidious task to notice weak points in this beautiful paper, but there is another statement which I think open to observation. On the top of page 202 there is the expression, in brackets, “But, with the exception of one doubtful form,”—now an evolutionist might say, “There is an important exception in the case of this ‘one doubtful form.’” It may be that that exception is a very powerful one. I should here like to ask one question with regard to these separate creations. Does he think that in the case of these separate creations there have been creations of vast numbers, or does he suppose that only a small number of these coral insects were created at first, and that their increase was due to the ordinary process of generation ?

Mr. W. GRIFFITH.—I think our friend who has just spoken rather misapprehended the argument of the lecturer, which, as far as I understood it, was that there was no instance of development in these different corals. The fact that we have the same coral in the Devonian and in the Carboniferous strata does not by any means prove that the one was developed from the other. On page 202 of the paper it is stated that “the ancient Cyathophyllidæ were most important in size in Palæozoic times ; but, with the exception of one doubtful form, they have all become extinct.” That statement may imply that one of those forms may or may not be in existence ; it does not say that the doubtful form may have been developed from a previously existing form. *The subject is necessarily difficult, owing to the somewhat ambiguous sense in which the term evolution may be employed.* The greatest writers on each side often use the word in an ambiguous way, We must admit that there is evolution, at least to some extent. When we have an artificial arrangement of species we naturally make mistakes and put forms into one species which ought to be put into another. It is not necessarily proved that one form was necessarily evolved from the other, but rather that we make mistakes in our classification. We ought to be more exact in our specification and marking out of species and genera ; otherwise we shall make mistakes. On the other hand, if we admit all that is stated on behalf of evolution, we do not necessarily deny the Creator. Certain successive forces may have been attached to natural bodies and these may have produced a kind of evolution, and yet, unless those forces sprang into existence of themselves, they do not therefore deny creation. Those forces must have been caused in some way by external action, and, although they produce certain effects, they are altogether independent of those effects. I think the weakest part of the evolution theory is that it only takes a survey of part of the great field of creation ; and in saying “creation” I do not wish to prejudice or anticipate the

argument ; I will, therefore, say, the great field of nature. The evolutionists may show that certain species have been evolved from others, but they have never been able to prove that life has evolved itself. They have never been able to show that the moral qualities have been evolved from a lower state of existence, or that the intellect of mankind and the higher spiritual forms of life have been evolved. The great fault committed in this controversy is that we sometimes take different views of the meanings of words, such as the word "evolution," and that we do not take a sufficiently extensive view of the facts from which we make our inductions. The real question at issue is whether at any particular time there has been an act of creation ; because, if there were an act of creation, certain qualities may have been attached to the thing created which may have evolved subsequent consequences. There was a paper published some time ago in the *Nineteenth Century*, in which Mr. Gladstone discussed this question, and Professor Huxley replied. Mr. Gladstone wisely took a somewhat legal view of the question and and reduced the controversy to this point : "Is the first chapter of Genesis credible or is it not ?" On this point I should be happy to put myself under the guidance of Mr. Gladstone rather than of those who, like Professor Huxley, take what I would venture to call a limited view of the question, and do not establish any conclusion. Learned natural philosophers may show evolution in a particular place, but, unless they show that everything has been evolved, they do not establish the conclusion that there has been no creation. The Creator may have willed that there should be evolution in a particular place, and, if that be so, it militates against the correctness of Professor Huxley's conclusion. Undoubtedly, if this question had to be decided by an intelligent jury who had to deliver a verdict, "ay" or "no," they must say that the case for evolution has not been proven. No doubt, when you have a controverted question before a jury, you have to look at all the facts and to frame a theory which explains the facts ; and unless that theory explains all the facts, the verdict will be against the theory, and will be given on the other side. Certain explanations all evolutionists do give ; but, although they explain some, they do not explain all the facts belonging to the natural philosophy around us. They do not show how inorganic nature has become endued with life or has been changed into organic nature, or how the lower animal life has become endowed with moral qualities, or how intellect or the higher forms of spiritual life is produced from the lower forms of animal life.

The AUTHOR.—The last speaker has furnished a complete reply, such as I should otherwise have attempted to have given to Mr. Hammond. He has explained the fact which the first speaker was quite right in calling attention to, namely, that in the three instances in which I spoke of the continuity of things I have spoken of species and not of genera. The cases that have been referred to are those of the continuance and the recurrence of species ; and it is quite true that there has been no recurrence of species though there has been a recurrence of genera. I ought to have put that a little more plainly. I should have shown more clearly that species do not

recur, but that genera do. I think that nothing could be better than the simple way in which Professor Stokes has left the question. There is an absolute absence of all evidence of transition, which, I think, is proved by the facts I have brought before you. That there can be no evolution in the forms which are brought before us; that there may not be evolution in some shape or other with which we are not acquainted I should be very loth to deny. I cannot, however, dogmatise on a matter I know not. All I say is that the facts I have given prove, as they present themselves to me, that there is no evolution in the common sense—namely, that these things create themselves, or by themselves originate a different order of succession. In reply to the question whether these numerous species were made all at once, or whether they came into being gradually by parentage, I should give the answer that both are true causes. I cannot look at those old Silurian rocks without seeing that a great number of species have come to us which have been created all at once, because we find them in the same layer. It is true that there is great difficulty in conceiving the way in which creation could have been effected, and that difficulty it is not at present given to us to solve. It may be some day, and certainly in eternity, if not in time. I am only dealing with facts as they are, and cannot pretend to give the rationale of God's dealings with nature where He has not revealed them. I am not aware that there is anything more about which I need trouble you. It is quite true, as Professor Stokes indicated, that my statements are a little too absolute with regard to the occurrence of the division plates as being six in the modern and four in the ancient corals; that is to say, there has been found one species in which it is doubtful whether this is true or not, but this is so minute a matter that it does not affect the general question. I did not mean to treat on corals at large, but only to give the conclusions I have formed on a mass of evidence with reference to the points I have dealt with. I am much indebted to Mr. Lea for his valuable letter, to those gentlemen who have spoken, and to all present for the kind way in which my paper has been received.

The Meeting was then adjourned.

ORDINARY MEETING, APRIL 18, 1887.

D. HOWARD, ESQ., VICE-PRES., CHEM. SOC., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

Works presented to the Library :—

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| “Proceedings of the Royal Society.” | <i>From the same.</i> |
| “Memoirs of the Imperial University of Japan.” | ” ” |
| “The Plants of New South Wales.” | By Rev. W. WOOLLS, Ph.D.,
F.L.S. |

The following Paper was read by the Author :—

PRACTICAL OPTIMISM. By CANON W. SAUMAREZ SMITH,
B.D., Principal of St. Aidan's College, Birkenhead.

THE title of this Paper is derived from a passage in J. Sully's able and interesting book on *Pessimism*. The information, the suggestions, and the arguments in that book are full of interest; but there is a fundamental defect in the treatment of his subject which prevents the book from being a complete presentation of the *data* which claim consideration from those who are seeking for the whole truth in the matter under discussion. Mr. Sully sets aside the “theological” aspect of the question as consisting of “transcendental conceptions” which “anticipate” experience, or explain it *a priori*, and must therefore be regarded as unscientific. And yet he admits that such conceptions are facts of human nature, and make for an optimistic as distinguished from a pessimistic view of life. “Theological truth,” he says, “sometimes, at least, professes to rest to some extent on experience, and to be a fair inference from observable facts. Consequently, if—as must clearly be the only correct way—we interpret experience in its widest sense as including facts

and all legitimate inferences from these, it may be urged that we are bound to include theological ideas in our investigation. For example, Christian theology, recognising the misery of our present life, teaches that this misery is to be more than compensated, in the case of a certain proportion of mankind, by future blessings. Now, if this future existence is inferable either from historical or other *data*, it must plainly be included as an element in the life whose value is to be determined. Again, this theology tells us that the existence of a benevolent and wise Creator is inferable from the complex combinations of the world. If so, we may be sure that even if human life, so far as we can observe it, seems to be other than happy, this defect will be somehow made good."

And in the passage, with an allusion to which I commenced the paper, after he has argued that an "*unqualified* optimism would speedily relax all the higher kinds of moral endeavour," he says that "if we frame a PRACTICAL OPTIMISM, and say that life is as good as it could be, provided we make the best of it (which seems to be the practical faith of the best Christians), we, no doubt, reach an idea most encouraging to effort."

It is of such optimism that I am now to speak.

2. My object in this paper is not to enter into anything like a historical review of contending theories, or to make a detailed criticism of any particular theory, but to submit a philosophical estimate of the worth of life, as viewed from a *Theistic* standpoint, and to advocate as reasonable an optimism which is neither baseless nor superficial. I believe, with Professor Flint, that, "the true reading of human life, when it is surveyed in a sufficiently comprehensive way, is not pessimist," and that we cannot survey it "in a sufficiently comprehensive way" unless we deliberately take into account those religious, or theological, *data* of human experience and history, which Mr. Sully acknowledges to be "facts," though he chooses to exclude them from his line of reasoning, with the result that that reasoning becomes "narrow and partial." The exclusion of these *data* makes it impossible, too, to be content with that "scientific meliorism" which some have suggested as countervailing the gloomy and negative tendencies of pessimism. For "meliorism," which stands aloof from the acknowledgment of a supreme Divine will, must, in the face of the pessimist's objections, stop short of being a genuine and adequate motive to sustained moral endeavour.*

* As there will not be many direct quotations in my paper, I may as well mention, in a note, some of the books I have consulted in working out my

3. We must start with a clear view of what we mean by the antithetical terms Optimism and Pessimism. It is patent that for minds of limited capacity there can be no all-embracing view of the universe. No finite beings can determine what is absolutely best, or absolutely worst. Such knowledge can only belong to an Omniscient, Eternal, Self-existent Being. But man can reason from phenomena to laws. He can trace tendencies and characterise them; and from accumulated experiences and observations he can arrive at large conclusions which have for him a most important practical value. Thus, in estimating the worth of the world and of human life, he discerns both a *malefic* and a *felicific* tendency at work; and, accordingly as he considers the former or the latter to preponderate, does he become "pessimist" or "optimist" in his speculations. Optimism is the theory that good is normal, and evil abnormal, and that the whole course of things make for good. Pessimism is the theory that evil is the normal condition of existence; that good is temporary, evanescent, illusive, and that Non-being is preferable to Being.

These two theories correspond to two sets of phenomena which come under the ratiocinative and reflective observation of men. Optimism is, logically, antecedent to Pessimism. It is more natural to think that things tend to good than to think that they tend to evil. It is more natural to be hopeful than to be otherwise, and the saying has become proverbial that "hope springs eternal in the human breast." Yet in human life and history this hopefulness is continually dashed with bitter antagonistic experiences, and the question again and again recurs—in one and another shape, but substantially identical—*Is life worth living?*

4. The Pessimistic philosophy represented in Schopenhauer and Hartmann is a reflection of the general unrest and disappointment of our age. It is, as has been often remarked, a reaction from the somewhat inconsiderate optimism of the last century. One reviewer, speaking of Schopenhauer, attributes the rise of much pessimistic literature to the "morbid disappointment which followed the French Revolu-

subject. The principal ones are Sully's *Pessimism*; Dr. Gass's *Optimismus und Pessimismus*; Caro's *Pessimisme au XIX^e Siècle*; and Ribot's *Philosophie de Schopenhauer*. I may also mention Leibnitz's *Theodicée* in Janet's *Extracts*; Flint's *Theism, and Anti-Theistic Theories*; Wright's *Book of Koheleth*; Hartmann's *Die Selbstersetzung des Christenthums und die Religion der Zukunft*. I have also recently perused J. H. Clapperton's *Scientific Meliorism*.

tion." Nor does it seem improbable that the excitement produced in some minds by premature hopes of rapid political and social progress in an age of extraordinary scientific discovery, and of application of science to the material wants of men, tends to beget an impatient attitude of mind, which, when not counterbalanced by moral and religious motives, is apt to foster a despairing view of the world, and of the capabilities for happiness of human life.

Reasoned pessimism, however, cannot stand critical analysis, for it is inconsistent with the facts of human history, and with the faculties of the human mind. It is entirely inadequate to explain the positive and persistent aspirations of human nature. As a philosophy it becomes unmeaning, unless egoistic Hedonism be regarded as the only possible explanation of life, and pain and suffering be treated as final and absolutely independent facts. Intellectually viewed, pessimism is mental suicide, and to assert that "all is illusion" is a mystical despair, not a rational affirmation.

Optimism has far more *a priori* reason in its favour than the opposite theory; but it is confronted by the mysterious existence of many phenomena which seem to hinder the pleasure, the progress, and the happiness of mankind, and to interfere with that tendency to harmony and joy which the optimistic theory asserts. For the operation of what we call "evil" compels us to regard evil not merely as privation and defeat, but as a strange, antagonistic force which mars joy, hampers progress, and seems inconsistent with the ascription of perfect goodness either to God or to Nature.

5. The truth is that both lines of speculation can be supported by an array of facts and experiences. But the practical resultant which emerges from a fair and full comparison of the arguments that can be advanced on either side is distinctly anti-pessimistic. It should not be forgotten that the question can only be fairly dealt with by recognising that we have to do with metaphysical and ethical phenomena, and that—however much the discoveries of physical science may modify philosophical theories—it is still to the mental, and not to the materialistic, side of our knowledge that disputants on all fundamental problems that touch human action and desire must make their final appeal. This being allowed, it will be perceived that truth-seekers in this dispute aim not at a demonstrative proof, but at moral certainty, and that what we have to look for is not a complete ("scientific") explanation, but a reasonable inference concerning the principles which should guide us in our view of the constitution

and nature of things around us, and of our own action as intelligent beings.

6. That there is much to perplex, to disappoint, to sadden human life, and our views of human destiny, is beyond all question. But pessimism as *philosophy* is a very different thing from pessimistic utterances in *poetry*. The latter express the idealised tension of individual sorrow, and are emotional claims for sympathy with individual suffering; the former lays it down as a permanent and dominant principle that all hope of human progress and happiness is vain. The plaintiveness of the poetry is a natural, though often overstrained, outcome of human experience; but the claims of the pessimist as a dogmatic philosopher are arrogant and untenable. His method is inadequate, and his arguments admit of an easy *reductio ad absurdum*. A "philosophie qui maudit la vie" is a strange and startling phenomenon indeed, when it predicates objective, universal evil, and by a pretentious comparison of pains and pleasures in life "makes nature bankrupt" of joy. The method of such a philosophy may be described as a compound of arrogance and moral blindness; for it deliberately refuses to take account of the higher instincts and ideals of the *reflective*, as distinguished from the *sensitive*, portion of human nature. It exaggerates by descriptive accumulation all the pains and evils that may befall men in reference to the individual life, and pretends to estimate the value of life by a calculation of a *quantitative* character, where the real solution of the problem depends upon the correct adjustment of mutually *qualitative* facts. It views all things from the standpoint of "what is pleasant?" and practically ignores the question, "what is right?" It refuses to entertain the idea of God, and substitutes for it the irrational concept of an Unconscious Will. Nor can we fail to detect the absurdity and grotesqueness of pessimistic philosophy, if we really test its reasoning as an offered explanation of the world, or of life. When we are told, in effect, that man's life is only a struggle for existence, with the certainty of being conquered; or, again, that the *summum bonum* to be aimed at is a state of "perfect indifference," "where subject and object disappear, and there is no more will, nor representation, nor world;" when it is laid down, as the true doctrine, that all conscious beings are the victims of a gigantic illusion, and are "pitiable puppets" of an irresistible impulse which makes life a succession of sufferings, and compels men to act contrary to their true interest, which is to cease to be; may we not justly term such philosophising, irrational, and absurd? The sum

of Schopenhauerism is this: an unconscious will somehow objectivises itself in individual beings who, finding consciousness a burden, seek, by means of true knowledge, the goal of utter unconsciousness!* Nor is Hartmann's theory less absurd, though his exposition of it is, perhaps, more interesting and less misanthropical. Hartmann reasons from "the Unconscious" in terms of consciousness. He ascribes to It—the great THAT whence comes all that is; the central monad which manifests itself in consciousness and matter—all the attributes of a perfect intelligence, the predetermination of a course, the omniscient use of means, the regulation of a world-course, which, although bad all through, is to end in the perfect peace of primitive unconsciousness. Surely this is either making irony of all philosophic exposition, or it is very unphilosophical. The suicide of existence cannot be the explanation of it.

7. In all philosophy we have to choose between a theistic and a non-theistic line of speculation. If the "theistic inference" is a valid one; if we are led by the observation of what we call "nature" around us, by reflection upon our own mental constitution, and by certain moral intuitions or requirements, to the acknowledgment of a Supreme Being in whom the ideas of power, wisdom, and righteousness, which are revealed to us in our own mental experience and by the history of mankind, find their source and culmination,† we shall become "practical optimists." Pessimism is only possible for those who will not accept, or who arbitrarily set aside, Theism. And Optimism varies according to the degree in which men's minds realise the existence and operation of a Divine Will superior to finite conditions and transcending human science. The Pantheism which confounds God with "Nature," the Materialism which will not look above "Nature," and the Atheism which refuses to believe in God at all, tend to a pessimistic view of life; and although theories of natural development or evolution may throw some consolatory gleams upon the view of the world-process, the optimistic tendency will eventually fail to be of any practical worth, when faith in a Divine Order, regulated by a Personal will, dies out.

* "A. Schopenhauer," says Emerson, "with logic and learning and wit, teaching pessimism—teaching that this is the worst of all possible worlds, and inferring that sleep is better than waking, and death than sleep—all the talent in the world cannot save him from being tedious."

† Lotze speaks of God as "the One Being whom we regard as the *indispensable presupposition* of all intelligibility in finite things."

Theistic speculation, on the other hand, must be optimistic, whether we argue from our knowledge or from our ignorance in reference to the Supreme Being. What we know, even apart from the teaching of the Hebrew and Christian Scriptures, encourages the conviction that the Supreme Will is beneficent, and not maleficent. What we know, when we receive the revelations in those Scriptures, makes that conviction ineradicable. And then our ignorance of the whole scheme and constitution of nature serves to check complaint as well as doubt. We cannot fall into a boastful optimism and ignore evil, but we feel that, as within our knowledge, so beyond it, the constitution and order of things must perpetually tend to that which is good.

8. This conviction (so far as the philosophical expression and exposition of it is concerned) is best seen in the optimism of Leibnitz. His *Theodicée* is an able and thoughtful endeavour to vindicate God's government of the world from a *rational* point of view. Whatever weakness or defect may be found in the reasoning, considered as a complete argument, it is of permanent value, and exhibits an irrepressible impulse of Godward consciousness in a cultured mind. Leibnitz argued that God, as the first reason of things, must be perfect in wisdom, power, and goodness. He could not fail, therefore, to choose what is best. To the Divine Intelligence all possibilities represent themselves, and from "an infinity of possible worlds," the one selected must have been the "best possible." It was very easy for Voltaire, in his clever but superficial satirical tale of *Candide*, to ridicule this notion, but almost all the sting of the satire is taken away when we remember that Leibnitz did not argue that this world is the best of all possible worlds *absolutely*, but as viewed *relatively* to what we must conceive as the process of Divine government of the universe. To arrive at a true estimate, we must not only consider isolated details and events, we must regard "toute la suite des choses." "Il se pourrait que l'univers allât toujours de mieux en mieux si telle était la nature des choses qu'il ne fût point permis d'atteindre au meilleur d'un seul coup." This principle of "perfectibility," according to a Divine order, is intellectually reasonable, and practically encouraging.

9. It is true that this optimistic theory may become a superficial and abstract dogmatism, and by its one-sidedness provoke a grim counter-statement of the miseries and disappointments which characterise much of human life as known to and observed by us, and seem *primâ facie* to refute the more sanguine philosophy. The "easy-going optimism" of

Shaftesbury, who thought that "good-humour was not only the best security against enthusiasm, but the best foundation of piety and true religion;" the complacent optimism represented in Pope's *Essay on Man*; the emotional optimism of Rousseau, were all provocative of such counter-statements, and needed the correction thus supplied. These optimists failed to recognise sufficiently the existence and operation of evil in the world; and I think we may safely say that none of the three mentioned were "religious" enough to see the true solution of the controversy between the optimistic and the pessimistic views of life. They were one-sided theorists, and neglected to consider the facts which told against their rose-coloured schemes. The pessimist is unfair in refusing to take note of the tendencies to good which exhibit themselves in nature and human nature. The "theoretical" optimist, on the other hand, does not fairly confront the darker side of the problem, and becomes an unsafe guide, because he is a partial judge. To concede that all is bad, and that life is a hopeless illusion, is to fly in the face of a great many patent facts, both in individual life and in the history of the human race. To argue, on the contrary, that all is good, and that what we call evil is only imperfection, and may be put out of account in our estimate of the progress of the race, is also against the facts which we are bound to consider.

10. But the concession that all is not good, and that there are mysteries of pain and evil, which must prevent us from the dogmatic assertion — "One thing is clear, *whatever is, is right*,"—will not prevent the "practical" optimist from arguing that "whatever is, is" *on the road* "to right." Do the facts, taken all together, allow us to admit that evil is an absolute and irremediable anomaly in the affairs of men? What is the universal tendency of things? Is it good or bad? These are inquiries in reference to which we may hope to attain practical information and guidance, even where we may not acquire complete knowledge. But, primarily, we must neither deny nor with a light heart attenuate, the fact that what is for us evil exists and operates. A dissonance and discord make themselves felt which forbid the assertion that the present condition of things is "the best possible," or as good as it might be, if circumstances were different; and this disturbing element in our contemplation of the world and of life demands investigation.

The existence of this disturbance is indisputable, and must be examined by every truth-seeker who wishes either to

learn or to teach. Its origin may be, in the ultimate form in which the problem presents itself, inexplicable; but the question, "What is evil?" presses for some sort of answer.

11. Leibnitz, as is well known, classified evil as metaphysical, physical, and moral. In the first aspect evil is simply the *imperfection* which we necessarily connect with all finite existence; in the second aspect evil is *pain*, as opposed to pleasure; in the third aspect evil is *sin*, as opposed to righteous action. This classification is a convenient and an instructive one, and saves us from much confusion of thought. Without some such distinction we are in danger of calling evil good, and good evil, for our first inclination is to call everything that is painful bad, and to call everything that is pleasurable good; but to recognise that pleasure may be hurtful, and that pain may be beneficial, is a conviction which depends very much upon our making a correct analysis of what constitutes evil.

12. Thus we are met by the important consideration, how are we to judge concerning good and evil? The individual experience cannot be a sufficient test; it needs a wide comparison of the phenomena of human life and history to enable us to draw a general inference which may be of practical worth. It will be at once perceived that such a comparison involves many social, political, and theological problems, and that, as our inquiry is necessarily in its ultimate form an ethical one, the claims of the Christian religion to be the universal religion for mankind has much to do with the question of the worth of life. All philosophy of life must be affected by our views of God, and of what we receive as revelations of His will and purposes. We leave aside from this discussion, as far as possible, dogmatic theology; yet we venture to assert that those who will not allow the ideas of Divine Will, Righteousness, and Goodness, as historically presented in the Hebrew and Christian Scriptures, to enter into their reasoning concerning the value of life and the destiny of men, are guilty of a most unphilosophical omission.

13. When we have recognised the need of making distinctions between various forms of so-called "evil," and have honestly consulted the historical materials at our disposal, we find three notable phenomena which interfere with the optimistic view of life and human destiny—viz. pain, sorrow, and sin. Of these, the first interferes with sensuous enjoyment, the second interferes with mental tranquillity, and the third interferes with moral satisfaction.

14. But it can, without difficulty, be shown that pain and sorrow are, as a matter of fact, in many cases subservient to

higher and wider good; and that much that is permanently good results from the temporary incidence of bodily or mental suffering.

No one, for instance, can doubt that pain often acts as discipline, stimulant, and warning. Is there not a whole philosophy of pain as an educational agent in the proverb, "A burnt child dreads the fire?" The spur of pain and discomfort incites men to make effort for ameliorating their condition; and the educational influence of pain upon every one of us is in the line of progress to what is better.* "It is the pain of hunger that we shun in taking food; the pain of fatigue that prompts rest; the pain of injury that compels us to take care of our bodies."

The "*duris urgens in rebus egestas*" often leads upwards, while indolent epicureanism produces first stagnation, and then decay. The struggle with difficulties (whether physical or moral) may be often temporarily painful, and yet be an indispensable condition of success; and what is, at first, painful effort becomes pleasurable in retrospect; or, sometimes, itself grows into a pleasurable exercise of activity.

Pain is not inherently an evil. A famous preacher has asserted that "there is just as much evidence of a design to produce pain as to produce pleasure" in the world, and that it was "a grand mistake of the old reasoners in their arguing for the goodness of God" to try to prove that there was more evidence of design for pleasure. He was probably speaking of pain in its effect upon the moral training of men; but even if we only regard the "physical" aspect of the universe, as known to us, is it reasonable, when we think of mysterious natural forces of a destructive character like poisons, or explosive gases, or when we view with dismay the effect of great "natural calamities" like earthquakes, or hurricanes, or floods—is it reasonable, I say, in face of all that the universe presents of design, order, beauty, and vitality, to infer that the constitution of nature does not tend to general happiness and enjoyment? is it not rather reasonable to infer that what we term natural calamities may be, in some cases, reparative and remedial agencies, needed for the due balance and right adjustment of the cosmic system? By such calamities, too, intellectual and moral progress is encouraged. They give incitement to human effort, and to the search after further knowledge in the way of remedying the

* "Le grand agent de la marche du monde c'est douleur," says Renan, somewhere.

disastrous effects upon human life and comfort where remedy is possible. The occurrence of storms, *e.g.*, leads to greater care and science in shipbuilding; the occurrence of pestilence, to better sanitary regulations, and so forth. "Der Kampf mit der Natur," says Dr. Gass, "umfasst von Anbeginn einen beträchtlichen Theil der Menschenbildung, und er hat, so unzählbar auch die Opfer sein mögen, der Menschheit weit mehr verliehen als geraubt." Many facts will show us that pain is often subservient to good, and conducive to a higher stage of happiness. And if we once desert the low ground of "egoistic Hedonism" as a standard of human happiness, we come to discern the fact that to give up our own pleasure and to encounter pain is often a higher form of what is, in effect, *pleasant*, because it is in a mental or moral sense *good*.

15. Sorrow and mental suffering are not evils in an absolute sense. They temporarily interfere with individual happiness, but they often have, and seem intended to have, a disciplinary and awakening effect both upon the intellect and the conscience. The longing for a more complete and higher life is a spiritual motive within men, which—even apart from definite revelation of a life to come—elevates the soul, and so makes men in reality happier than they were before the suffering came. Moreover, both the experience and the observation of suffering tends to evoke sympathetic capabilities which widen men's outlook, and cultivate a humane and philanthropic spirit. Nor will it be denied that "endurance" is often nobler than "enjoyment," and intimates truths of self-control and self-sacrifice which point to a higher goal than individual self-complacency, and develop possibilities of a social harmony yet to be attained where every part, in mutual adjustment, shall contribute to the happiness of the whole body.

16. Sin, or moral evil, is the only form of evil of which we have to acknowledge that it seems absolutely antagonistic to good, to happiness, to hope, to harmony; and "sin is universal." Here is the greatest mystery and perplexity for the optimist philosopher. Violation of moral order is mischievous because it is the opposition of the will of intelligent beings to a Supreme Law, and an absolutely Righteous Will; yet where is there not such violation? and why is this violation of moral law permitted? "It is sometimes asked," says M. Naville, in his lectures on *The Problem of Evil*, "why did not God make the creature incapable of sin—that is to say, *necessarily* good? It is forgotten that necessity excludes liberty; that where there is no liberty there is neither good nor evil; so that the idea of a creature necessarily good really implies a

contradiction." The possibility of sin is "the condition of created liberty," "but the cause of the actual realisation of evil exists nowhere else than in the will which rebels against law." The exercise of this rebellious self-will introduces disaster and discord into human history. And the worst kinds of suffering and sorrow are the results of sin. The fact, however, that suffering follows sin—dogs it, we may say—is surely a hopeful feature in the survey of this strange, disturbing influence in the world of humanity. Whether such suffering be viewed as penal, or as remedial, it speaks of a tendency in the whole order of things which is contrary to sin. The solution, however, of the mystery of moral evil, and the cure of the mischief, must be confessed to be beyond the grasp of our finite philosophy. But though in this matter philosophy can help us little, the Revelation from God which Christians allege to have been made in Jesus Christ helps us much, at any rate in a *practical* way, and allows us to hope that sin and all its sad results in the world may be regarded as "the conditions of a grander order" of things yet to be revealed.

17. I have said nothing yet of death, as an evil. To the Pessimist, privation of life ought to be, by his very theory, rather good than evil. To the bare Materialist, death is but a cessation of molecular movements of matter. To the spiritualist philosopher, death must appear to be an emancipation. To the Christian believer it is the gate into a higher realm of life. That death is so generally dreaded and viewed as an evil, even by those whose circumstances of earthly life seem most miserable, is a strong argument against the truth of a pessimistic philosophy, and a strong argument in favour of the theory which regards life and the faculties of living as designed for happiness.

To those who believe in the spiritual capacity of man, and yet have doubt as to any future existence, death must present itself as a burden and a sadness, because it quenches aspiration and stops progress. Such a view can only be cured by the hope of a life to come.

Death, in its relation to sin, is a theological topic, and cannot be dealt with in this paper.

18. Sufficient has been now said by way of protest against taking up with the philosophy of despair. The positive considerations in favour of an optimistic philosophy are partly derived from a comprehensive logical inference, and partly from an intense moral conviction. When we look at the world as a whole, we perceive a preponderance of phenomena that make for general happiness, and a wonderful adjustment

of a compensatory kind which keeps the cosmic mechanism in order.

And when we fairly face the problems of human life in the light of the facts of human history, we find a perpetual tendency that makes for righteousness rather than for unrighteousness. To this the Christian believer adds a faith in the special revelation made in Jesus, the Christ, and the whole horizon of speculation becomes lit up with radiance of a better day coming.

19. The right view as to the value of the world depends upon a patient consideration of the way in which all the phenomena within reach of our knowledge work together. What is the impression produced upon our minds when we estimate by the total resultant, and not by our opinion of individual details? Is there not a *universitatis pulchritudo*, notwithstanding any long catalogue that may be made of what may seem to us defective or repellant phenomena? Modern researches in science have added marvellous testimony to the existence of pervading design, and adaptation to environment in nature around us. And this thought is of itself at once awe-inspiring and consoling.

20. But the problem which most intimately concerns men is the worth of human life. Here, again, it would be a mistake to judge of the value of life by individual experience, or by exceptional cases of sorrow, poverty, or pain. The materials for judgment are not simple, but complex. And the whole inquiry is a question of *tendency*, not of phenomena isolated from the general current and order of things—of *dominant law*, not of what appears to be specific pains or evils, when viewed individually.

Hence the importance of a historical survey of humanity, and of a wide comparison of the different varieties of possible enjoyment for different classes of men and types of human energy.

History will teach us that human progress is, on the whole, stronger than degeneration; and that, in proportion to the elevation of ethical standard, man's capabilities of happiness and hope increase. The degeneration itself is good so far as it leads, not only to "a survival of that which is fittest," but to a prevalence of higher ideas and better conditions of life. And the comparison of the many ways in which life can be used and enjoyed will enable us to perceive that the sum total of even actual present happiness is apt to be disregarded by those who—either in expression of pessimistic sentiment or in construction of an indictment against optimism—look only at the dark side of things. The verdict of a careful historical survey of humanity is that there is a constant

evolution of good out of evil which tends in the direction of general progress; and that there is much general enjoyment of life.

It must too be specially borne in mind that the inquiry is predominantly an *ethical* one. Buddhism and Epicureanism, or Hedonism, may be regarded as representing the opposite poles of the search into the true object of life; and it is only by some practical approximation to an ideal *summum bonum* that we can estimate the full meaning or value of life.

Both these methods of viewing life lead to pessimism—one directly, the other in an indirect way. The former, by a universal negation of the happiness of conscious life, is blankly pessimist; the latter, by a mistaken affirmation that pleasurable sensation is the sole standard of human happiness, leaves the soul starved and helpless when it comes into contact with pain and death. Yet it should not be forgotten that the existence and wide acceptance of Hedonistic standards, especially when pleasures like the pleasures of culture, of the pursuit of knowledge, and of intellectual activity are taken into consideration, point in an opposite direction to that of pessimistic philosophy. The inquiry into the worth of life, being an ethical one, is concerned with personal, subjective, mental conditions, rather than with external circumstances. Subjective joys, pleasures, aspirations, hopes, may outweigh all that seem, to an outside observer, to be pains and penalties of life.

21. But without religion no firm standing-ground for the optimist can be reached. An infinite region of mystery lies beyond our reach which cannot be fathomed by finite science or philosophical speculation.

The facts that we can reach show that, while pessimistic sentiment has a *locus standi* in the circumstances of human life and the things which condition it, pessimism as philosophy is irrational. On the other hand, the facts show that, while optimistic sentiment may sometimes lead to a flimsy and superficial estimate of life, optimism, as philosophy, is more rational than its opposite. It needs, however, to be complemented by religious sentiment and religious truth. For that there is a disturbing element which affects human nature and human society in a most painful manner is indisputable; and for this moral disturbance neither science nor philosophy can be the cure.

21. The Christian religion recognises what lies at the basis of pessimistic sentiment, and yet enables us to gain a position in which *practical optimism* is perceived to be a true philosophy of life. Such optimism is the result of persistent

faith in an Ideal, *i.e.*, a Divine, order and constitution of things, and to this Divine order the best and most instructive testimony which can be found anywhere is given to men in the Bible. Faith in God is brought into highest intensity and reality by the outcome of the progressive teaching of the Hebrew Scriptures, which culminates in the religion of Christ. When Hartmann asserts that in an age which is being increasingly secularised, Christianity will become "what it exclusively was at its origin, the best consolation of the poor and wretched," yet confesses that "only slowly and gradually can the power of an idea so great as the Christian be broken," he is really bearing testimony to the fact that Christianity meets the deepest needs of the human race, and prevents men from entertaining a philosophy of despair. And the following words from Amiel's *Journal Intime* may be well contrasted with this contemptuous reference of Hartmann to the Christian religion:—"This orgie of philosophic thought" (says Amiel, so he describes pessimism), "identifying error with existence itself, and developing the axiom of Prudhon, 'Evil is God,' will bring back the mass of mankind to the Christian theodicy, which is neither pessimist nor optimist, but simply declares that the felicity which Christianity calls eternal life is accessible to man."

22. Faith in a future life—or the hope of a future existence, *i.e.* of a timeless, ideal progress for the individual and for society—is an essential factor of consideration when we ask the question, Is life worth living? And in the Christian religion this fact of "immortality" becomes (though still girt about with much necessary mystery for finite minds) a stimulus and hope of great motive power and consolatory influence. Mr. Sully seems to me to make a misleading statement when he says that "the thought of a more than counterbalancing good in a future state may, no doubt, if we are capable of a persistent imagination of the remote, help us to bear our present misery, but it does not make this misery one whit less real." When we are "helped to bear" a present uncomfortable condition of things, it surely makes the discomfort, and the perplexity attendant on it, less. And the idea of "a future life" need not be estimated as chronologically remote, for it is connected with a spiritual world which encompasses us, into which we may be at any moment transferred. The modern watchwords of "Progress" and "Evolution" are of very attenuated moral worth as motive, if Death ends all, and if there is not really in store an Ideal Good to which the world-process is being conducted. In the Christian Scriptures a personal hope of

immortality is the crown, and in some sort the interpreter, of the optimistic view of the Hebrew prophets concerning the future of the world under a righteous, manifested Theocracy. But the goal of the personal hope and of the hope concerning the world at large is still the same—a perfected life in a purified Universe.

23. "Philosophy," then, like "Science," terminates in "Religion." And by means of the Christian religion we secure an optimism to which we can hold fast,—not a flimsy, superficial, or one-sided theory, denying or ignoring the fact of evil, but a sobered, practical optimism; in the strength of which, men can hope on, and work on, confident that although man is strangely *πλημμελής*, sin, which is the only essential evil, is abnormal, and that the end and final cause of the created Universe is Harmony; not "the primitive harmony of the Unconscious" (a lame and impotent conclusion, which makes life and the world an illusive passage from nothing to nothing!) but the divine harmony spoken of by Paul of Tarsus when he says that God shall be all in all. He who holds this before him as the *terminus ad quem* of all hope and effort can never cease to be a "practical optimist."

24. For "practical optimism" is not a complacent setting aside of effort. It is, to quote Mr. Sully's words again, not "the unqualified optimism" which makes "a mere rosy image of life," and "tends to paralyse the loftier and more arduous varieties of human effort," but it is a view of life, and of the course of the world, which asserts that "life is as good as it can be, *provided we make the best of it.*"

THE CHAIRMAN (Mr. D. Howard, V.P.C.S.—I am sure all will accord the Author their best thanks for this paper;—it is a curious phenomenon of the progress of science and education that such a paper as this, containing a clear and distinct exposition of the real facts of the case with regard to optimism and pessimism, should be needed, and should indeed be regarded as a matter of great practical importance at the present day; and yet, so it is. No doubt, in some cases, the result of our boasted science is to go back to the old longing for *nirvana*, as if the last hope which the nineteenth century can give is an escape from life as from an evil intolerable to those who have to endure it, although it be but a mere phantom with no real existence; and yet, when we study the writings of those who adopt these ideas, we see that they are all put forward in the name of science; but how scientific men can refuse, as these do, to take due cognisance of the facts of science I cannot conceive. Who, let me ask, are the pessimists of the present day? Buddhism, we know, is a pessimism of the most advanced type; but is it the most miserable who are the

Buddhists? There is plenty of misery here in London, and it is certainly not the Buddhist who is most miserable. These pessimistic views are the luxury of the rich, of the very affected and the very pampered class of Sybarites, who consider indulgence in pessimism a matter of enjoyment. It strikes us as a strange and curious phenomenon to witness these things, and one can but wonder how on earth such people are not practical optimists; they love life only too well, and yet they like to make us believe that they hold the pessimistic view of existence. To many of us, it is a startling thing to remember that such an exposition as we find in this paper is really needed. Hartmann confessed that Christianity is "The best consolation of the poor and wretched," and so it really is; and if we study the life-history of the inhabitants of London, we shall certainly find that now, as at all times, it is the idle, the rich, and the luxurious who are the pessimists, while the poor and miserable, to whom eighteen hundred years ago the gospel of Christ was given, are those who regard it as their chief hope and blessing.

Captain FRANCIS PETRIE, F.G.S. (Hon. Sec.).—Among the letters received from those unable to be present this evening is one from Dr. Harold Browne, Bishop of Winchester, who says:—"I have read Canon Saumarez Smith's paper with great interest. I think it very able and good."

Mr. P. VERNON SMITH.—I do not think it possible to express a different opinion from that which has been put before us in the very able and interesting paper which we have just had the privilege of hearing. Consequently, what remains to be said must, like the remarks which have fallen from our Chairman, be merely in illustration of what the lecturer has put before us. Proceeding on that line, I would venture to call the attention of the members of this Institute to a passage that was brought to my recollection by glancing at the paper before I came here. It is contained in a book, entitled *Reasonable Apprehensions and Reassuring Hints*. Among the "apprehensions" with which the author deals is one which he says must strike everybody as being put forward as an objection to Christianity by all who look at the problem apart from Revelation. He asks, "Can man from nature arrive at any definite conclusions, any trustworthy indications, as to the disposition, the benevolence, or the malevolence of the Creator towards the creatures of His hand?" This question must, I think, bear very clearly on the question of optimism or pessimism, because if we admit a Creator, and if He be a benevolent Creator, we must take up the optimistic view; but if, on the other hand, He is a malevolent Creator, we must suppose the state of things He has created to be otherwise than optimistic.

Canon W. SAUMAREZ SMITH.—I am very much obliged to those who have spoken in regard to the line of thought I have followed in my paper. The quotation of my cousin, Mr. Vernon Smith, was very apt and remarkable, and what our Chairman said at the beginning of the discussion was very much in illustration of the ineradicable truth which resides in the contest between persons who are either pessimists or not. I think I may say that

the adage about the tendency of bad things towards good really embraces almost all that has been said. We have seen this in nature, and in the lessons we are able to draw from our own experience, as well as in those we have derived from the Hebrew and subsequent revelations. I refer to the proverb, *mors janua vitæ*—death is the portal of life.

The Meeting was then adjourned.

ORDINARY MEETING, DECEMBER 6, 1886.

PROFESSOR G. G. STOKES, D.C.L., P.R.A., PRESIDENT,
IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following paper was then read by the Rev. R. Thornton, D.D., V.P. the author being unavoidably absent in the United States.

*THE RELIGIOUS BELIEFS AND TRADITIONS OF THE
ABORIGINES OF NORTH AMERICA.* By the Rev.
S. D. PEET, Editor of the *American Antiquarian*.

THE traces of Bible ideas in the aboriginal religions of America is the subject of a recent paper by the Rev. M. Eells.* It is an interesting subject, and one on which he is well qualified to speak. His acquaintance with the languages and traditions of the North-west is quite complete; at the same time his reading has extended over the wide field of American archæology and ethnology. In this article he does not confine himself to personal observation, but quotes largely from other authors. In these quotations he throws himself upon authorities which are well known, and supplements his own information and investigations by those which have been conducted by others, and gathered into permanent shape by various publications. There is a double advantage in this course. In the first place, it permits him to announce his own discoveries in a modest and unassuming form. In the second place, it enables him to buttress his own positions by the opinions of others, and through this means to exhibit the analogies which exist between the religious beliefs of all the native tribes of America. It should be said that the

* *Transactions of Victoria Institute*, vol. xix.

missionaries among the Indian tribes have great advantages, and frequently find opportunities for learning the peculiar beliefs of the aborigines. It is true that many have failed to improve their opportunities, and have very strangely remained in ignorance of the very systems of thought and of ethnical religion which are so prevalent around them. Mr. Eells has, however, taken the pains to investigate the traditions and customs, and has brought out from time to time a considerable amount of valuable material. This is fortunate, for the opinion is held quite extensively in this country that the missionaries are poor authorities on ethnological subjects. It is not an opinion which is justifiable, for there are very many scholars among these Christian laborers, and some of the very best contributions to the science have come from them. The many translations of the Bible into Indian are monuments of industry. These translations were many of them made at a time when there were no ethnologists in this country, and had it not been for their self-denying and scholarly labour there would be no record of the state of the native languages at the time.

It is a remarkable fact that the Indian Bible which was prepared by Rev. John Eliot in 1661 is now, not only very scarce, bringing fabulous prices, but the persons who are able to read it are still more scarce. The Dakotah dictionary of Rev. S. L. Riggs is an extremely valuable work, and the only one which has ever been prepared on that stock of languages. In this department, the labors of the missionaries are appreciated, but in the line of mythology and comparative religion there seems to be a strange lack of confidence. (1) It is said that they do not discriminate between the native traditions and those which have been borrowed. (2) The attitude of the missionaries toward their superstitions have the effect to make the Indians reticent in reference to their belief. (3) The missionaries are never allowed to enter into the sacred feasts or religious ceremonies of the pagan Indians. (4) The questions which are presented to the Indians are very likely to bring back a response which is deceiving, and on this account the missionaries are likely to confound the native ideas with those which reflect their own thought. (5) The teaching of preceding missionaries has had a tendency to confuse the natives themselves, and they are quite likely to mingle the Bible stories with their own traditions. On these accounts, ethnologists are inclined to reject the testimony of missionaries in reference to traditions. It is a question, however, whether there are any better authorities. The following

are the sources of information concerning especially the traditions of the uncivilised races:—(1) Indian interpreters, camp retainers, and private adventurers; (2) there are many persons who have occasionally come in contact with the Indians, as travellers or explorers, or as newspaper correspondents, who have furnished a small amount of information concerning these native traditions; (3) a few military officers, especially surgeons, have made a specialty of the subject, and these are generally very reliable: among the number we are happy to give the name of Dr. W. Matthews, U.S.A.; (4) the Ethnological Bureau and the Peabody Museum have employed certain parties who have made their home among the aborigines, and have taken pains to learn all their traditions, and to become acquainted with their customs and tribal organisms: among those who have succeeded in penetrating the mysteries two persons should be especially mentioned, Mr. Frank Cushing, of Washington, and Miss Alice M. Fletcher, of New York; (5) another source of information is represented by a class of educated gentlemen who have, by their circumstances, been thrown into contact with the natives, and who have taken up the study of tradition and have written monographs: among these should be mentioned Stephen Powers, of Ohio, and Judge Rose, of California; (6) the papal missionaries, who were formerly located among the Indians, have furnished many reports which are now very valuable; (7) the Protestant missionaries who are now labouring among the various tribes.

These authorities are remarkably agreed in their evidence, so that we are quite sure that we are getting the traditions into a reliable shape, and can speak intelligently as to the religious beliefs of the Aborigines.

On this subject there is much to say, but we shall be obliged to condense what we have to say into the smallest compass.

I. There are some very remarkable coincidences. It is but a few weeks since I had the opportunity of listening to a gentleman who had spent forty years as a teacher and Indian agent among the Chippewas. He held exactly the same views that Rev. Mr. Eells does. He said that he had been surprised to find so much correspondence between the teachings of conscience, as exhibited by the rude savages before they had been trained or even affected by missionary labour, and the teachings of the Bible. He had noticed this among the pagans as often as among the Christian Indians.

The Chippewas hold the opinion that the "ancient people," the ancestors of the ancient tribe, were far advanced

in their information, and a decline had taken place. It is a common custom with the chiefs to refer to the "ancient people." The common response to the preaching and teaching of missionaries is, "This was the belief of our ancestors," and it is represented that they taught exactly the same doctrine and truths. This gentleman made the same division of the subject that Rev. Mr. Eells does. There are four or five points on which both missionaries seem to be agreed. These are:—(1) The idea of the Great Spirit is a proof of the knowledge of the existence of God; (2) the view of the Indians concerning the future state is a proof of the belief in immortality; (3) the various superstitions of the Indians show that they all have the sense of sin; (4) the prevalence of sacrifice shows that the same doctrine of atonement or expiation for sin by sacrifice was common among these tribes. These four doctrines—the existence of God; immortality of the soul; the sinfulness of man; and the necessity of sacrifice;—seem to be held in various modified forms by all the tribes in North America. The researches of Rev. Mr. Eells have been among the Nez Percés, those of Rev. S. L. Riggs among the Dakotahs, and those of Mr. Williams, the gentleman referred to above, among the Chippewas. These embrace three of the great aboriginal families of the North, mainly hunters. The testimony of these gentlemen shows what was common among the hunter races.

Other authorities might be cited to show that the same opinions were held by the agricultural races; and still others to show that similar opinions were held by the civilised tribes. The testimony which comes to us from so many different sources proves to a certainty that these ideas were prevalent with the native mind. It has been disputed whether the Indians really hold to the doctrine of a "Great Spirit," but the quotations by Mr. Eells are very numerous and from many different authors, and show that this was common. The term Great Spirit is not one which comes from "accommodation" to the whites, but is used by them to express a common belief. This idea seems to have been fundamental, and is a result of the teachings of nature. The clear apprehension of the character of God we should not expect, but the conviction that there was one great being whom the Bible calls God seems to have been universal with the American tribes. It is sometimes said that monotheism is a late product of thought, but here is another case where monotheism proves to be a primitive belief. It has also been doubted whether immortality was a primary doctrine. Some have said that it does not appear even in the Old Testament.

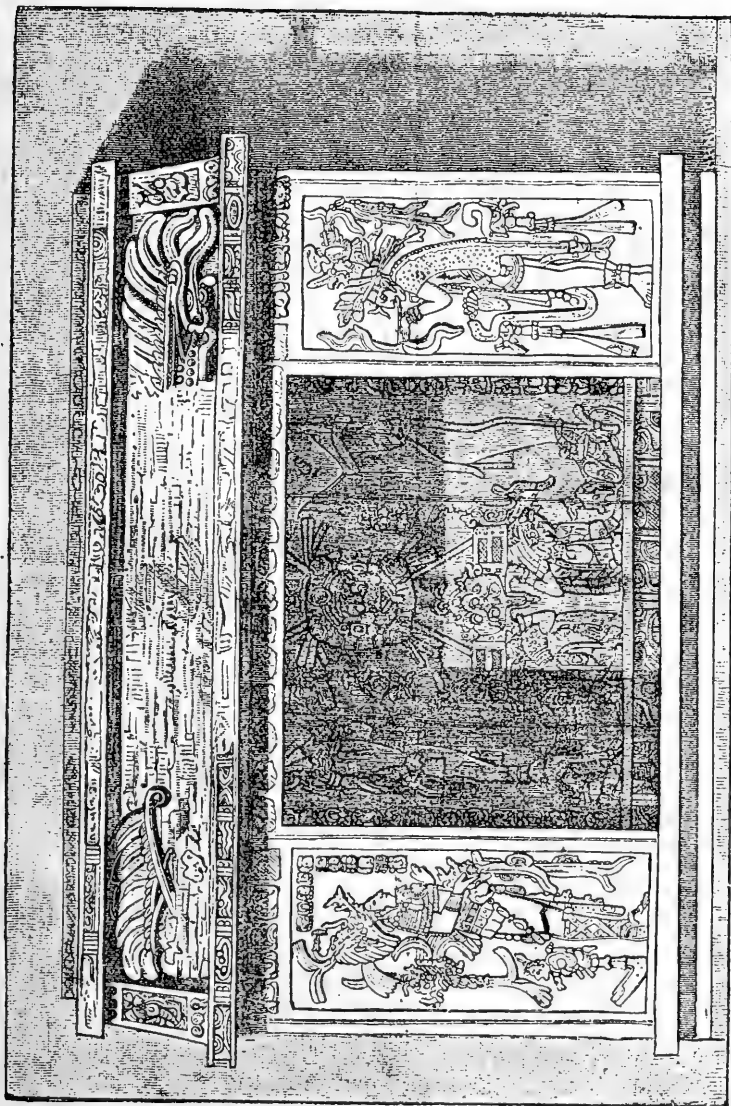
But a modified belief of immortality is very general among these rude tribes. So with the sense of sin and the doctrine of sacrifice. These are taught by nature. They are not the last products of Christian civilisation, but are found in the low stages of savagery. The ethnic conscience seems to point to the same beliefs and doctrines as fundamental in the Bible, and in the natural constitution.

II. The classification of the native religions is very suggestive. These religions may be divided by geographical districts into several classes. (1) Shamanism. This is the religion of the Eskimos, Aleutians, and many of the hyperborean tribes. It is peculiar to the fishermen of the north, and is seldom found among other tribes. (2) Next to this is Animism. This is more common among the hunters than any other class. It is found in its highest stage of development in the tribes which formerly inhabited the whole region which lies between Hudson Bay and the chain of the Great Lakes. It is a system which makes its abode in forests and amid rocks, and is a powerful superstition. (3) Animal-worship is another system. This prevailed among the people which were given to the mingled hunting and agricultural life. It was most powerful among the tribes which formerly had their habitat between the chain of the Great Lakes and the Ohio River, and in the same belt of latitude as one goes farther west. (4) Sun-worship of an inferior kind was prevalent among the tribes south of this belt, including the Mobilian tribes on the Gulf Coast, and the Pueblo tribes of Colorado, Arizona, and Utah; also in Peru. It was also prevalent among the Mound Builders. (5) The Elemental worship, which included the rain, lightning, the god of death and of war. This was common in Mexico and New Mexico. (6) Anthropomorphism, a religion which gave human attributes to the divinities, but assigned to them supernatural powers. This prevailed in Central America.

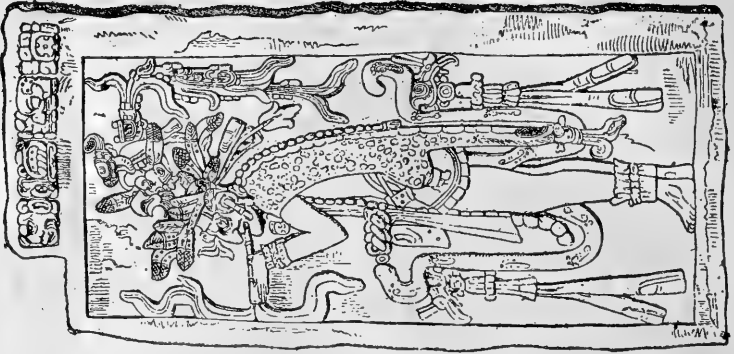
These were the different religions which existed among the civilised and uncivilised tribes. Is it not surprising that, under such elaborate and well-organised systems, there should have been so much of the natural effect of conscience? most authorities agree on the point. Notwithstanding the superstitions which prevailed, and which resulted in so intricate ceremonies and mysteries, the individual conscience maintained its force, and often asserted itself in expressions which are quite marvellous in their resemblance to the thoughts contained in revelation. These are not the results of education, nor are they taught by a priesthood, but they come from "primitive beliefs."

III. The symbolism of America points to the same truth. This symbolism is worthy of study, because it reveals beliefs which prevailed among the prehistoric races. A remarkable and complicated system of symbolism was spread over the continent corresponding to the traditions of the later races, showing that there were many religious ideas among the prehistoric races which have survived to historic times. We trace in the symbols the various forms of religion which existed before America was discovered, but in the customs and tradition of the natives we recognise the very ideas embodied in the monuments. The symbols of Central America (and the Ohio valley and Mexico also) are most elaborate, and these are especially worthy of study. Here animal forms, elemental powers, human attributes are all combined in the idols, showing that the divinities had a very complicated character. We see sculptured tigers covering human faces; we see also sun-symbols attending serpent figures, and in the midst of both are human faces; we see also crosses wreathed with serpents, surmounted by birds, and before the crosses human forms offering sacrifices; we see human figures with animal skins and serpents twisted about them, but their faces are distorted, and every part full of a strange and mystic significance; we see columns or pillars elaborately decorated and sculptured, altars highly ornamented, temples with façades wrought into strange symbolic shapes, and many other forms of art and architecture all expressive of the religious thought of the people. The anthropomorphic character of the worship is seen in the human face, as every part of the face was made to express a thought and to symbolise a divinity. The tongue symbolises the sun, the eye symbolises the rain, the cheek symbolises the drought and famine, the hair and ornamentations on the head symbolise the lightning. A wonderful system of nature-worship, which combined personal attributes, animal figures, and elemental powers all in one, appears to have embodied itself in these symbolic shapes.

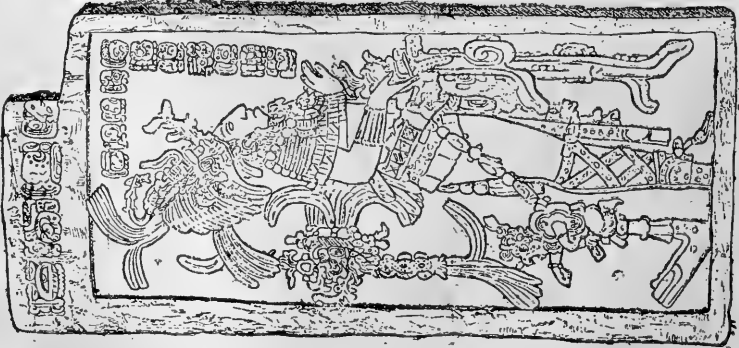
Take, for instance, the bas-reliefs of the Temple of the Cross at Palenque, and see how nature-worship expresses itself there. Here is the cross with its four points of the compass, or the four winds, with its arrow signifying the lightning; the thunder-bird surmounting it, and, before the cross, a priest offering a child, or the figure of a child, in sacrifice. Before the cross, on the façade of the temple, is the statue of a human figure finished in the round, but covered with symbols which are peculiarly significant and expressive. Take the Temple of



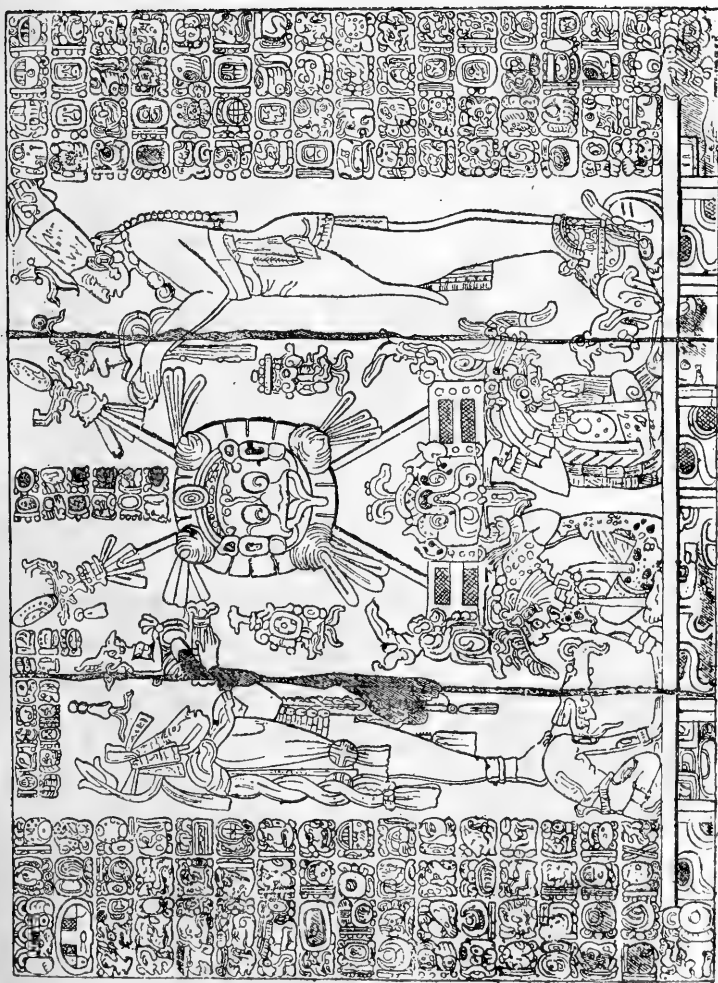
THE AUDITORIO, OR SHRINE TO THE SUN, IN THE SUN TEMPLE.



THE RAIN GOD OF THE TOLTECS.



THE WAR GOD OF THE TOLTECS.



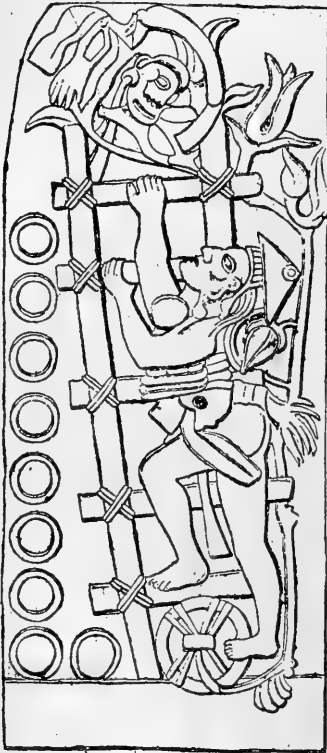
THE SUN GOD SUPPORTED BY RAIN GODS.



THE SACRIFICIAL STONE FROM MEXICO.—THE FACE OF THE
SUN IN THE CENTRE.

the Sun (*see plates*), and see the mask, or human face, which hangs suspended on the wall, back of the shrine or altar. Here is the round face which symbolised the sun, the projecting tongue to symbolise the power of the sun. In front of the Oratorio, or chapel, on the piers, are the bas-reliefs which represent the nature-divinities. Here is the rain-god on one side and the war-god upon the other. Notice, however, that the rain-god is marked by a peculiar form and face, the chief feature being the open, bulging eye. Here we have a specimen of nature-divinity, but there is ascribed to it all the personality that it is possible to express by the human face or by the human eye. The tiger-skin on the back of the rain-god represents the animal attributes, but the human face represents the personal attributes. The same eye will be recognised in the face of the sun and in the faces of the figures below the sun, showing that all the powers of nature were personified. The rain-god has in his mouth the pipe or tube through which he blows the winds, and in front of his person may be seen the feathered serpent which symbolises the lightnings which obey his will. Above the piers on the façade is the winged circle which signifies the cloud, and the rain the overshadowing divinity of the sky. The Temple of the Sun is full of the emblems of personal power, and illustrates how intensely the artists struggled to express the attributes of the personal divinity which ruled the powers of nature. I cannot look upon these figures without being impressed with this thought, that there was a personal divinity which looked out from the faces and the forms, and that the people were impressed with the power of this divinity. Here, then, we have *the first doctrine embodied in Scripture, the existence of a personal God*. It is a principle of henotheism that one divinity rules at a time, the conception of that divinity absorbing all thought and feeling. If henotheism existed in Central America, it was henotheism which reached the anthropomorphic stage, and was as expressive of personality as was ever the same system in the classic regions of the East. We do not maintain that monotheism existed among the Toltecs, but we think that all this imagery, which is so elaborate, was only the expression of the feeling which is very strong in every human heart, that there is a God above us to whom we are accountable, and on whom we depend; and though the mind was beclouded and the religious consciousness overshadowed, yet, amid the symbols and ceremonies of this strange nature-worship, the conscience struggled to express itself, and to make known the true divinity. The doctrine of

immortality is not without its witness also. In the sculptures of Santa Lucia Cosumal-whuapa, in Guatemala, there are figures which express this thought. Take this one. Here is a



ladder reaching upwards toward the sky. On the ladder is a human figure climbing; above the ladder is a death's head with human arms attached; the head seems to smile upon the human figure; the human face looks up with a mild and placid expression. Here there is no fear of death, but a climbing to immortality. Here is another tablet. On one side is a face which smiles out from the sky above; it is surrounded by flames, symbolic of the sun; serpents form its head-dress symbolising the lightnings; many other figures symbolise the nature-powers; below this face is a human form, one hand lifted as if in supplication, another hand outstretched as if to betoken some offering. The upturned face has the symbol of speech protruding from the mouth. There are many symbols on the person, but the expression of the form and face is

that of a suppliant addressing a gracious God. Nothing could better express the hope of immortality. Take next the doctrine of sacrifice, and you will see it embodied in the sacrificial stones and the many other provisions which were made. The temples and altars and pyramids are full of them. Take next the doctrine of sin, and you will find that there are baptisms and lustrations, as well as sacrifices (even circumcision was common),—a marvellous resemblance to the Jewish ritual. All of these are the concomitants of nature-worship, and whatever their source, they show that the same ideas of the need of a sacrifice and the importance of a cleansing prevailed among the religions of the Toltecs, Aztecs, and other civilised American races. The symbols in Central America remind us of the symbols of Egypt, Assyria, and

India; but the ceremonials remind us of the ritual of the temple in Jerusalem, and the circumcision, baptism, and other rites impress us with a very strange sense of recognition. We are greatly amazed as we think of the resemblance, and do not wonder that the superstitious Spaniards went to work to destroy these symbols of worship, thinking that the devil had counterfeited the Bible and presented it to these barbaric races. The Orientalists look upon the hieroglyphics of the East and study for words, but they do not often find in mythology, archæology, or philology, such striking resemblances to the Jewish ritual as we in America do in these very barbaric ornaments, symbols, and ceremonies of the American Aborigines. Many of the Orientalists reduce the religious symbols, myths, and expressions of the eastern races to an allegory, and recognise in them a primitive sun-worship. In this way they interpret Egyptian, Hindoo, and Scandinavian mythology, but in America the sun-worship is on the face of things, and the moral or personal conceptions are in the background. The sacrifices are in their details appalling and full of cruelties, but the superstitions at the back of them point to a fearful sense of sin. The personifications which are common among all the tribes of America and the mythologies which are full of personal exploits, show that the divinity in America was always regarded as a person. We have no "bright heavens," no All-father, no "shining sky," no "thundering Jupiter," no "mighty celestial power"; but the divinity is a hero with divine attributes and supernatural powers, or an animal with human attributes. It seems sometimes as if the "culture-heroes" were all of them of the same general character, full of remarkable exploits, possessing natural traits, but endowed with supernatural powers. We cannot dwell now upon the culture-heroes who introduced civilisation, but will only refer to them briefly. The White-God of the Aztecs, Quetzalcoatl, the bearded god of the Toltecs, the Manco-Capac of Peru, Virococha of Quito, the Montezuma of the Zunis were all personal divinities. Below these, among the wild tribes, are divinities with human attributes and with human history. The Mano-bozho of the Mandans, the Hiawatha Atotarho of the Iroquois, the Glooskap of the Abenakis, the Michabo of the Algonquins, the Ioskeha of the Hurons,—all had human attributes. Other divinities were prevalent among these tribes, but the chief Law-giver and controller of the tribes was a culture-hero. Still lower than these was the animal divinity who was the creator or restorer, but who was represented as the great "master of life." The conception of

the divinity varied according to the cultus of the people. The culture-hero was the divinity of the more advanced tribes, but an animal divinity was the master of life with the more degraded tribes. Dr. D. G. Brinton, of Philadelphia, a great authority, thinks that all culture-heroes were personifications of the sun-divinity; but he has taken some examples from tribes which had not reached sun-worship, and therefore is mistaken in his interpretation. They were divinities which possessed human attributes, and it is gratuitous to identify them with nature-powers, for some did not even symbolise these powers. The animal divinities, also, had personal attributes, and many of them had a history which was almost as human as the culture-heroes. The Coyote, the Wolf and Dog of the Chinooks, the Serpent of the Pecos, the Raccoon of the Navajoes, the Eagle of the Pimas, the Hawk of the Californians, the Grizzly Bear of the Mount Shastas, the Raven of the Thlinkets, the Dog of the Tinnehs were all supernatural beings whose work was to create or to restore, and who assumed control over other animals by their supernatural powers as well as by their human intelligence. This element of personal character which is so frequently ascribed to animal divinities must have come from the *religious consciousness*, and not from any elaborate philosophy. It takes a great deal of study to trace any analogy between the animal divinities and the sun or nature-powers; but a very primitive fancy was enough to personify an animal, and make it represent a divinity with human attributes. The attempt to *naturalise* the human divinities and culture-heroes breaks down, but the work of humanising animal divinities is done for us by the natives already. Take the adventures of any one of these "culture-heroes" or "masters of life" which bears an animal name and semblance, and see how much of the human element there is, and how little of the natural. The imagery is always expressive of the habits of the people: bows and arrows, canoes, caves, trees, lodges, medicine-bags, villages, islands, lakes, mountains, forests, fire-brands, waves, salt water, river banks, and a thousand things which are familiar to the savage and hunter tribes are mentioned when telling the story of their animal divinities. There is a different framework for the culture-heroes, which bear personal names. Here there are council-houses, conversations, hours of meditation, and many other scenes which indicate a contemplative and purely human condition.

Personality was ascribed to all the divinities. Even the fetiches, which were mere stones or sticks of trees, had personal qualities, and were supposed to be possessed by

spirits resembling human souls. The animals were also personified, and were regarded as human personalities. The myths and poetic stories always represent the animals as if they were human beings. There are myths in which the animal divinities and human divinities are associated. Sometimes the animal is supreme and sometimes the human deity is supreme. But in the narratives the adventures of the one are quite similar to those of the other, and transformation frequently takes place. This idea of personality is as common in America as in Africa. It is a prominent feature in American mythology.

IV. The religion of the aborigines of America had one quality which we must consider. The far-off, the mysterious, the incomprehensible, the wonderful, the unknown are always suggestive of divinity. It would seem that all the divine attributes were condensed into this. Whatever had this was divine. It might be a stick or a snake, a tree or a stone. If it was strange and *outré*, it was regarded as "a Manitou." This was the nature of superstition. It magnified the shadowy; it deified the wonderful. If an object was mysterious, it was sure to be worshipped. The dark rock, the rapid stream, the shadowy cave, the over-hanging forest, the swift lightnings were worshipped for no other reason than that they were mysterious. The animals which were wild and weird were always exalted to the level of supreme deities. If they were subtle and stealthy, and held themselves aloof from men, they were feared. They were the greatest deities because they were mysterious. It was on this account that the Coyote, the Eagle, and the Hare were chosen to represent the supreme divinity. These creatures were wary and wild, and far off from man. They roamed the forest, cleaved the air, hid among the rocks, and were full of mystery, and so were regarded as superior. These were the chief divinities of the hunter races. It was on this account that the nature-powers were worshipped. These were the divinities of the civilised races. Every element that was mysterious, incomprehensible, or full of power was exalted to the level of a supreme divinity. Even the human personalities which figured so conspicuously in the systems of the Toltecs and Aztecs were worshipped as supreme because of the mystery which surrounded them. The White-God was mysterious. He came from a far-off country, and went away again. His advent and his departure were enveloped in mystery. He was a Melchizedek in disguise. His character was different from every other person. He suffered for his people, and secured good for them, but

was overcome by his enemies, and retired. His return was hourly expected. He was the Christ of the American races. He was not Hercules, nor Dyonysus, nor Apollo, nor Mercury. He was more like Christ than any of these, but he was very mysterious. Some say that he was an historic personage, a Buddhist priest; others that he was a personification of the sun; others that he was a pure creation of the fancy;—but, whatever he was, he bore a remarkable character. His moral attributes were, unlike those ascribed to the other divinities, certainly in contrast to those possessed by the other nature-divinities. Strangely enough this culture-hero was driven away, and the nature-gods took his place. Where did this idea which is so much like the Christ come from? Was it brought in from another continent, or was it the product of the native thought and conscience? The Bible idea was not totally unknown, for the Toltec divinity, in his life and character, has a wonderful resemblance to the promised Messiah.

V. We now turn to the main question, and shall, by quoting the opinions of others, suggest an explanation. There are many writers who have given opinions upon this question which are worthy of regard. Some of these writers are mere speculative thinkers, but others have based their opinions upon facts, rather than upon theories. The ethnic religions of the earth have been studied attentively, and among them those of the native races of America have gained prominence. Perhaps they have not been treated as fully as they should have been, but they are at least taken into the account.

The religious sentiment is the first object of thought. This is a mysterious power in nature. The question is, in what way this sentiment first expresses itself.

On this point there seems to be a great diversity of opinion. Caspari says that "Parents, chieftains, and sages were the first objects of religious reverence and homage." Jules Baissac, on the other hand, concludes that the generative principle was the beginning. Motherhood was deified. Next to this the male principle, and after that the phallic worship was the form which the religious sentiment took. Comte takes the ground that the earliest attitude assumed by the mind in interpreting nature was a fetichistic one. Spencer, however, thinks that the very fact that the first man could easily distinguish animate from inanimate objects would refute this, and takes the position that animistic and fetichistic beliefs were not primary beliefs. De Brosses and Tiele assert

but Quatrefages and Tylor deny the primitiveness of fetichism or animism.

Darwin conceives the *first men* to be capable of rising in thought above the knowledge furnished by the senses. He says that the same *high mental faculties* which first led men to believe in unseen spiritual agencies, then in fetichism, then in polytheism, and ultimately in monotheism, would infallibly lead him, so long as his powers remained poorly developed, to various strange superstitions and customs. These are aberrations of the human intellect, but they show the *loftiness of man's powers*. Lubbock also ascribes to the *earliest men* a like ability to *conceive* of the *super-sensual*; and Tylor says, that "high above all the doctrines of souls, of divine manes, of local nature, spirits, of the great deities, of the elements, there are to be discerned in savage theology *shadows quaint or majestic of the conception of a supreme deity.*" He says also that the races of North and South America, of Africa, of Polynesia, recognising a number of great deities, are usually considered polytheists, yet their acknowledgment of a supreme creator would entitle them to the name of monotheists. Max Müller takes the ground that fetichism itself points to *antecedent ideas* which give force to the fetich.

The great objection to these views is found in the low morality of the native religions, but it should be added that the character of the deity partakes of the character of the worshippers. The ideas of morality among the natives of America are quite low, but their divinities compare favourably with others. There were many deceptions practised by the gods, and occasionally a deed of lust appears in the record. Yet they never equal the amours of the classical divinities, and the deceptions, if compared with those of the Scandinavian, are harmless and without malice. The sacrifices which were introduced by Montezuma, the King of Mexico, were cruel and bloodthirsty; but so were the sacrifices of the Phœnicians. Cannibalism existed in America, but there was a peculiar superstition about it. It was to secure the bravery or the virtue of the victim that the people ate his flesh. Phallic worship prevailed to some extent on this continent, but never reached the base degradation which was common in the East. The worship of Bacchus never prevailed to any extent here. We do not claim for the divinities of America any quality of holiness; but there was often a benevolent disposition in them which was quite remarkable amongst such a race. The White-Gods and the culture-heroes were the embodiments of lofty and majestic purity, of self-denial for the good of others, and

of benevolence, so that we may say that an approach to the high standard of character which appears in the Bible is here found. We do not say where this standard came from, but only state that it was here.

The two sides of the aboriginal religion are in great contrast. The Divine side is always advancing towards a better moral standing, and is full of good. But the human side is always retrograding into a very inhuman and gross superstition.

VI. The closing thought of this paper is the most important. Was there any historic connexion between the aboriginal religions of America and the teaching of the Bible? On this point we will not give a decisive answer. There are evidences for and against the position. The common opinion or train of thought of American ethnologists is in favour of the autochthonous origin of everything which is native American. Yet there are many things which go to prove the contrary:—

1. There are many symbols in America which are analogous to those in the East; symbols which remind one at once of those mentioned in the Bible. (*a*) The cross or sacred Tau of Egypt is found in America. It assumed not one form, but many. (*b*) The serpent is a very common symbol. (*c*) The tree; this with the serpent reminds us of the Garden of Eden, and of the serpent and tree-worship so widely spread over the world. (*d*) The symbol of the ark. (*e*) The symbol of the cloven tongue reminds one of the confusion of tongues. (*f*) There are towers or pyramids around which traditions hang reminding one of the Tower of Babel.

2. There are customs in America which resemble the common customs recorded in the Bible. (*a*) Circumcision was practised. (*b*) There were baptisms and lustrations which remind us of the Scripture rites. (*c*) There were vestal virgins, and the custom of burying alive those who had violated the vow, reminding one of the custom which was common in Rome.

3. There are many traditions which remind us of those found in the Bible. (*a*) The tradition of the Creation. (*b*) The tradition of the Flood. (*c*) The tradition of the Dispersion of the race. (*d*) The tradition of the incest of Lot and his daughters, with the reproach upon the origin of the Moabites. These have their correlatives in the mythologies of America. We do not say that they are the same traditions, or that the American tribes derived their ideas from the Bible, or even from any one who was familiar with

the Bible. We only say that these events are recorded in the native traditions of America and in Bible history. The cosmogonies in America are generally local, or associated with local surroundings. The imagery is local, the deluge is also local. There are mountains which have traditions of the Deluge connected with them—American Ararats. But the persons saved were the ancestors of particular tribes. There are also “arks,” but they are the “big canoes” in which the “medicine-man” came over during the flood. There are traditions of the world being repopled, but it is repopled by the ancestors of particular tribes.

The truths which are embodied in the native traditions are very similar to those found in Bible history, proving, perhaps, some common origin long ago, but the imagery is in great contrast. One of the most remarkable coincidences which we have noticed is found in the Tale of Incest, which has just come to light as a tradition of the Navajoes. This story has been published in the *American Antiquarian*. The story is adapted to the Indian customs in its details, but the general purport of it and the reproach which was brought upon the Utes as the fruits of the incest remind us of the reproach which the Jews brought upon the Moabites because of the incest of Lot. Dr. Washington Matthews, who has furnished me with a copy of the myth, says there is no doubt of its pre-Columbian or prehistoric character, and has referred to the remarkable resemblance which exists between it and the story in the Bible. The fashion is to explain away all these resemblances to Bible stories, but they seem to be accumulating more and more; and it is among the possibilities that by-and-by the evidence will be so overwhelming that it will convince the most sceptical. For the present we only refer to the general resemblances and the correlation between the facts and truths found in the traditions of America, and those which are so marked in the Bible record, and leave others to decide whether these coincidences could be produced by any law of ethnic development, or by any other cause than that of an historic connexion.

THE PRESIDENT (Professor G. G. Stokes, M.A., D.C.L., P.R.S.).—I have to ask you to accord your thanks to the Author of the paper and also to Dr. Thornton, for having delighted us all by the manner in which he has kindly read it.

REV. R. THORNTON, D.D., V.P.—I have read Mr. Peet's paper with very great satisfaction, because it is one which asserts most definitely, and proves most convincingly, the great truth that there was a primeval revelation given to our first parents and handed down more or less authoritatively—

generally less—to all the races of the earth. We hold that that revelation was given, in its perfect and written form, by Moses to the chosen people of God ; but we are not, therefore, necessarily to suppose that other peoples and nations were entirely unaware of the existence or the attributes of God. On the contrary, the Great Father of all did not leave them without all knowledge ; there was a tradition of some kind, and it is apparent that the remarkable traditions of these North American Indians were simply corruptions of that original revelation. I have said here before that I hold very firmly the doctrine that the primeval tradition was known to the ancestors of that race, and I hold this doctrine none the less firmly because the other day I saw, in a sceptical book which I looked into, the notion of the primeval tradition scouted as one which a sensible man would not entertain : now, when a sceptic, dealing with a proposition he is unable to refute, says “none but an idiot would hold it,” that seems to me a very strong argument in favour of its not being capable of refutation. We have, I think, often had pointed out to us here, the wonderful coincidence there is between the recorded tradition, as we have it in the Scriptures, and the form in which the original tradition has been handed down to different peoples in different parts of the world. These are very important facts, and I cannot see how any person before whom they are put can resist the conclusion that there must have been a real reason for the similarity found to exist between superstitions and traditions, such as the author of this paper has dealt with, and our own record. In point of fact I think that with regard to these, and not only these but a number of coincident traditions, one can scarcely resist the conclusion that all the races of man sprang from one family, and from one pair, as recorded in the Mosaic Scriptures, and that they have all retained, in some form or other, that Revelation which the Creator of All originally delivered to them. (Applause.)

The Meeting was then adjourned.

ORDINARY MEETING, FEBRUARY 7, 1887.

PROFESSOR G. G. STOKES, M.A., D.C.L., P.R.S., PRESIDENT,
IN THE CHAIR.

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

ASSOCIATES :—Rev. J. Hodgson, M.A., F.S.A., F.G.S., Stourbridge ; Rev. W. F. Stokes, M.A., Ireland.

The following Paper was then read by the Author :—

ON THE BEAUTY OF NATURE. By the Right Hon.

EDMUND LORD GRIMTHORPE, LL.D. Q.C. F.R.A.S.

HAVING been asked to contribute a paper to your Transactions this year, I have looked over your subjects since the one I wrote in 1884, entitled, "How did the World Make Itself?" and I find that I shall be repeating nothing that has been written since, if I extend the few remarks I then made respecting the beauty of nature as a general phenomenon, wholly unexplained by any of the spontaneous evolution theories ; whether Darwin's, which started from a few unknown primary living creatures ; or Mr. Spencer's, which starts still farther back with what he calls Persistent Force as the origin of all things ; as to which I will only refer to my former paper, and the simultaneous Edinburgh Review of "Spencerian philosophy" in January 1884: to neither of which have I seen any answer, except some insignificant verbal criticism, which signified that the writers could give no real answer.

When I say that the beauty of nature is wholly unaccounted for by those theories, and every materialistic theory, I use those words in the strictly scientific sense. It is too often forgotten, and always suppressed or ignored by the writers of that school, that no scientific theory can be true which is clearly incapable of explaining all the phenomena which must have the same primary cause, though it appears to explain some, and even many, of them ; and no theory of automatic cosmogony does even that. In my little S.P.C.K.

book on the "Origin of the Laws of Nature," I noticed the very few phenomena of beauty in the world for which any evolutionary theory at all has been invented, and I will say a few words on them presently. If they were ten times as many as they are, and if the evolutionists' explanation of them were ten times more certain than it is, the automatic theory would be no more proved than it is, so long as any considerable number of phenomena obstinately stand out inexplicable by it. In every branch of real science—though apparently not in this sham science that pretends to go behind all others—that rule of reasoning is undisputed, and is recognised universally. Here are two well-known specimens of its recognition. The motions of Uranus, for some years after its discovery by Herschel, were so abnormal as to make some astronomers doubt whether the law of gravity was really as universal at all distances as had been supposed ever since its establishment by Newton for all the solar system known to him. And if no cause consistent with the universality of that law had been discovered for the irregularity, that conclusion would have had to be adopted, by reason of that one obstinate exception. We know that a cause was afterwards discovered which confirmed the theory of the universality of the law of gravity instead of shaking it—viz., the existence of a still more distant and disturbing planet; but that does not affect the former proposition. Take a case the other way. The Newtonian or corpuscular theory of light, making it an emission of some physical particles or vapour, as smells are, accounted for all, or nearly all, the phenomena then known. Gradually some occurred which no doctoring of the emission theory would explain; and so by degrees the undulatory theory was established, which does explain them all.

It seems, however, that when we try to investigate the ultimate cause of all phenomena, we are at once ordered to accept a new form of logic and the dogmas of a new philosophy, that some cause which may serve to explain a few phenomena is therefore to be taken for granted as a sufficient explanation of them all, though it is clearly impossible for some of them. Take their favourite instance with reference to beauty. Bees frequent and fertilise some pretty-coloured flowers, though some of their favourite flowers are still the most colourless. Therefore we are to take for granted that the beauty of all flowers, both in form and colour, has been produced by insects admiring and frequenting them. Then for the next step in this new-fangled logic: flowers are vegetables; therefore, the beauty of all vegetables, up to the oak and the *Wellingtonia gigantea* and the big trees of Columbia,

has been produced by insects ; and so toadstools have risen into oaks. At least we have never had any other theory of their beauty propounded by evolutionists. Again, some animals perhaps choose their mates by their beauty (of which there is very little proof) ; and therefore all do ; and therefore beauty has been constantly increasing, from oysters, octopuses, and gorillas, up to whatever creatures you think the most beautiful, by spontaneous generation and mutual admiration ; and the beauty of the human race has been steadily on the increase from the ancient Greeks through all stages of civilisation and improvement up to the modern Irishman. That kind of logic is queer enough when applied to living or reproducing things. But it is still queerer to say that because all these advances have taken place through "natural selection," or some other process or phrase, therefore we must take another leap in the dark and believe that all the beauties of entirely inanimate nature have developed themselves by some yet unnamed process without any assistance from any more intelligent or personal First Cause than Mr. Herbert Spencer's "Parent of all, Persistent Force," in no particular direction, gradually subdividing itself into innumerable streams of peculiar forces, and spontaneously converting a homogeneous nebula of universally dispersed matter into all the present varieties, by what he calls "unfathomable mysteries."

By way of introduction to further reasoning on the subject, I cannot do better than quote again the same words of Dr. Mozley's sermon on "Nature," which I did in the chapter on it in my own little book above named. He says:— "Nature is beautiful by the selfsame materials and laws that it is useful. Take a gorgeous sunset. What is the substance of it? Only a combination of atmospheric laws of light and heat ; the same laws by which we live and see and breathe. . . . Who could have told beforehand that these physical laws which fed us, clothed us, gave us breath and motion, the use of our organs, and all the means of life, would also create a picture?" If any one should say that mere habit and custom have produced our admiration of what we call beautiful sunsets, let us substitute another phenomenon of light, so rare that many persons never see one in their lives, and yet so beautiful that those who see it for the first time are amazed at its magnificence, especially if it happens to be such a brilliant specimen as that which appeared here in October 1870 : I mean the aurora borealis.

I do not know that the evolutionists have really made that or any other answer to that argument of Mozley's ; and yet

that cannot be because they are ignorant of either it or him: he was far too great a writer for that. Moreover, they occasionally show themselves ready enough to swoop down on writers of far less theological celebrity than Mozley, who has been called "the modern Butler," when they see a chance of making capital out of it by exposing some real mistake.

Perhaps you might not unreasonably say to me, "Why need you trouble yourself to prove an undefended case? The Darwins, Spencers, Huxleys, Tyndalls, Hæckels, *et id genus omne*, have practically confessed the beauty of nature to be too much for them, by leaving it to explain itself, with a few insignificant illustrations about insects and flowers. It will be time enough to reply to them when they have answered Mozley and your former remarks." In one sense that is all true. But leaving alone does not propagate truth. If one side is left to go on preaching its own dogmas and keeping discreet silence about objections which they cannot answer, and if the objectors keep silence too, the objections will be forgotten, or assumed to have been silenced, though nobody undertakes to say how, or when, or by whom. Therefore, in short, it does not answer to abstain from repeating the objections to bad theories merely because the theorists abstain from noticing them, as most of this class of theorists do when it suits them; or coolly say that their theory is getting universally accepted.

I have not only looked at the most likely books, but I have asked greater readers than myself, including some with an inclination rather against than in favour of my views, whether they could tell me of any automatic theory of general beauty beyond those oft-repeated ones about flowers and animals, and I have asked in vain.

Let us consider then some specimens—for they can only be specimens—out of an innumerable multitude of natural beauties, which it is impossible to account for by any theory except the simple one that they were designed by some mind which had also the power to produce them, whatever means it worked by. We may be quite ignorant of the means, but quite certain that some means were intelligently used: as certain as we are that the most inexplicable conjuring-tricks are contrived by more intelligence in that matter than we possess ourselves; indeed, the less we can guess at the means of performing them the more we think of the cleverness of their inventors. The only answer that I have ever been able to obtain privately to questions of this kind is the one I alluded to before, and which is worth further notice because the person who gave it me was as capable as any in the world

of giving the best answer that any such question admits of, being one of the most eminent philosophical writers of the age, and not a mere inventor of phrases intended to pass for philosophy with half-educated people who pronounce them "greater than Newton," and their periodicals print such rubbish for them. Probably they could not answer a single question out of Newton in an examination. The answer I got was this: that beauty is merely a question of habit and fashion, and that there is no such thing as absolute beauty, and therefore nature has done nothing for it. That is only another specimen of the common fallacy of that school in these matters, of generalising from a very small or special set of instances, which is directly contrary to the great law of scientific induction. We can afford to admit that our ideas of artificial beauty, such as we try to make for ourselves, are very much matters of transitory fashion, though even that requires some qualification. I need only utter the word "dress," to bring to your minds the very idea of mutability rather than of beauty; and you will need no reminder that we are considering the beauty of nature, and that dress is not natural. Nor is any artificial adornment of the person, or the cultivation of any particular kind of figure, in which one nation, or the people of one age, may admire just the contrary of another, and call that a beauty which some other nation pronounces a monstrosity.

But, setting aside mere dress as an ornament, in which change (with some regard to use and convenience) has long been regarded more than abstract beauty in all the modern nations, I do not think it is true that the taste of civilised nations about the cultivation of what is comprehensively called figure has materially varied in any known period, and still less about beauty of face, which admits less of artificial cultivation. We need not consider purely barbarian tastes, which sometimes extend to absolute mutilation, as of Chinese ladies' feet, and the production of hideous deformities of face and figure by still more barbarous and unprogressive nations.

Most young men and women now would accept it as the highest compliment to be told that they resemble some famous Greek or Roman bust in face, and even in their hair, of which the style for women is necessarily, in some degree, artificial, and therefore variable. If some of the old Roman hair-dressing is not copied by modern ladies and their "artists" in that line, it is certainly not because it is not beautiful, but either from ignorance how to do it, or from the vile modern habit of allowing French *hetairæ* to invent their fashions, and perhaps from a bold desire of advanced female thinkers to display their contempt for St. Paul's and other antiquated

prejudices in favour of long hair over "touzled fringes," or an imitation of boys, or some of the other ugly vagaries which come into fashion for a little while and then die out and never revive; which is probably the best test to apply to any doubtful fashion as a matter of real beauty.

The same cannot be said of the constant admiration of what has always been understood by the common phrase, "a good figure," or "a fine shape," as it used to be called in the novels of the last century, and its consequent cultivation by various exercises and still more artificial means. Those who have occasionally seen the controversial articles and letters in sundry periodicals in favour and in derision of the Rational Dress-Reformers (we must take care to put the hyphen in the right place) will have read, or may know independently, that the very same kind of epithets and descriptions were applied to the figures of female beauties and their cultivation by the oldest Greek and Roman poets and other writers, and by the mediæval and later ones, and by satirists and philosophers of the "rational dress" order, for nearly 1000 years up to the present day, and that the fashions they denounce have only varied in intensity from time to time. Notwithstanding such variations, and in spite of both satirists and philosophers in all ages, I suppose one could not find in all literature any admiration expressed of what everybody now understands by the common phrase "a bad figure." It matters nothing for this purpose whether those who denounce or those who advocate artificial means of improving it are right. Some of the strongest denouncers avow themselves admirers of the very same result when they believe it to be natural; and others lament that their scolding produces no effect beyond apparently intensifying the fashion they revile by evoking contradictions said to be grounded on experience as to health, however contrary to theory and *à priori* probabilities.

All this goes to prove that there has been no material variation in the estimate of beauty of either face or figure in the civilised nations of the world in any known period, and that when people talk of the proverbial mutability of taste and fashion, it really means taste and fashion in purely artificial things, like dress and furniture, and not in those which are chiefly made for us by nature; and it is the beauty of nature that we are talking of throughout.

Therefore it is hardly necessary to consider also the variety of tastes in building, which again is purely artificial. Yet even in that we may trace more uniformity in taste in the long run than some people imagine. It does not follow that because only one style used generally to be in fashion in one

age and nation, all those old ones are not more or less beautiful. Most likely all the styles which are possible within the laws of mechanics and geometry have been exhausted, except mere monstrosities. And what is the consequence? Why, that we now recognise the beauty of them all, and do our best to imitate them, some persons preferring one and some another, either for different purposes or the same. A man would now be thought a fool who built a dwelling-house to imitate a Greek temple, as they did in all the Georgian period; and yet an equal fool to pronounce Greek temples ugly. Two centuries ago, and less, writers who knew no better wrote of all the great mediæval styles, which are collectively called Gothic, as "obsolete" and "modern" and contemptible, just because the renaissance of the classical styles was then in fashion. But the natural instincts of mankind returned upon them, and before the end of the last century they began to see that mere ignorance had led those writers to condemn what they only did not understand. Moreover, religious prejudices had much to do with it. In all northern Europe, though not in Italy, where the classic St. Peter's had been built with the "indulgences" which caused the Reformation, the style of the old abbeys was associated with Popery against Protestantism. By degrees that delusion vanished, and then people began to see that both the great styles of architecture have peculiar beauties of their own, against which all that can be said is that they refuse to mix. At least, all the attempts of architects a few years ago to make an eclectic style out of classical and Gothic were miserable failures, though all the five Gothic styles mix well enough, as nearly every cathedral tells us. It is much like the case of animals which will not breed outside of their own species, but will freely within it.

I have said more than I need to answer the only attempt that I have ever been able to meet with from any of the deniers of design in nature to account for the enormous preponderance of beauty over ugliness that prevails throughout nature, and even in things that are partly, if not wholly, artificial. It is plain that there are permanent or continually reviving instinctive tastes for beauty, which no argument can prove to be either right or wrong, but no temporary craze of fashion can get rid of or prevent from returning. Moreover, some of our tastes for beauty may be called latent, and ready to start into action whenever the proper object is presented to them by some law of nature which has never before had the opportunity of acting, so far as we can tell, but does act, the moment it is wanted, as promptly as gravity, which never sleeps, as the old saying is. I have already mentioned the

aurora borealis as a perfectly new phenomenon to many people, and indeed always new the first time they see it, and much too rare to admit of the explanation that admiration of it is an inherited taste.

Another not so grand, but a still newer, phenomenon is the beautiful coloured spectra of electrical discharges through a tube almost vacuous, or filled with certain rare gases. Nobody in the world had seen that, or anything at all like it, until it appeared of itself as soon as the requisite conditions took place a few years ago; and yet nobody in the world would pronounce it anything but beautiful. So are many of the phenomena of polarised light, which are also quite modern, and are yet as unknown to the common run of men as those electrical discharges are. Not only those occasional exhibitions, but some constant ones, are equally surprises to those who see them for the first time, and had never been seen by the civilised world till quite lately. Such are, or rather were, those magnificent terraces in New Zealand, which were destroyed by an earthquake almost as soon as they had been introduced to general notice by Mr. Froude's "Oceana." In short, if the theory of beauty being only what we have learnt by long habit to think so were true, we should admire nothing that is very different from what we are used to. Some people indeed are stupid enough to think *à priori* that they never will; but very few indeed are so stupid as to withhold their admiration when they see a really beautiful object, entirely different from anything they have seen or imagined before. It is old tastes that are depraved by fashion and prejudices, not new ones; and the power of appreciating any real beauty that we have never seen before is latent and as ready to start into action the moment a proper object is presented to it as a needle is to jump up to a magnet, though it may never have been within miles of one before, and to turn towards a particular spot on the earth, thousands of miles away, the moment it has been stroked with a magnet and set free.

The same remarks apply to an infinite number of non-living objects which the most audacious theory-monger cannot pretend to have been modified by any non-creative agency. Such are natural water in all its forms—stormy or still seas, in sunshine and under clouds, waterfalls, rivers, brooks and lakes in the bottom of a valley, and the valley itself; mountains and hills, and all the green things upon earth; dews and frosts, ice and snow, and what are called frost-férns on glass windows; "iridescent films" of very thin plates; polished marbles and fine woods, of which the beauty is latent till it is so brought out, and then it appears in endless variety.

And how came that endless variety? It is hard enough for us to invent a little that is beautiful every now and then, and very seldom without some great defect or mistake. What we call Nature makes no mistakes, and yet is always producing novelties, and never by any accident repeats anything exactly. It is idle, and for scientific men absurd, to talk about chance doing these things, for science knows that there is no such thing; and the more it talks about the immutable uniformity of laws of nature, the more it declares that what we call chance is only the result of some of those very laws, of which perhaps we know nothing. Set the cleverest artist to draw a thousand of the most varied patterns he can of the leaves of any tree, or indeed of any other thing, and you will soon be sick of their monotony. Yet his, according to the "persistent force" and evolutionary philosophers, is the highest intelligence in the universe, and "nature's" artistic work is only the result of laws of absolute uniformity. Which *ought to be* the most full of variety and "life" on their theory? And which is?

I might logically stop here, and say to the evolutionist, "Your theory, your only theory, that pretends to explain the beauty of nature by explaining it away and calling it conventional, is done for, even if you had far more evidence than you have of natural selection, or any of your other inventions, to account for the beauty of living or reproducing objects." For, after all the complicated and portentous definitions of natural life, I think a capacity for reproduction is practically the best, though we can easily imagine once-produced creatures that might exhibit all the usual phenomena of life except that, and except mortality too, theoretically. I mean generically, not individually—such as mules, or other barren individuals of a species.

But I will not shrink from facing the automatic philosophers on the ground where they are a little stronger than they are with reference to non-living objects, and from inquiring how far their selection and survival theories can carry them towards accounting for the immense preponderance of beauty over ugliness in the world. One very large and immeasurable class of living objects—viz., trees of all kinds—we may sweep off at once with the remark that the evolutionists do not even pretend to have invented any theory to explain why all trees should not be as ugly as toadstools. And we must add that it is by no means an even chance whether things should be ugly or beautiful, though those are as opposite words as yes and no, or black and white. For everybody who has ever tried to produce anything beautiful, even in his own opinion, or has watched the attempts of other people, knows how difficult it

is, and that there can be no greater delusion than to fancy that you can produce beauty by merely making something opposite in all its features to something else which you know to be ugly. The useful or the strong can be produced by scientific invention and adequate knowledge of the laws of nature. No knowledge and no rules of science or art have ever been able to produce the beautiful, if they are able to keep designers from very gross defects or blunders.

If that is so, it follows that even if beauty did not so vastly preponderate over ugliness in nature, yet any considerable quantity of it would be a phenomenon requiring explanation. No talking about the laws of chance would do anything for it, even if chance can be admitted as a scientific cause of any phenomenon. The once-popular toy called the kaleidoscope, which was invented by Sir David Brewster, a great optical philosopher, presents an infinite number of pretty figures as you turn it round, which are made only by a good many coloured bits of glass or stones tumbled about promiscuously, and so you might call them all beautiful pictures produced by chance. But until design and contrivance were brought in, and the machine made what it was by a pair of reflecting glasses set at the proper angle, there was no beauty at all. It was the glasses that produced the pretty radiating and symmetrical figures out of each confused little heap formed by chance. Chance very seldom produces beauty without the intervention of something that lifts the arrangement above that of chance. Mere heaps of stones which have been broken and thrown together by some natural convulsion have no beauty; as, for instance, at Ilkley, in Wharfedale. That is just the converse or opposite of the composition of stones and marbles and crystals and vegetables, by what we may call the constructive laws of nature as opposed to destruction. The former almost always produce beauty; the latter very seldom do.

In like manner decaying substances are generally ugly and nasty, until some reconstructive process has set in which is going to produce new life. I know that the living creatures which are often the first products of decay are generally nasty enough looking things too, and so are some of the fungi, but they never last long. Moreover, I by no means say that beauty is universal, even among things which have ample merits of their own, such as oysters, to whom unknown ages of natural selection and admiration by man have been unable to impart anything that their greatest admirers can call beauty externally. What I do say is that the enormous quantity of natural beauty in the world is wholly inexplicable by any

theory except that of a designing power, able first to design what is beautiful (which we can very seldom and very little), and then able to produce it in such profusion that it looks spontaneous, and far more natural than ugliness, because it is so common, and in quite infinite variety.

I have said all that I need about the universal beauty and unlimited variety in trees of all kinds, for which the evolutionists have never yet pretended to invent an explanation. And I have said all that need be said of coloured flowers. If anybody likes to consider the insect theory sufficient to account for them, let him. They are so small a portion of creation that they are not worth arguing about. If that theory is right, and adequate to account for the infinity of beautiful shapes as well as colours in flowers, it wants another theory to explain how the insectal taste for floral beauty came to agree so well with human. Perhaps we and the flies had a common ancestor, and inherit our taste for beauty from him, whoever he may have been. Nor is the insectal theory much helped by the fact that bees of all kinds cultivate flowers of a multitude of kinds and colours, including some with the very minimum of colour, such as mignonette, and have not yet been able to impart any more of it to them. If it is said that the insects are attracted by nice smells, I reply that the vast preponderance of nice smells over nasty ones in nature, and of nasty smells over nice ones in art, is an additional difficulty for the automatic creationists.

Leaving that small section of creation then, with that small attempt of the evolutionists to account for it on automatic principles, I will say a few words on another kind of life, for the usual beauty of which their explanation is more plausible, but yet very far from sufficient—viz., that of animals. The effects of judicious selection in breeding are undeniable when that selection is made by some agent with adequate intelligence and experience. And so we can breed new varieties of flowers and improve fruits, whether insects do or not, beyond what is ordained for them by their instincts or their experience, which depends upon the laws of their creation. So it is not unnatural to conclude, but it is very difficult to prove, that animals select their mates according to their beauty. According to their strength, there is evidence enough that they do, and in fact must, whenever there is a superfluity in whichever is the stronger sex (which is not quite always the male sex). And, so far as strength and beauty go together, the result will be that the beauties get the best of it. Very likely also, the beauties of the weaker sex, on the whole, get the best of it. But they do so less than one would expect,

even among the human animals, in which we recognise far greater differences of beauty than we do among beasts and birds. Indeed, so little does this prevail that it is very difficult to say that it has improved the beauty of mankind in any known period. It is true that civilised men and women are, on the average, much handsomer than savages; but it is a great deal too uncertain that the civilised and handsome races have risen from savages, and ugly ones, to build any conclusion on that as a fact. All our experience is that savages die out when they come in contact with the superior races; and, I believe, absolutely none that they improve. The experience of all the known history of mankind, including the supposed oldest skeletons, exhibits very much less than one would expect in the way of improvement in beauty by natural selection or survival of the best, seeing how quickly careful breeding does produce its effects in animals. In some respects there is no longer any doubt that both we and the French have reached and passed our climax physically, and I suspect, intellectually too; for learning is not genius, which is becoming rarer in every direction. Yet our circumstances, and condition, and means of cultivating beauty had certainly increased, until a few years ago, at any rate, before universal poverty set in among the classes most likely to do the best for themselves in breeding.

This absence of evidence of general improvement in human beauty within the longest known period is still more awkward, because men are evidently more likely than beasts to avail themselves of opportunities for judicious selection. And again I say of them, as of the flower theory, that if the evidence were a hundred times better than it is, it would do absolutely nothing towards accounting for the infinity of beauty of everything with no life as high as that of locomotive animals; for locomotion is evidently a necessary element in selection, and some low animals are not locomotive. Another awkward fact is that the beasts most like us are, nevertheless, by general consent the ugliest. If, on the other hand, it is contended that apes have a standard of beauty of their own, and choose their mates accordingly, as savages probably have, then it follows that we must dismiss all animals from this discussion, and of course insects with them, and treat each species as having its own taste. And then I am afraid we shall be driven to ask how it is that an undoubted majority of every nation with our known taste is rather ugly than handsome? In any case it is an odd result of the theory of improvement by natural selection, that our nearest neighbours, the apes, and ourselves present the largest

proportion of ugliness of any known creatures above the rank of oysters. A few kinds of dogs, who rank about with monkeys in intelligence, are certainly ugly enough too; and elephants, who make the third family of the most knowing beasts, can hardly be called beautiful. On the other hand, what product of life is as beautiful as many shells? A collection of them, such as Dr. Percy has, is quite amazing for its beauty and variety. How does any evolutionary or selection theory profess to account for them? Or do you suppose that oysters occasionally make pearls for their own private contemplation or ornament? Or that even peacocks know how to make the spines of their feathers grow so to compose "eyes"?

So it seems we are driven to these odd-looking conclusions:—1. Though the human race in its best form is the most perfect and beautiful of all animals (though not if we take the gorgeous colours of some birds into account), nevertheless the great majority of human individuals must be called ugly, and vastly inferior in beauty to many of the commonest and smallest, and almost the lowest creatures, who must be very superior to us in good taste if we are to judge either from their productions or their progeny, which, we are told, is the result of their selection in breeding; and therefore that theory of beauty breaks down in the very place where it ought to be the strongest and the most successful.

2. When we get below locomotive life, the only attempt to account for any vegetable beauty—viz., that of flowers—is so inadequately supported, and goes such a little way in accounting for their whole beauty, that it is worth nothing as a general theory; leaving beautiful but stinking poppies, and tulips which have no smell, and almost colourless but very sweet mignonette, to reconcile themselves as they can, and also to explain as they can what primarily made the connexion which does exist between insects and flowers.

3. Beyond that very limited attempt to account for floral beauty, the evolutionists have absolutely nothing to say for trees, and *à fortiori* nothing for inanimate nature.

4. Our general impotence in producing beauty, even to please our own taste, is a no less striking fact when we are considering how its prevalence in the world is to be explained.

Is it necessary to draw any further inference from these facts? Or can there be any inference but one as to the prime cause of all the beauty of the universe? Beauty differs from usefulness or necessity in this obvious way: If the world was to exist at all it must contain all the necessary adaptations; though it is still true that that would not make one of them. As I said elsewhere, the fact that children cannot be reared

without milk would not produce either milk or children. Living creatures must either be immortal, or must cease, or be reproductive; but that would not take them a single step towards reproduction, or perform the seeming miracle and the yet inexplicable mystery involved in it; for its universality leaves it no less wonderful than the first time it happened.

But these things must have been done somehow, if there was to be a living world at all. Beauty need not. It is altogether a gratuitous exhibition of perfection. Look at the hideous things we make for all purposes, and continually more and more hideous as we advance in science. Why does not nature make its necessary works hideous, too? Why are teeth, and eyes, and hair, and feathers, more beautiful than coffee-mills, and telescopes, and ropes; and the paddles of steamboats, or than our own bones and entrails or body without skin? A single blotch on a face ruins its beauty. How came most young faces to have the beautifully-arranged colours that belong to them in health? Except the arts of painting, sculpture, and building for a few centuries, we can hardly make anything that gives any lasting pleasure, even to ourselves, and except when we call in nature to help us, which is always ready, as when we "make" gardens, as we say—though we do not really make them, but only invite nature in a certain way. Where then is the real factory from which all this infinity of never-failing and never-blundering art is being continually turned out, and who is the artist that invents it all? When the Spencers and Huxleys, and their fraternity, have tried their answers to these questions (which they never do), we may consider whether our side of the case needs arguing further. At present it does not. The factory of the beauty of the world is not chance, for chance is infinitely against it. It is not ourselves, for it is all prior to ourselves, and we can make hardly any when we try. It is some person with evidently unlimited mental resources and power to make every atom behave as he chooses, both for use and beauty.

People who call themselves "thinkers" write sententious and pretentious nonsense about the impossibility of mind influencing matter, merely because they do not know the *modus operandi*. But something or other has influenced matter to make it assume beautiful forms, chiefly for our delight, as far as we can see, and very likely to show us how vastly inferior our own conceptions of perfection are to those of the Divine mind. For if this is not to be called Mind, what is it? If any one is prepared to argue that self-existing force in no particular direction has resolved itself sponta-

neously into an endless variety of beauty-making forces as well as others, let him begin and show us how he thinks the first step was taken without the aid of anything that can be called a mind, or a designing power intending to produce the results that are apparent everywhere. The anticreationists take care never to attempt anything of the kind, and therefore they cut their own throats as inventors of a cosmogony.

I have only one more point to deal with, very shortly. These people may ask us how we account for such a designing power as we assert to be the only possible producer of all the beauty of the world leaving anything ugly. The proper answer is that we cannot tell, beyond this: He has Himself told us that He did not mean to make this world perfect, either morally or physically. He has not told us why, and all the guessing in the world will never be any more than guessing, quite incapable of proof. It is only another guess, that an omnipotent creator would not make an imperfect world, to be hereafter changed into a perfect one, and a guess worth nothing in the face of all the facts, including this—which the evolutionists themselves insist on more than anybody—that the world has, on the whole, improved immensely. The dictum that an omnipotent creator would have made it perfect at once means nothing more than that we think we should if we had had the making of the world, and that we do not know the reasons why it has been made otherwise. But, as a matter of fact, it has, and with an amount of contrivance which is still quite beyond our understanding in many essential points, even in the fundamental constitution of all matter, and in the nature of the primary forces of gravity, electricity, heat, and nearly every physiological operation of nature.

Of those in general I have not been speaking in this paper, but only of the special laws and forces of nature which in some quite unknown way produce the unnecessary but delightful results that we call beauty. We are ready to attend to any theory of creation which professes to account for *all* of it. Theories to account for little bits alone are not worth attending to in any science, and, *à fortiori*, not in the science of cosmogony. Our theory accounts for it all; and therefore by all scientific rules it is good until it can be supplanted by a better, of which there is no symptom yet. And therefore it is scientifically indisputable, that beauty, like "every good gift and every perfect gift, is from above, and cometh down from the Father of lights, with whom is no variableness nor shadow of turning."

THE PRESIDENT having conveyed the thanks of the meeting to the author,

Mr. A. C. RANYARD said if they defined beauty as that which caused enjoyment of perception, he thought they could understand the enjoyment of the perception of sunset colours, and of the beautiful things which were revealed to man by the microscope directly their beautiful polish and variety of colour was perceived. The impression of beauty might arise from the vivid sensation, accompanied by a mental action too rapid to analyse, as the mind perceived the exquisite finish or repetition of form or tint.

Mr. D. McLAREN said he was sure they must all have been gratified at having expression given to conceptions which every one of them must have been conscious of now and again in their ordinary observation. He remembered not many weeks ago being very much struck with the exceeding beauty of the fern-like forms produced on the pavement by the frost; and he had often wondered that photographers did not take advantage of the opportunity they had of getting pictures of the most exquisite tracery. The idea suggested itself, why should this product of the frost be of such a shape as to commend itself at once to their highest ideas of beauty of form. He remembered on a previous evening when a paper was read upon the evidences of design in Nature, that those evidences mostly turned upon the evidently useful purpose in the design. But mention was also made of the symmetrical marking of butterflies' wings; the four wings exactly corresponding—the two on the one side with the two on the other; also the wonderful beauty not only of the colour, but of the shapes of the spots. Take the common tortoiseshell butterfly, or the Admiral, as examples. Let any one look on these and ask how it came about that these animals were marked in such a way as to call forth our sense of beauty.

Mr. W. ST. C. BOSCAWEN, F.R. Hist. Soc., said that the paper was a very interesting one. It was important to see how the beauties of Nature had appealed to the early races of the world. One could hardly turn to any of the old religious books of the East without seeing how Nature was the magazine of symbolism to which the writers turned. The very sunset had provided some of the most beautiful pictures in the Vedic hymns. It was the sunset and the radiant dawn that were the bases of those beautiful old poems of which we are the heirs. It was the same with the hymns of the ancient Chaldeans and Assyrians—just the same perception of the power of Nature, and of the adaptation of the beauty of Nature, and their impressions—expressed in grand and beautiful symbols—which made those hymns and poems so valuable to the student of mythology. There was another point in the paper to which he would refer. If man had been developed or evolved from this wonderful oyster father, it was a very curious thing that in the human race only we found any attempts to give graphic expression, and to reproduce that which we regarded as beautiful. They knew the cave dwellers in France gave the only drawings in existence of the Mammoth, so accurate that it could be recognised

when one was found in the ice of Siberia. Then if in Egypt we turned to the tombs of the kings of the third and fourth dynasty, and took the inscriptions of the Egyptians, there we would find various objects in Nature produced with marvellous accuracy which the Egyptians of the present day would be utterly incapable of producing ; so the effect of Nature upon these men must have been very great. If the high development of mind, and that high appreciation of all that was beautiful, was the result of a gradual development, he was afraid they must go back to most extraordinary antiquity to find the dawn of the sense of the beautiful. Indeed, he was convinced of two things—that the two great bars to the theory of evolution as applied to man were the existence of systematised articulate language, and the presence of the graphic instinct. There was no animal that could draw, and no animal that attempted to reproduce objects. Were it not for language, and the existence of a language, human beings would not have been enabled to communicate thoughts from one to another, and were it not for the existence of the graphic instinct which called into existence the art of writing, then culture would have died out as individuals die out. It was the desire to reproduce objects around that formed the basis, and was one of the greatest powers of civilisation, namely, the art of writing. So from that point of view the subject Lord Grimthorpe had touched upon was one of considerable interest. There was another point, and that was the fact that when one turned to the very early monuments one saw how the lowest objects which had been spoken of were admired for their beauty. It was now pretty conclusively proved that one of those curious spiral ornaments on the whorls from Troy and from the islands of the Mediterranean were derived from the marking of shells, and the forms of the limbs of the cuttle-fish. So when we turned to the Assyrian and Babylonian monuments, we found the earliest decorations derived from the leaves of the palm tree. He had lately examined a monument bearing date 2,500 years before the Christian era, in which a frieze of birds formed the chief decoration. The lion was also frequently used upon Assyrian bowls, and there was also adapted to the handles of artistic objects a figure of the gazelle, one of the most beautiful animals in existence. The paper to his mind seemed to offer another strong barrier to the theory which, as regards mankind, he certainly had never been able to accept ; and the more he studied the monuments of the past, and the more he studied history, and saw what great and infinite mental power was called into force, both in written and spoken language, the more difficulty he found in adopting the evolutionary theory.

Mr. H. BIGNOLD said that many of the objects that were revered among the Egyptians appeared to us now not to represent at all the objects of beauty ; but on the contrary, looking at some of their Gods, they had always appeared to him not so much calculated to evoke a sense of reverence as objects directly suggestive of hidden laws of beauty.

REV. PREBENDARY WACE, D.D., said one point had been raised in the discussion to which he wished to refer. The speaker who endeavoured to explain our enjoyment of the beauty of a sunset must have forgotten

that our faculties of perception were sometimes exercised in the observation of ugliness. If the mere exercise of our faculties produced a sense of pleasure, there would be no such thing as a difference between a sense of beauty and a sense of ugliness. It appeared to him that the main importance of the question turned on the inquiry, whether beauty was really an ideal or not ; whether it was a varying function which differed with different opinions and different sets of times, or whether there was such a thing as an ideal of beauty just as there were first principles of truth and goodness. That was a question which had been debated from the earliest dawn of serious thought among mankind. The great question raised in the time of Socrates was whether there was absolute goodness, absolute truth, and absolute beauty. It had been decided by the general verdict of the most earnest thought in the world that there was an absolute ideal in all those subjects. Precisely similar objections to those which Lord Grimthorpe had told them had been raised by his friend, had been raised by Plato's contemporaries, and were raised now, but the only argument which could be produced against his views was the existence of lower standards of right and wrong. When they looked at the matter from the point of view of right and wrong, they all saw the absurdity of the argument. The fact that in certain nations there was an imperfect moral standard proved nothing against the existence of a perfect standard. It only proved that those nations were in a state of degradation. He remembered being struck by the statement of a missionary on this subject : he was asked whether, in spite of the moral degradation he came in contact with, he had ever met any nation that rejected the morality of the Ten Commandments when they came to understand them, and he said he never had. Custom might maintain a lower standard, but all men recognised the true standard of right and wrong when it was explained to them. What was possible in respect to man's conscience was similarly possible in respect to beauty. In proportion as the faculties of men developed, they appreciated the one uniform and ideal standard of beauty. It was from this point of view only that the full force of Lord Grimthorpe's argument could be discerned. What we had to consider was that there was by common consent of mankind, or the increasing consent of intelligent mankind, an absolute standard of beauty, and they found that throughout Nature there was a continual approximation to, and in the great majority of cases absolute attainment of, that standard of beauty, no matter what the work might be to which Nature put her hand. His lordship asked the question, how it came that Nature in all its forms and circumstances was continually approximating to this beauty ; and it certainly was a most extraordinary and amazing circumstance. There was only one point in his lordship's paper to which he would venture to take exception, and that was an observation he threw out once or twice that this beauty is not necessary. He should be rather inclined to think that that was an *obiter dictum* which weakened his case ; because it might turn out to be, and it would be, a very strong argument, pointing to the conclusion he is aiming at, if it were proved that

beauty is an indispensable concomitant of the highest perfection in other respects. Just as in mathematics, the law of action proved to be the law of least action ; that which at first appeared to be an arbitrary law, turned out, when it was fully investigated, to be the very means of doing the work with the least possible expenditure of force. So it might be here, and beauty may be necessarily associated with the simplest and best of all contrivances. But if that was so, it added force to the argument, because it compelled them to ask the question, "How comes it that all these extraordinary qualities, accuracy, strength, usefulness, beauty, capacity for moral action, are all found bound up together so indissolubly that they could not separate one from the other?" The more we knew of Nature, the more we found these qualities united. Human Nature was of such a character, that the highest forms of morality were inseparable from it. The question was, what united them ? and when the question was put in that form, new force seemed added to the argument which Lord Grimthorpe had put before them in a manner for which they were much indebted to him ; for there was one explanation which accounted for it all, namely, that the whole framework of Nature was designed by One mind, in which all ideals were so united that He could not do one good thing without doing all good things at the same time. But if they once lost sight of this central influence in the mass of conflicting forces, the whole manifestation became inexplicable.

Mr. J. HASSELL said that Lord Grimthorpe made a statement which should never be forgotten, namely, that "If one side is left to go on preaching its own dogmas and keeping discreet silence about objections which they cannot answer, and if the objectors kept silence too, the objections will be forgotten, or assumed to have been silenced, though nobody undertakes to say how, or when, or by whom." That should be kept in mind. They who were standing up in these days, and had to bear much ridicule, should not be backward in bringing before their young people all the evidences they could upon these matters. Let nothing prevent them from repeating those grand ideas of God's order and God's perfection, as seen in His works.

LORD GRIMTHORPE, in reply, thanked Dr. Wace for saving him the trouble of answering his friend, Mr. Ranyard. Some of them might remember that Sydney Smith, in some of his letters against America, talked about a "larcenous lake and swindling swamp." He did not know whether people had any idea of that as a thing of beauty. The latter remarks of Dr. Wace were certainly very significant indeed, and he had no doubt they would turn out some day to be right, but he (Lord Grimthorpe), being a lawyer, could not venture to assume it. He could not venture to assume that beauty was a necessary concomitant of every kind of perfection, and he was never in the habit of assuming for the purpose of argument what he could not prove. He quite agreed with him that it did enforce the argument very materially. Mr. Boscawen's remarks were interesting all through. It would be found that a good many people

who were on Darwin's side were beginning very seriously to question Darwin's own doctrines, and no doubt the longer they went on the more that would be the case. He did not think there were any other remarks which required any observations from him.

The Meeting was then adjourned.

REMARKS UPON THE FOREGOING PAPER

BY

THE REVEREND W. ARTHUR.

LORD GRIMTHORPE does good service in pressing the argument from beauty to design indicated in his vigorous work on the Origin of the Laws of Nature. That argument is one that will grow of itself, and will be found to have broad bases and manifold connexions.

Particular attention should be given to the answer which Lord Grimthorpe reports as that made to him by "one of the most eminent philosophical writers of the age." This philosopher says: "Beauty is merely a question of habit and fashion; there is no such thing as absolute beauty, and therefore Nature has done nothing for it." The conclusion, namely, that Nature has done nothing for beauty is so absurd that it could not be drawn from any properly formulated premises, or even tacked on to them. With that conclusion the assertion which in the apparent premises stands immediately before it has nothing to do. It may be quite true that there is no absolute beauty, and yet all relative beauty may be directly due to Nature; just as it may be true that there is no absolute motion, and yet all relative motion is due to Nature. The other assertion in the premises, that beauty is merely a question of habit and fashion, is itself merely a begging of the question. It is not true; beauty is more than a question of habit and fashion. But even if it were true, it would not prove that Nature had "done nothing for it." Dress is clearly a matter of habit and fashion, yet Nature has done something for it by giving, on the one hand, wool, cotton, silk, and hides, and on the other hand the desire and ability to make clothes, joined with the twofold appreciation of utility and beauty.

In respect of dress, however, social considerations outweigh those of beauty; that is, fashion overrules taste, and dictates either permanent or transient habit—the usage of the caste in India fixing for ages the form of dress which will be most respectable, as the fiat of some milliner in Paris fixes for a season what will be most in vogue. But it is equally vain to look for the approved pattern in nose-jewels, or in crinoline, apart from a mind to design, or a power to mould. But to regard beauty in dress, or in any production of man, as if it were the whole of beauty, is the philosophy of the workshop.

This remark includes furniture and architecture, for in all departments of these we are in a region of what man frames out of Nature—not of what he finds and admires in it. In painting and sculpture we are in a complex region—one, it is true, of what man produces, but of what he produces more or less in imitation of what he finds in Nature and admires in it. The reason why we so seldom see beauty in implements or machinery is because that in them natural forms are so seldom reproduced, the product required being one of which Nature has not given the mould. The assertion that science has done nothing for beauty would be absurd, but not so absurd as the assertion that Nature has done nothing for it. What science has [done for it was subsequent] to what Nature had done, and totally dependent upon it, whereas what Nature did for it was done ere science began to be.

In any sense of the word “beauty,” to which even the lowest philosophical value can be attached, it must mean not anything either in the object taken alone, or in the subject taken alone; not merely some quality in an object without us which prompts us to say “Beautiful,” and not merely some faculty within us which recognises that quality, and feels admiration of it. Beauty no more means either of these apart, than rainbow means water, air, or sunlight, apart from one another. It is the synthesis of all that makes rainbow, and it is the synthesis of certain qualities of body external to us, and certain faculties of mind internal to us, which creates that state of delight which utters itself in the word beauty. All the stars in the sky would never give origin to the idea of beauty if they shone only upon wood and stone. No more would they give origin to the *human* idea of beauty if they shone only into the eyes of toads. But they shine into no human eyes without giving rise to that idea—an idea which gathers to itself intellectual, emotional, and active associations according to the grade of the mind in which it is awakened. In contrast with these natural objects, all the slag heaps in the Black Country by day, and all the furnaces by night, never gave rise to the idea and emotion of beauty, whether they addressed themselves to the eyes of an Englishman or of a Japanese, of an artist or of a cowboy.

Into certain objects Nature has put something calculated to excite in man a pleasure which makes him say “Beautiful”; into man Nature has put the capacity of recognising this quality in the object, of feeling the pleasure, of naming it, and of uttering the name. But the object and the man may be billions of miles distant one from the other, and till they are brought into communication, into presence, by some connecting medium between them,

neither the radiance of a body nor the susceptibility of a mind gives origin to the sense of beauty. When by the action of a medium they are so brought together, then arises what before was not, an idea of beauty, an emotion of beauty, an exclamation "Beautiful," upon which follow trains of thought, feeling, and it may be action, graduated, as I said before, according to the mental and moral character of the percipient. The steps whereby is done the work of bringing object and subject into presence are always manifold, and often reach over tracts never yet measured. Those steps imply means of utterance on the part of the object, means of receiving what it utters on the part of the subject, and a vehicle of conveyance to carry the utterance over the inch or the practical infinity which may separate between the two. Could a star or a rose, a wave or a field of corn throw off nothing from them, and could a man not take in what they do throw off in any other way than he takes it in on the palm of his hand, they would never be known to him. Therefore the offices of an eye in him, and of a reflecting or emitting impulse in them, are called for. These given, a vehicle to carry the impulse from the surface of the star to the interior of the eye must be found. This being supplied, as we believe by ether, what Sirius emits and what the moon or the rose reflects is borne both to the hand and the eye, but to the hand it is as if it were not, while to the eye it brings tidings of a fair object without. Now the eye has not evolved either the ether or the star, not even the motion in ether which travelled from the star. No more has the star evolved the eye. All of them together have not evolved the mind which can say "Beautiful," can ask "Who made it"? can speculate on its distance, can determine to try and measure that distance, and can bring others to enjoy the sight. Yet all this synthesis is to be accounted for without any Mind planning and perfecting the whole, accounted for by a few phrases and a few trifling facts which to the phenomenon are not more than the emery dust is to the diamond.

In the passage quoted by Lord Grimthorpe from Mozley, it is said that no one could have anticipated that the same physical laws which feed us, clothe us, and give us breath and motion, would also create a picture. Of themselves the light, heat, water, air, do not create any picture. All the trees and flowers which glow in a beautiful sunset see no picture. The animals see a glory and a beauty, but the inward picture never leads to an attempt to reproduce itself. This is for the human mind only. Just as such inward picture of the sunset as man enjoys is born of the soul in union with Nature, so such external picture as he may paint to

perpetuate the memory of his delight, and to impart some portion of it to others, is born of that soul. When that external picture is on the canvas it is not philosophical to show how pigments are composed, how they coalesce with canvas, how given motions must result in given forms, the pigments being what they are, and then to dispense with Turner, as well as with his conception and performance of the whole. Just as surely as that picture on canvas came of man, who could make and manipulate canvas, so surely did the inward picture on mind which gave birth to it come from One who had made and could act upon mind.

The picture of light in the mind of Milton, and that of the starry sky in the mind of Kant, were as much real events in the history of our planet as our sunshiny showers or phosphorescence at sea. Those two inward pictures belonged to a world in which wood or stone have no part—to a world as much above the orbit of animals as the path of the eagle is above that of the waggoner. They not only left behind all power of animals to attain to them, but all human power to embody them in any painting. Words go further here than forms and colours, because they more directly admit mind to the views of mind, suggesting the beauties as they shone inwardly, not as they were built up outwardly. If to the two cases named we add Newton's contemplations of light, and then consider how much effect on human thought and feeling, consequently upon human pursuits and action, has been produced by the allurements to scientific research which the charm of light brought to bear on Newton, by the intellectual stimulus to lofty speculation it gave to Kant, by the sublime emotion wherewith it inspired Milton, we have some slight hint of the potency of beauty as a practical force in human affairs. We have also some idea of the grossness of that conception of it which sees in it only a matter of habit and fashion. The two supreme beauties known to earth, that of the light of day and the lights of night, with all of human delight and elevation to which they have given birth, flash exposure on the school which would reduce beauty to a thing of habit and fashion. It would not be more unscientific to say that light itself is a matter of tallow chandling.

In the commerce of mind with body, the place held by beauty, when bodies present themselves to mind through the eye, is analogous to that held by pleasures special to each of the other senses when they are the channels of communication. Taste brings us sweetness, touch the pleasures of genial warmth, and many others, smell those of perfumes, and hearing those of music, whether that of speech, of song, or of the woods. All these may be viewed as

beauty reaching us in various guises. But in beauty proper, that of forms and colours, there is a special feature. It serves no pressing physical need. Taste has its direct utility, it is our alimentary sense ; so without touch we could not guide our motions, it is our mechanical sense ; without smell we could not keep our homes or cities pure, it is our sanitary sense ; without hearing we could not hold fellowship with our kindred minds, it is our social sense. In each of these, over and above the purpose of bare utility which possibly might have been served without any attached pleasure, there is a system of direct contribution to mental delight through physical channels ; yet in all pleasure is manifestly enlisted in the service of utility ; a beneficent end dignifying every arrangement. The beauty of flowers, of woods and fields, of flocks, herds, and birds, of hill and sea, of morn and eve, of noonday and of night, is not needed to make us feed, or to keep us right when we walk, or to warn us of fever in the pool, or to call us out into communion with our fellow men. That beauty is over and above the purposes of physical existence, of survival in that existence, a sheer surplus of delights, and of delights tending to lift us up above bodily wants into a region where things are prized for their own sake, where joy is known above mere animal satisfaction. And those delights allure our thoughts, our researches away to other worlds, and in so doing marvellously enlarge the range of our intellects, as well as guide the practical sciences and the course of commerce and manufacturing—all this ministry of the senses to our happiness, both in direct enjoyments, and in resulting benefits involving, as it does, the co-ordinated action of more worlds than one, of forces, motions and agents incalculably numerous and complex, is no matter of habit or fashion alone, but is a system of conduits through which flows the goodness of a great Creator.

One remark more ; from the beauties which mothers see in the faces of their babes, to those found in the gardens, the fields, or the skies, not one depends on this world alone. Independently of other worlds earth can make nothing beautiful. In a pitch dark night the child's eye has no expression, neither is the rose red nor the lily fair, nor yet on land or sea is there aught lovely to behold. All physical beauty depends directly on light from Heaven.

This is the cardinal fact in the matter, and for ever settles the question whether beauty is or is not a mere question of habit, and whether it is or is not automatic. In fact, when looked into, the term "automatic beauty" will be found absolutely unmeaning, contemplating, as it must do, beauty as something with a single base, and evolving itself from that base alone. That light which is our sole

fountain of beauty leads us by scientific consequence farther than habit and fashion : as far as the sun—farther than that, as far as the stars—farther than that, as far as the all-surrounding ether. But for ether to give light it must be moved. In any substance, motion is not a somewhat evolved in it, but a somewhat imparted to it. Motion, vibration in ether is the last physical fact to which we are conducted by light, the exclusive source of physical beauty. That fact compels us to think of a Mover and that Mover must be One whose touch can simultaneously thrill the substance encompassing all worlds, and pervading their inmost recesses.

ORDINARY MEETING, DECEMBER 5, 1887.

PROFESSOR G. S. STOKES, D.C.L., P.R.A., PRESIDENT,
IN THE CHAIR.

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

MEMBERS :—R. Armitage, Esq., Scarborough ; W. H. Barlow, Esq., Bath ; C. Bartholomew, Esq., C. E., Ealing ; H. W. Bristow, Esq., F.R.S., F.G.S., Senior Director of the Geological Survey ; Professor T. Carnelly, D.Sc., F.C.S., Dundee ; J. Corbet, Esq., M.P., Droitwich ; E. H. Dering, Esq., D.L., Knowle ; H. M. Simons, Esq., London ; Rev. F. A. P. Barnard, D.C.L., LL.D., United States ; Rev. Professor J. L. Bowman, A.M., S.T.D., United States ; Rev. G. A. Jacob, D.D., Teignmouth ; Mrs. Cheyne, London ; Miss K. Moore, London.

LIFE ASSOCIATE :—W. Edwards, Esq., India.

ASSOCIATES :—Right Rev. Bishop of Bathurst, D.D., Bathurst ; E. Arrowsmith, Esq., Sydenham ; R. Ashby, Esq., Staines ; Col. the Hon. F. C. Bridgeman, M.P., London ; Staff-Commander E. W. Creak, R.N., F.R.S., London ; W. Debenham, Esq., London ; W. G. Edwards, Esq., Bretagne ; T. C. Garfit, Esq., Lincolnshire ; E. George, Esq., Kent ; Lt.-Gen. J. G. Halliday, Kent ; F. A. Kezer, Esq., United States ; H. E. Kirby, Esq., F.C.S., London ; Dr. J. W. Lowber, M.A., D.Sc., Ph.D., United States ; Claude Leatham, Esq., Pontefract ; Deputy Inspector General, H. F. Norbury, C.B., R.N., M.D., Plymouth ; F. Nimr, Esq., Cairo ; C. B. Warring, Esq., M.A., Ph.D., United States ; Rev. G. Ackerman, United States ; Rev. H. A. Buchtel, D.D., United States ; Rev. W. Crook, D.D., Ireland ; Rev. T. Fleming, M.A., Ph.D., United States ; Rev. Preb. J. T. Fowler, M.A., Chelmsford ; Rev. A. G. Gristock, Hereford ; Rev. G. A. Humble, M.D., South America ; Rev. D. Honeyman, D.C.L., F.R.S.E., F.S.Sc., Nova Scotia ; Rev. R. C. Kirkpatrick, Kilburn ; Rev. J. H. Lamb, M.A.,

Norfolk ; Rev. P. R. Mackay, N. B. ; Rev. Professor F. Paget, D.D., Oxford ; Rev. G. W. Peck, M.A., LL.D., United States ; Rev. C. C. Starbuck, United States ; Rev. E. W. Syle, D.D., Surrey ; Rev. E. S. Talbot, M.A., Warden of Keble College, Oxford ; Rev. J. H. Vincent, D.D., United States ; Rev. Dr. Wherry, D.D., India ; Rev. F. A. Wilbur, Ph.D., United States ; Rev. J. R. Winchester, M.A., Ph.D., United States.

Also the presentation to the Library of the following :—

Proceedings of the Royal Society.
 „ Royal Colonial Institute.
 „ Royal United Service Institution.
 „ Royal Geographical Society.
 „ Geological Society.

THE PRESIDENT.—I think this Institute is to be congratulated 'on the large number of adhesions it has received during the recess. (Hear, hear.) I will now call upon the Rev. H. J. Clarke to read his paper.

EVOLUTION A REVELATION; OR, THE UNIVERSE UNFOLDING IN THE PROCESS OF TIME AN ETERNAL PURPOSE AND AN ILLIMITABLE PLAN. By the Rev. H. J. CLARKE.*

THE title I have given to my paper, as will be perceived, lays me under an obligation to justify two debatable assumptions. I must endeavour, on the one hand, to show that a philosophical view of the origin and progress of differentiation necessitates the recognition of a law or principle which may with propriety be termed Evolution; and, on the other, to render it apparent that the process thus indicated, instead of leaving in impenetrable darkness the character and properties of the mysterious Energy which it presupposes, constitutes in some measure, if duly apprehended, their Revelation.

2. Now, before attempting to establish these propositions and before entering into particulars relative to differentiation in organic structures, it may be advisable to invite attention to the full scientific import of the term in question. When one type is assumed to stand to another in the relation of lineally-direct conditioning antecedent, the latter is conceived as having been *evolved* from the former, and the evolution as having been effected by some specific determination of a persistent force, the reproduction of prior characteristics being ascribed to sameness, and deviations from them to

* Vicar of Great Barr, author of *The Fundamental Science*.

modifying variations, in the manifold conditions under which its continued operation has taken place. Facts, however, illustrative of the genealogy of this or that organic type, having suggested, as the most probable account that could be given of its origin, the theory I have just alluded to and briefly sketched, the perception of their significance enlarged with the progress of scientific observation and research, until the principle to which they seemed to point came to be regarded as universal, and it was believed that a scientific basis had been discovered, for the notion that the production of the countless varieties and elaborate complications of form and structure which constitute existing nature had its beginning in a movement which terminated what was imagined to be an original equilibrium of undifferentiated material, and has ever since that time proceeded in the way of continuous evolution.

3. It will, I presume, be generally conceded that the acts which have been adduced in favour of this hypothesis are neither few nor unimportant; rather that they are very numerous and profoundly suggestive. But a theory of Evolution, in which the fixing of the starting-point involves an arbitrary assumption, and a primal state of things is supposed for the existence of which no exigency of rational thought can be held to have established the necessity, is obviously wanting in philosophical completeness and stability, cannot reasonably be welcomed as the key to any of those arcana of knowledge which Nature has been reserving for disclosure in these latter days, and, indeed, if it has any significance from a theologian's point of view, and comprises such assertions or negations as he may be expected to dispute, is destitute of the slightest claim to even provisional acceptance. A hypothetical scheme of doctrine, of which the fundamental hypothesis is purely conjectural,—in other words, rests upon nothing,—is ill-adapted to interpret, or rather must needs fail to exhibit in their true aspects and relations, the facts which bear upon it, whether they seem to render it credible or not.

4. Let, then, the fundamental hypothesis of the theory of Evolution, as that theory is commonly propounded, be attentively examined. The beginning of the Cosmos having been conceived as a state of things in which differentiation has as yet no place, there is but one way in which it can present itself distinctly to the imagination: it must needs be pictured as a system of homogeneous atoms in perfect equilibrium; in other words, having room to move and fraught with tendencies to movement, which, however, so long as their assumed arrangement lasts, precisely neutralise one another.

5. A troublesome question, it is true, at once suggests itself, unless the law of gravitation may be ignored: How can it be admitted that such a balance is conceivable, except on the inadmissible supposition that the number of the atoms being absolutely infinite, the system is without a superficies, and therefore without a centre? A system, however, of atoms in equilibrium is what, it seems, we are to suppose. Indeed, what other relevant supposition is there that might commend itself to us as being at once more simple and more definite? Let the purely natural philosopher, putting out of view the embarrassing question I have just adverted to, suggest, if he can, another starting-point more suitable as such, and one which encumbers the theory with a smaller amount of arbitrary assumption, for the process of evolution. Even if, overlooking that differentiation is thereby taken for granted already, he should think he sees reason to assume the existence of some permeable material medium whose property it is to originate motion in the more substantial particles of matter, and, in so far as they agitate it, to react upon them, he will find, in the attempt to imagine what he has thus conceived, that it too resolves itself into a mobile system of atoms, and that the commencement of a course of evolution still presupposes for the entire space-occupying aggregate a perfect reciprocity of neutralising tendencies. Upon this point, however, I need not dwell, provided no equivocal assumption be introduced unawares, and it be understood that the theory we have to consider is constructed on the hypothesis of an original homogeneous equilibrium of evolutionary tendencies, wherein all developments which were in due time to appear have what may be called their *Logos*, and are, to all scientific as well as practical intents and purposes, adequately accounted for.

6. But an ideally unstable equilibrium being manifestly unattainable through the mere operation of conflicting tendencies, and as the result of movement thus generated, we cannot assume its existence without committing ourselves to one or the other of the two following suppositions:—Either (1) it has been in existence from all eternity, or (2) its constituent materials—let us call them homogeneous atoms—coming into existence at some time or other, find themselves in equilibrium. The latter supposition, if I am not mistaken, is far from likely to approve itself to persons who uphold the ordinary theory of evolution; and, indeed, in necessitating a view of origination which they repudiate, it partially nullifies itself by rendering gratuitous the hypothesis of an unstable equilibrium. As to the former, even if we should allow a *status*

quo to be without beginning and yet terminable,—in other words, both eternal and temporal,—they cannot maintain the proposition that, having lasted an eternity, it has come to an end, without binding themselves, as rational beings, to account for so marvellous an incident, or at least to offer some suggestion that may seem to throw light upon its cause. A similar obligation must, of course, be acknowledged if the other supposition be adopted. To whichever of them the preference be given, it cannot be evaded. Let the instability ascribed to the imagined equilibrium be such that less than the millionth part of the force transmitted by the impact of the tiniest mote which sunbeams ever rendered visible might suffice to overthrow it, the disturbance must arise from something; it implies, but it cannot be simply and purely due to, instability. The cause, whatever it may be, is plainly *ex hypothesi* something extraneous to the system of balanced forces. Had it, then, in this point of view an effect that might be compared to that of the kiss by which the princess in the fairy tale is released from a trance of a hundred years' duration, and wakes up, together with her court and household? Did it find entrance into a universe of sleeping atoms, which must otherwise have slumbered on through all eternity, and breaking, as it were, the mysterious spell that had kept them motionless for ages, rouse up their suspended energies to evolutionary activity? However amply, in other respects, the theory which presents in idea an unstable equilibrium might satisfy the demands of the philosophical inquirer, an indispensable requisite has clearly been omitted—there is no suscitant force.

7. An attempt will perhaps be made to meet this objection on the ground that we are under no necessity of assuming the actual existence of an original state of exact equilibrium; for it has been argued that, "whether that state with which we commence be or be not one of perfect homogeneity, the process must equally be towards a relative heterogeneity."* Is it then allowed in the words I have just quoted that the fact I suppose to have been assumed is after all uncertain, that possibly there never was an exact equilibrium? Well, but if it be true, as the writer asserts, "that not only must the homogeneous lapse into the non-homogeneous, but that the more homogeneous must tend ever to become less homogeneous,"† the concession is fatal to the theory, unless it may

* *First Principles*, by Herbert Spencer, ch. xiii. § 109.

† *Id.*

be maintained that the degree of heterogeneity which the universe has by this time attained is perchance the outcome of a process which had no beginning. Such a notion, I presume, may be dismissed from thought without discussion: to spend words in controverting it would be a waste of time, even if, regarded simply as assuming that a series may be co-extensive with infinity, it could not be at once refuted.* It should, therefore, be sufficiently apparent now that the theory I have been criticising lacks an essential condition of stability—namely, such indisputably first principles as might constitute for it a base of adequate breadth. Vain are all efforts to make it stand: it may be compared to an isolated column with a huge capital, but without a plinth; let those who have constructed it do what they will to set it up, it topples over, if I may so express myself, this way or that, and falls of its own weight.

8. What, however, if no primordial state of matter can be imagined which satisfactorily accounts for the existence of a multiplicity of heterogeneous forms? and what if the retrogressive investigation of the phenomenal universe is perceived at last to lead to nothing? It by no means follows that the failure of every intellectual enterprise in which that route has been taken should be accepted as conclusive evidence that the origin of things is inaccessible to science—that their beginnings are buried in absolutely impenetrable obscurity. Surely in the invincible persuasion, so unmistakably characteristic of the truly scientific type of mind, that indefatigable research in the direction of origin will find its justification in fruitful discoveries—a persuasion to which the world is indebted for substantial advantages far too numerous to be ever acknowledged in full—there is something which deserves profound respect. The thorough-going student of Nature has grasped a truth, and one which, through his agency, may be destined in some measure to benefit his fellow men, even although, it may be, he fails to see distinctly what it is, and whither it ultimately tends. The heavens and the earth having revealed to his observation that changes are incessantly taking place in the direction of the increasingly manifold, that the phenomenal universe has been from the first, and still is, progressing in the way of development, he cannot allow himself to believe that science will have ever accomplished its work, so long as in any respects its elemental

* *Vide The Fundamental Assumptions of Agnosticism examined in the Court of Pure Reason, by H. J. Clarke (Trans., vol. xx., p. 180).*

doctrines and their expository applications admit of further simplification; and there is thus a possibility of making a nearer approach to some ultimate principle, which, if discovered, would account for all things. A new step thitherward may seem to have been lately taken in the theory which has necessitated the coining of the word *Protyle*,* and which, perhaps, in some modified form, may be eventually accepted as a luminous simplification of the first principles of the science of chemistry, and as still further correlating its phenomena with facts which astronomical observation has brought to light. But in the endeavour to penetrate the mystery of an ever-receding past, the increasing risk of mistaking baseless speculation for scientific progress renders continually more and more needful a clue which the explorer may discover if he looks *within*, and which, therefore, is inevitably overlooked by those who, in seeking guidance, confine their attention to such outward signs and tokens as seem to point out the way.

9. What I take to be the clue is to be found, not in the phenomena that await interpretation, but in the interpreter himself, in the resources of that *volitional* power which he possesses in association with sensibility and reason. For if the fundamental principle of evolution be sought, what is there in nature to suggest a conception of it so worthy of a rational being as that of which we seem to have an inkling if we reflect upon that evolution from within ourselves which takes place in so far as the outward world reveals us, and our own minds account for any phenomena which would be wanting but for them? In reference to this question, the products of human thought and industry have an unmistakable significance: in the conversion of masses of earthy material and of vegetable fibre into elaborate structures adapted to the manifold needs of the highest order of organic life there is a notable transition from imperfect homogeneity to a relative heterogeneity. The cropping-up of houses, and villages, and towns, and the development of those countless tangible evidences of advancing civilisation with which they become enriched and adorned, constitute a growth, running, in a measure, parallel to that which clothes the earth with verdure and breaks out into flowers and fruits, and, it may also be affirmed, crowning, so far as this planet is concerned, the ascending grades of cosmical evolution.

* "Address to the Chemical Section of the British Association" (Birmingham, 1886,) by William Crookes, p. 11.

10. Following, then, the clue which may be thus perceived, we trace up the heterogeneous, in all examples of the kind just specified, to a point at which (if for a moment we put out of view that cause which, being eternal, is *absolutely* original) our consciousness assures us we have reached its source; and here an operation of which we have immediate intuition, and which is too simple either to need or to admit interpretation, discloses to us its origination, and, as I cannot doubt, reveals, so far as in the nature of things such a revelation is possible, the fundamental principle of Evolution. An unstable equilibrium, even if it is to be assumed, still fails to account either for its own existence or for its disturbance; but in the stirring of that spontaneous energy within itself of which Mind is conscious, and which it is utterly incapable of representing to itself as separable from consciousness—in that action in which it recognises something different from a mere phase in the operation of persistent force—in that peculiar kind of movement which the verb *to will* denotes, it perceives, for a species of evolution it is intimately acquainted with, an unmistakable point of departure. The perception, it is true, takes place in a mind whose existence presupposes antecedent conditions, whose power, however exercised, is at all times dependent upon their cause, and whose products are only forms assumed by material already provided, are nothing more, in fact, than contrived situations, or, so to speak, samples of manipulation. But these considerations, it is plain, are by no means grounds for suspecting that the clue we have been following has led us astray; for nothing whatever forbids the conception of an *absolute* power of origination, a power which, instead of *finding* any of the conditions it was to fulfil in its working, *determined* them all, the contributions they were severally to make to the complete result being all comprehended in an Eternal Idea. Our immediate consciousness of volitional action involves the ability to conceive an *ideal* freedom of origination, and thus philosophically to recognise as such an Original Cause. If in the conception thence formed any defect can be detected, let it be pointed out, and let a preferable conception be suggested and named. If this cannot be done, and if it cannot be alleged that any intellectual requirement has been left unsatisfied, then let it be acknowledged that Evolution has been tracked to its source, and discovered to be a stream of manifested thought issuing from the hidden spring of an Eternal Mind, revealing ever more and more the riches of a manifold wisdom in association with adequate prolative power, and still widening and deepening as it flows.

11. This being granted, it will easily be seen that the phenomena of Evolution are no less philosophically accounted for, if for that scientific term, so applicable when rightly understood, we should substitute a word which has become consecrated by its theological use, and which is commonly taken to be antithetical to the other—I mean Creation. The supposed opposition between them is purely imaginary; the compatibility of their applications is real and fundamental. Any undisputed product of Mind, contemplated simply as such,—for example, a picture or a statue,—it is permissible to regard as being, relatively to the artificer, a creation; and this term, if it has any meaning at all, is unquestionably in such a case applied with strict propriety, while, relatively to a poetically-conceived store of hidden resource and potential development which has yielded the visible production, the latter may with equal propriety be represented as having been evolved from the former, or, to use a virtually equivalent metaphor, spun out of it; and the work, as it grows under the producing hand, may be termed a continuous evolution. In short, to evolve is to create, and to create is to evolve. Rival philosophies are alike superficial, if they drag these two concordant words into the arena of religious polemics for the purpose of pitting them against one another.

12. Lest, however, the objection should be raised that, in conceiving the Original Cause to be an emittent source, we embarrass the conception of its immutability, and virtually comprehend with it in the same category of being the things to which it gives existence, making its effects to be self-developed modifications of its own substance, allotropic reproductions of some single all-involving element, we shall now do well to observe that the products of Mind, so far as we have any immediate perception of them as such, are essentially distinct from the conscious subject. A clear intuition assures us that they constitute no portion of the producing substance, and that in springing from it (I ignore, of course, all purely organic waste) they become no loss to the individual, imply no drain upon the resources of his personality, no deduction from himself. The causal relations we evidently bear, although in limited degrees and respects, to forms of objective existence direct our attention to a definite subjective property. This, when distinguished as a specific force, is named *volitional*; when its efficacy is characterised it is known as *creative*; while if, in contemplation of its effects, regard be had to a hidden fund of corresponding resources, the adjective which suggests itself is *evolutional*. The proceeds of evolution may be numerous and endlessly

diversified, but the process takes place in conjunction with the consciousness of an indivisible unity and simplicity of being, and, moreover, of a rank so exalted as to forbid the classification of the producer with the things produced, otherwise, of course, than relatively to a higher and a common origin. Absolute immutability, indeed, is by no means, as a matter of course, to be inferred from the indiscernibility of a personal unit. Action, if it involves a new experience, may be admitted to imply a change in the condition of the agent; only, however, in relation to that experience, and to its necessary subjective effects, if such there be. But to the source of all other things besides itself that have been, are, or shall be, nothing can at any time be new; for whatsoever it has within itself it must have always had. When, therefore, lifting up our minds to a First Cause, we direct our attention to the process of origination, what we have to conceive is a *modus operandi* which, instead of being determined, whether by successive modifications of thought and feeling, or by any of the restrictions to which volitional action in created agents may be forced to submit, presupposes a pure, simple, and ideal ability to effect things that shall have their place in subjection to the conditions under which the existence of the finite is possible. How, then, is the immensely comprehensive evolution exhibited in that system of interrelated and continuously developing forms of being which we call the universe to be accounted for? We have found, I believe, the answer to this question, having, as I now venture to assert, arrived at it by a synthesis of unmistakably trustworthy intellectual intuitions; for they authorise and necessitate the conclusion that AN IMMUTABLE SOVEREIGN WILL IS GIVING, IN ABSOLUTE FREEDOM OF ACTION, UNCEASINGLY PROGRESSIVE EXPRESSION TO AN ETERNALLY FIXED IDEA.

13. This conclusion reached, it falls in my way to notice in passing two ancient notions respectively characteristic of rival systems of philosophy, but both profoundly suggestive, and historically important as regards the influence they have severally exercised in determining modern developments of philosophical thought. Each, as it appears to me, betokens a certain philosophical kind of insight fundamentally sound, bearing witness, as it does, to an experience of the difficulty of firmly grasping those restlessly-shifting indications of being which are ever playing upon the senses, producing impressions that vary from moment to moment; and to a conviction that the interpretation of these impressions is not to be found otherwise than in stable intellectual perceptions. Plato, contemplating nature with the steady gaze of an

inward eye that strove hard to escape being dazed and abused by the fleeting images of a phantasmal scene, fancied that he saw in them adumbrations of archetypal forms; and these forms, which he called *ideas* (ἰδέαι), were in his view true, substantial, and enduring. Aristotle's imagination, while his inquisitive and discriminating intellect sought to penetrate the secrets of nature, likewise created for each subjective concept a sort of objective counterpart. This, the distinctive εἶδος of the object contemplated (he did not name it ἰδέα), was its constitutive form, something which the conception of it implied, and which must therefore be considered indispensable to its essence (John iii. 10 R.V.) or being (οὐσία), but which, apart from the supposed nondescript material (ὕλη), wherein alone specific characters could find expression, had no substantial existence. Of these two notions the later shows doubtless some advance in the spirit of scientific caution which facilitates the avoidance of error, but it was not, like the earlier, conceived in that elevation of soul which involves a superior aptitude for the apprehension of truth. In the efforts, however, thus made to discover the stable and real by looking through the sensible into the sphere of the intellectual, it was overlooked that the concepts thereby assumed to have their counterparts in the nature of things had not been formed out of pure intuitions, either intellectual or moral, materials in respect to which philosophers might be permitted to say, "We bear witness of that we have seen,"* but were products of tentative thought, as it were distinctive labels of provisional value at best, appended to aggregates of properties, observed and classified from variable points of limited view, results of an empirical and unfinished process, arrived at in the exercise of limited powers of perception and a fallible judgment, and leaving indefinite room for increasingly profound, accurate, and comprehensive knowledge. No portion of the universe, no single phase, or observed association of phases, of the ever-moving system of the manifold, can have an adequate intellectual counterpart otherwise than in each and all of its interrelations with the rest, not simply the interrelations of mere coexistence in an arbitrarily-assumed present, but those of a past which dates from a mysterious beginning inscrutably remote, and those of a future yet to be disclosed, which shall have no end. The eternal purpose of summing up (Eph. i. 10.) the universe in the

* In εἶδος we perceive a purely metaphysical conception; it is that which makes the thing just *what it is*. Relatively, therefore, to this term *essence* (οὐσία) must be distinguished from *existence*.

perfect Image of the invisible God, namely, in the archetypal Man, a purpose recognised in the Christian verity, evidently presupposes that the Idea of Him in its entirety, its length, and breadth, and depth, and height, and of the universe as it was from the beginning, and will be through eternity, are one. In short, one comprehensive, fixed, unchangeable Idea suffices, as the so-called formal cause, to account for everything, although the manifold conceptions in which it is destined to be apprehended will continue growing and expanding as the ages roll for evermore.

14. "Classifications," it is asserted by the eminent evolutionist whom I have already quoted, "are subjective conceptions, which have no absolute demarcations in Nature corresponding to them."* Now, in declining to claim for our definitions a complete and absolute character, we do not therefore deny that the objects manufactured by the Power which is at work in Nature exhibit real and significant varieties of type; nor do we leave it to be inferred that, in evolving finite existence, the mysterious Artificer, in so far as, having established distinctions in the products of His hands, He opens up to our view distinctive marks, has not allowed them to become for philosophical purposes distinguishable. Before, however, we hold ourselves entitled to form an opinion as to whether He has wholly or in part separated specific characteristics by lines of demarcation sharply drawn, or has connected them all by insensible gradations, it behoves us to supplement steady introspection with a close inspection of objective facts, to observe both the existing works of His hands and whatever traces are still visible of His operations in past times, and to take note of such laws and principles as may be empirically discovered by attending to the process of differentiation. An attempted exposition of Evolution, which left these facts and laws and principles out of view, and gave no further account of the genesis of the manifold and complex than is implied in simply setting it forth as the expression of the Eternal Idea, would be manifestly and inexcusably incomplete.

15. Our next step, then, it is plain, involves the consideration of a much-agitated question, and one which cannot be either profitably, or even honestly, evaded. As it necessitates attention both to the characteristics of Life and to the so-called Persistence of Force, it may be conveniently introduced by a few preliminary remarks in reference to these weighty matters. I would first of all submit that Mr. Herbert Spencer's definition of Life, which accurately describes, indeed, the only

* *The Principles of Biology*, by Herbert Spencer, Part I. ch. iv. § 24.

distinctive symptom observable in every case in which the term is held to be applicable, but takes account of nothing more, cannot properly be accepted as a *definition of the thing signified*; and that, accordingly, we ought to say, not that life *is*, but that it is *known by*, "the continuous adjustment of internal relations to external relations."* Further, I would suggest that persistence should be predicated of Effect rather than of Force. If a body, once set in motion, continue moving, it is an effect which visibly persists, whether in the simple, undeviating motion thus originated, or in the resultant of a multiplicity of effects. It may be eventually transmuted from sensible movement into molecular tremors, or may be lurking in situations of relative and apparent repose; but, howsoever this be, it is the effect which lasts, and which, if we suppose a final balance of conflicting effects, or, we may say, their absolute neutralisation, must in this form, but must in any case in some form or other, last for ever. The action of true force, so long as it persists, must needs be, as is evident in a falling body, *cumulative*. There is, I do not for a moment doubt, a persistence, or ceaseless conservation, of all tendencies observable in matter; and, for scientific purposes, every such tendency may be conveniently represented, relatively to the amount of *resistance* it can overcome, as *force*, and relatively to its equivalent in *work* (ἔργον), as *energy* (ἐνέργεια). To credit atoms and molecules, however, with the possession of forces and energies is, I cannot but think, to encumber science with gratuitously-conceived metaphysical entities, and thus to fall into the very snare against which scientists so emphatically caution us. Of Force we have no truly scientific knowledge, except in so far as, aided by the immediate experience of spontaneity, we conceive of a Necessary Force whence all movement and change originate. The philosophical conception of force assumes that the elementary particles from whose complex movements and combinations diversities of structure arise, execute with faultless regularity preordained manœuvres, and assume, without fail, appointed places under the control of an all-compelling Will, and thereby constitute the ever-growing expression of an Eternal Idea.

16. The question we have now to consider I formulate accordingly, as follows:—Are the various types which have been modelled to serve as vehicles and instruments of corresponding varieties of that specific determination of the Divine

* *The Principles of Biology*, by Herbert Spencer, Part I. ch. v. § 30.

energy which we call Life unrelated to one another, save as having their issue from the same unoriginated source? or are they developed forms, which, through the operation of dissimilar external conditions, have all alike insensibly acquired their several characteristics in the course of a continuous evolution of immense duration from some initial rudimentary type? Two opposite views in respect to the mode of the original genesis of organisms are respectively indicated in the alternative hypotheses just stated, and it is between them that we have to choose.

17. Whether or not the question at issue admits of an answer which may be accepted as conclusive, it behoves us to observe that, as regards certain points of paramount importance, these two hypotheses I now submit to you have equal claims; indeed, it does not matter in the least to which of them the preference be given. They both agree in representing different types to be distinct creations, and also in accounting for their existence teleologically; whereas, however, in the former the notion of origination is comparatively simple, leaving out of view all else but cause and plan and purpose, the latter resolves the process, separating the commencement from the state at present reached by an immense interval of gradual development, and thereby modifying and enlarging the first-formed conception of inter-relations. What, then, we desire to be assured of is, whether the phenomena which have suggested the development hypothesis find in it their true interpretation. For my own part, assuming, as I do, that a primitive conception of origination, although inbreathed from above, would in the nature of things obtain for its medium of imaginative thought the simplest notions through which it could be symbolically grasped, retained, and rendered fruitful, and that its literary expression would, as a matter of course, receive from these a characteristic shape and colour, I am not aware of any argument in favour of the earlier hypothesis grounded on rightly-venerated authority, nor can I see any reason for hesitating to regard it as a mere alternative to which science must necessarily revert in the event of its failing to establish the doctrine of a gradual development of organic types.

18. The arguments, however, which have been submitted to thoughtful readers in support of this doctrine I pass by; they are to be found fully and elaborately set forth in works of distinguished ability, and no summary could I hope to produce that would give an adequate impression of their amplitude and weight. But as even its strenuous advocates, if serious and candid, will assuredly confess, the objections

that may be raised against it are entitled to grave consideration; and, certainly, it is no genuine spirit of scientific caution that will forbid us to doubt whether they have all been satisfactorily answered. To instance one of the most obvious objections—although, it may be, not the strongest—given in the pedigree of the original man a species of anthropoid ape, equal in rank to the highest type now extant; given, therefore, two organic types which were related to one another, but separated by an interval of time which, without a moment's hesitation, we may assume to be no small multiple of a thousand years, have we not a right to ask, "Where are the modern analogues, where are any of the fossilised specimens, of the innumerable intermediate stages of development?" If, in respect to its being both continuous and imperceptible, Nature's progress from the homogeneous to the heterogeneous may be imagined to resemble the movement of a glacier, how are we to account for so enormously wide a crevasse, which, be it observed, shows the split to have been complete, alike from top to bottom and from side to side? It is not one connecting link that we miss between the brute and the man, namely, between the most advanced of the lower races of animals now existing and that race which towers and rules over all—it is not two or three, but thousands or myriads or millions. On the insensible development hypothesis, we might reasonably expect to find, at any rate, some transitional species of creature, of which it would be impossible to say to which of the two classes it belonged. In fact, it is not easy to imagine how this hypothesis can be adopted without theoretically expunging from organic nature all those boundary-lines, and pulling up all those landmarks, which now render classification feasible. The breaches of continuity which suffice to frustrate any attempt that might be made to track in any direction the supposed course of development are too numerous, and for the most part too wide, and in too many instances intervene between diversities of structure and function remote from similarity, and between peculiarities which have no appearance of standing in necessary relation to external conditions, to admit of being adequately accounted for by these conditions, and thus of finding the places they require in a definite and full-blown scheme of physiological evolution. Passing from this objection, I might proceed to ask what should induce Nature, in making choice of individuals with a view to their survival, to look with a friendly eye upon such budding organs, incipient wings for example, as in their undeveloped forms can have no more than a prospective value, and may, without stretch of imagination, be conceived likely

to prove an embarrassing possession. But it does not fall within the scope of this dissertation that the hypothesis under notice should be thoroughly sifted, and the arduous task of balancing the arguments for and against it performed with such care and delicacy as to do it justice, or rather that a point of view should be sought whence all the seemingly conflicting facts it has brought under notice may be seen to harmonise. Philosophy may rest content to leave it for the present, if not for an indefinite time, *sub judice*, insisting only that, if an immediate verdict be delivered, it shall be "Not proven."

19. Yet, let us suppose it has been established that, simply in virtue of properties inherent in matter, certain molecular combinations, which, in the maintenance of a moving equilibrium, had previously constituted non-sentient organisms, underwent, in consequence of some change in external conditions, such a modification as the transition to sentient life involves, can we allow it to be conceivable that the mere physiological alteration which thus took place gave rise to *sensation*? Assuredly, such an origin for such an affection is absolutely unthinkable. Whether or not a space-occupying atom may be conceived capable of feeling is a question which, although there might be a difficulty in making it more edifying than amusing, I would, if necessary, discuss. But there is no necessity. The question is, can the subject of sensation be an arrangement in respect to positions and motions? Or, let us ask—to put the question in a more comprehensive form—can it be a set of relations and nothing more? In short, can it be a nonentity? Has it come to this, that if I am to think scientifically I must begin by giving my consciousness of sensation the lie—must say within myself (namely, what I have hitherto fondly imagined to be myself) that it has been deceiving me, or rather, that something which, under the notion that I am, I call my consciousness, has all along been uttering a falsehood, which, did I exist, would have deceived me, but has not after all, inasmuch as I, who seem to myself to have been deceived, am absolutely nothing? Is *self*—I leave out of view for the moment all such knowledge of it as presupposes further internal witness than sensation—to be accounted simply a moving molecular counterpoise of a particular kind? According to the doctrine of Evolution, as commonly taught and understood, things are felt but nothing feels. The experience is recognised; not so one of the obviously essential conditions of its possibility. Of this, through some strange inadvertency, or for reasons yet to be divulged, no account is taken.

20. But if there is really something which feels, one of its relations to the organised aggregate of molecules with which, wheresoever discovered, it is found in close association, must needs be that of tenant. Whether it comes into existence before there is even a single room to receive it, and, if so, whether it has unconsciously a hand in building the house it is destined to occupy—these are questions which it might be interesting to ventilate, but which, so far as my purpose is concerned, may be left unanswered. Thus far, moreover, it is immaterial whether or not we can determine the grade of life at which the sort of susceptibility to outward changes that is evinced by appropriate movements becomes associated with actual sensation—in other words, with the most fundamental kind of psychical affection of which we have experience; and we may allow it to remain an open question whether the cases in which, in organisms supposed to be animal, apparent individuality, instead of being destroyed, is multiplied by mechanical division, exhibit the production of new individuals really sentient, or whether the kind of sensibility of which they furnish evidence may be ranked with that of the so-called sensitive plant, and may be regarded as having, in the functional susceptibility of the efferent portion of a developed nervous system, its analogue in the higher types of life. I still hold myself at liberty to distinguish from the organs or instruments of sensation the things which feel, and to contemplate the latter, relatively to non-sentient matter, as an evolution of something previously latent in the resources of Originative Power, as an advance in the revelation of the Eternal Idea.

21. The next step in advance is the commencement of *psychical differentiation*. In view of the possibility that variations of type may have arisen in the way of progressive development, it will here occur to us to ask whether limits determined by the capacity of its soul have been assigned to the developments which a sentient organism may undergo in correspondence with modifications of its environment, or whether the soul is, so to speak, illimitably elastic and indefinitely expansible in all directions. If (to illustrate my meaning by a further use of metaphors I employed just now) some considerable improvement of the house should so change its character as to necessitate on the part of the tenant a superior style of living, must he make way for another tenant? or will he, if he does not possess already, be supplied with, as a matter of course, the means of adapting his *ménage* and his scale of expenditure to the situation in which he will find himself, on the supposition that he is allowed to remain? One

thing I venture to assert without the slightest hesitation: I am at a loss even to conceive of a transition from the psychical condition of a lower animal to that of man having been effected otherwise than by what might be called *a new birth* or *a new creation*. He has certain distinctive mental characteristics which are surely traceable to the seed of some intellect of a peculiarly God-like order such as shows him to be of nobler lineage than the creatures over which he exercises sway. It is no mere difference of degree that we observe in comparing the brute soul, even in those specimens which exhibit exquisitely-developed sensibilities and perceptive powers, with the soul which manifests a capacity for thinking of an Author of all things finite and temporal, and of a life independent of all changes and chances. Yearnings and anxieties unutterable, in thoughts directed towards One who is perceived to have had no beginning, and to be the same yesterday, to-day, and for ever, are assuredly conceived through no faculty which owes its origin to nothing more than growing complexity in the inter-relations of appetency with a physical environment. An ellipse may be imagined to have its major axis lengthened out continuously *ad infinitum*, while the minor axis remains unchanged; but can imagination ever by this process expunge it from thought and fill its place with a parabola? Is there a possibility of blending the conception of the one with that of the other—in other words, of conceiving curves which are intermediate between the ellipse and the parabola, and do not admit of being sharply defined by either term? When this can be done, when the former can be represented as having by continuous modification of its axial relations evolved the latter, then may we allow it to be possible that the human soul has grown imperceptibly out of that which once belonged to some inferior animal.

22. To those whose psychological philosophy is but the interior projection and indispensable complement of their physiological scheme, I am quite prepared to concede that a fallacy must be lurking somewhere in my reasonings, if ever the brain, in any of the abnormal states to which it is liable, gives evidence of a break-up of personality. But is such evidence forthcoming? A lunatic, it may be, is under the impression that he is two individuals. Let us suppose them to be historical celebrities, whose characters present points of contrast. If his mental aberration involves corresponding alternations of character, there may be reason to suspect that the two hemispheres of his brain are in different states, and that they have been rendered by disease incapable of normal concerted action. For character, as manifested in the flesh,

cannot simply be the stamp which the soul bears: it must be in a considerable degree dependent upon the state of its instrument and medium of manifestation. Assume, however, the impression of a duplex, or of a multiplex, personality, and let it induce the bewildered man to hunt at times after some imaginary illusive self. We must needs postulate a subject to which it may be ascribed. What, then, should the subject of this impression be but a conscious self, a soul whose individuality cerebral confusion has left intact? If, from a conscious subject, some portion, not recognised while there as constituting a wedded, but distinct consciousness, were detached, how should its severance leave the impression of a *divided* consciousness? We may see plainly that what is really missed is some desirable habit of mind, faintly remembered, and the comparatively pleasing experiences associated with it; a multiplex personality, if the attempt be made to attach a meaning to the phrase, is absolutely unthinkable.

23. Nothing, therefore, now remains that might seem to forbid the conclusion towards which my argument has been tending. Evolution is more than the mere complication of molecular relations: it brought into view being of a kind which shows itself distinct from the material in which those relations find place; and, still differentiating and distinguishing, it opened up those superior attributes of which we find ourselves possessed, and by the aid of which we are enabled to conceive the existence of, and to ascribe a character to, an Eternal Author of the whole, an original and all-compelling energy.* Evolution has been raising that curtain of night and emptiness without beginning, which before all worlds had veiled His glory; and, in a type of creature exhibited on this planet at a comparatively recent date, it has disclosed what may be called an image of the invisible God. But Man, considered simply as an individual, fails to disclose fully what he is, and comes very far short of revealing, as he appears to have been destined to reveal, his Author. His social attributes have need to be duly developed, and to be brought into action in a social state, which shall afford adequate scope for their exercise. As regards the ultimate prospects of the human race, if any physiological progress can be now detected, the bounds which seem to have been established in the fixity of natural laws, render it of comparatively little moment. But the sort of facts which, about eighteen centuries ago, first made it evident to a chosen few that the

* 1 Cor. xii. 6 (Θεός ὁ ἐνεργῶν).

manifold wisdom of God was being made known by the Church to the principalities and the powers in the heavenly places (Eph. iii. 10), are still observable and conducive to the expectation of a state of existence in which the Eternal Idea will have its outcome in the absence of sin, decay, and death, and the invisible God thus revealed will be all in all.

THE PRESIDENT.—After a communication from one of the members has been read, we shall be happy to hear any remarks upon this paper, which displays a great amount of thoughtful treatment, and seems to require an equally careful consideration.

CAPTAIN F. PETRIE then read the following communication from Surgeon-General C. A. Gordon, M.D., C.B. :—

“ . . . With regard to sections 21, 22, and 23 of Mr. Clarke's paper, it seems to me that so far is man from being 'evolved' towards a higher condition than that occupied by him in his early history—he is mentally and physically now in process of retrogression or devolution. I think, also, that this theory accords with analogy as presented to us in the process of *decay* which we see pervades all things, whether animate or inanimate.

“I further think that as with the early Aryan poet-philosophers mentioned in my essay 'On Medicine in Ancient India,' so with the early Semitic and other 'prophets,' there existed in them a more intimate relation between the corporeal and *psychic elements* in their nature, than is now to be found in humanity as it at present exists. . . .”

Mr. W. GRIFFITH.—I rise with a certain amount of diffidence to offer a few remarks on a paper which exhibits a great amount of intellectual power and considerable skill in the use made by the author of philosophical terms, together with a knowledge of antique philosophy which we do not often meet with. If by “Evolution a Revelation” is meant that Evolution adopted as a truth would explain many facts, this, no doubt, may be the case; but the word “Revelation” does appear to me to be too transcendental for application to a system of natural and physical philosophy. Passing from the proposition which has thus been laid down, I would venture to make a few remarks on the reasons that have been adduced in support of it. The first argument is that, “the beginning of the Cosmos, having been conceived as a state of things in which differentiation had as yet no place, there is but one way in which it can present itself distinctly to the imagination: it must be pictured as a system of homogeneous atoms in perfect equilibrium.” Now those who are acquainted with the Greek philosophy know that the Cosmos is usually taken by the Greek philosophers to signify a uniform order in creation: not as a system of molecules thrown together indiscriminately, but rather that development of system in the universe in which there was order and beauty, and everything was harmonised and consistent. I think, therefore, that the use which is here made of the word “Cosmos” is entirely inappropriate. But, passing from mere criticism of the use made of

the word "Cosmos," I would call attention to the statement made in this passage, that all things were in a state of homogeneity, and I would ask, "Is not this assuming a great deal too much?" If we turn to the classics we find Ovid telling us:

Ante mare, et terras, et, quod tegit omnia, cœlum,
Unus erat toto Naturæ vultus in orbe,
Quem dixere Chaos ; rudis indigestaque moles :
Hanc Deus, et melior litem Natura diremit.

Surely we can imagine a state of chaotic existence before the beautiful and harmonious Cosmos came into being, and are not compelled to the conclusion that all the atoms were homogeneous. I think that such a supposition as this is quite as consistent with fact or reason as the supposition that all things, at that time, must have consisted of homogeneous atoms in perfect equilibrium. It would take too long to follow the very able development of the author's argument, and trace, step by step, the superstructure he has erected on, what I conceive to be, a fallacious foundation, till we come to the point as to Evolution. We are told that, if we assume all these things, there need be no great difficulty in substituting the word "Creation" for "Evolution." But this is the very point in debate. To my mind, it is simpler to take the first chapter of Genesis as we find it, and say, there may be difficulty in it which is hard to explain, but that it does explain the existing state of creation in a way which neither Herbert Spencer nor any of our more extreme modern philosophers seem to have done. As to the creation of matter, a question not taken up in this paper. How did matter come into existence? That it was created by the Almighty and that certain qualities may have been attached to it which evolved themselves in particular forms of physical existence, may have been the case; but I do not stand nor lean on that. We have what is supposed to be really a revelation—inspired—which does explain the difficulties of creation. These remarks of mine have necessarily been somewhat fragmentary. The subject is so vast and grand, and the points brought forward so comprehensive and sublime, that it is difficult to tie them down to the basis of calm fact and ordinary logic; but still, I think that what is put before us tends to show that we need something further to explain what is in existence.

A VISITOR.—May I ask whether the author will explain this passage, which appears in section 23: "Evolution has been raising that curtain of night and emptiness without beginning, which before all worlds had veiled His glory; and in a type of creature exhibited on this planet at a comparatively recent date it has disclosed what may be called an image of the invisible God." Are we to understand by this that the author regards the Saviour as a product of Evolution? I have heard such things before stated by some few men of learning and authority; but I should be very sorry to hear it asserted in this room. Again, may I ask whether I am right in supposing that the author wishes us to regard the term "Creation" as synonymous

with the term "Evolution"? Is it his opinion that they are one and the same thing? If so, I must certainly say I shall have to give up all thoughts of Evolution as I have previously held them. If I understand it rightly, Evolution, roughly speaking, would be the evolving of one animal from another, throughout the whole series, from those of the most simple origin up to the most complex types. If I am right, Creation is the production of beings by a definite act of the Creator. Of course, I may have misunderstood both the terms themselves and the view taken by the author of the paper; but I should like him to say whether I am to take for granted or how I am to construe the passage in section 12, where he says:—"This, when distinguished as a specific force, is named *volitional*; when its efficacy is characterised it is known as *creative*; while if, in contemplation of its effects, regard be had to a hidden fund of corresponding resources, the adjective which suggests itself is *evolutional*." Beyond this, may I ask one more question? As I understand Evolution, it professes to give a reasonable explanation of the different forms of life upon earth. In section 18 we are told that there is an absence of evidence connecting the highest being on earth—man—with the highest type of the lower animals, and in this the author is not in any way abstruse. He says:—"It is not one connecting link that we miss between the brute and the man, namely between the most advanced of the lower races of animals now existing and that race which towers and rules over all,—it is not two or three, but thousands, or myriads, or millions." If that be the case, I hope the author will pardon me if I say that in the absence of any proof, and in the presence of so complete a breach between two of what are usually termed allied forms, I cannot accept Evolution in the same sense as Creation, nor can I accept Evolution as in any way proved.

Mr. J. HASSELL.—I desire to ask one question. I shall not attempt to go into the whole paper, as I have not had time to read it before coming here to-night, and it is one requiring deep consideration. But after what has been said by others I may say that I am one of those who do not in any way believe in Evolution, as it is popularly put before us; and I should like to point out to those who reject the view that man is a separate creation, and hold that he is evolved out of a lower form of animal life, that the inevitable result of accepting such a theory is already claimed by some well-known Evolutionists themselves to involve the rejection of Christianity, if not of Theism altogether. For instance, one of their number, Mr. Grant Allen, speaks thus:—"While men believed in the special and separate creation of their own species, they could also believe that the Creator had endowed each human being with an immortal soul; but when the ascending line from the Amœba to man is seen to be unbroken* it is difficult to concede immortality to ourselves without conceding it also to every plant and every animal. . . . A consistent and logical acceptance of

* The "links" have not yet been found.—ED.

the Darwinian principle, therefore, would almost inevitably lead us to confine our horizon to the existing life, and to concentrate our efforts upon making this world as habitable and endurable an abode as possible for ourselves and others. . . . Such persons ask no reward, and fear no punishment." I would commend these plain words to the consideration of all. For my own part I agree with those who regard the extreme doctrine of Evolution which some hold, as unscientific, and consider it as based on wrong premises, and in this there are not a few able men that agree with me.

THE AUTHOR.—In replying to the observations made by the different speakers, I ought to say, at the outset, that I have not used the word "Evolution" in its ordinary sense, or rather I have not made the ordinary application of that term. I have represented it as the evolution of an Eternal Idea. I think it will be generally admitted that differentiation has taken place from the beginning—so far as we have any knowledge of the beginning; that there has been what may be called progressive differentiation. Evolution, as it seems to me, has been an evolution from the Mind which created phenomena, and in successive manifestations has brought them to their present state. I do not regard man as the evolution of a lower animal, and I think I have made this evident in my paper. I have not committed myself to the ordinary theory of Evolution, and do not regard man in any other light than as a distinct creation, although in reference to the Mind—the Eternal Mind from which he has proceeded—he may still be said to be an evolution. I think, therefore, that, in saying this, I have sufficiently disposed of the difficulty to which attention has been called in regard to the words used in section 23. I think I have shown that my views are perfectly consistent with the account of the creation of man which is to be found in the Book of Genesis. I was not at all conscious at the time I was writing this paper that I was deviating in the slightest degree from the Biblical account. I have taken what appeared to me to be the only possible philosophic view of Evolution. I have read certain masterly treatises on the doctrine of Evolution as it is commonly understood; and it has always appeared to me that, however ably the subject is treated in these works, they all fall short of being philosophical. I will make one remark with reference to the use I have made of the word "Cosmos." I have spoken of "The beginning of the Cosmos." Of course I do not mean that the Cosmos itself, or what might with propriety be called the Cosmos, was then in actual existence. What I meant by "The beginning of the Cosmos" was, that beginning from which the Cosmos proceeded; and if my words be taken in that sense, I imagine that my statement will be accepted as unobjectionable. I am not aware whether my attention has been called to any other point.

MR. GRIFFITH.—Will you explain your view of the origin of matter on the Evolution theory?

THE AUTHOR.—I believe matter to be a creation, and, at the same time, I conceive that it may be regarded as an evolution, from the Eternal Mind—that Mind in which there can be no change. I regard it as the evolution of

an eternally fixed idea, as far as we can form a notion of the subject from our investigation of astronomical facts. The first things created would seem to have been the material atoms, the mere matter out of which the universe was formed. Then, by progressive differentiation, the worlds thus produced came at last into the form in which they might be termed the Cosmos, which Cosmos might still, in some respects, become more and more elaborated. Differentiation is still making progress ; but I believe that matter itself was created by the Eternal Will. I take the words of the Book of Genesis in their simple and unmistakable sense, and without the least wish to put any qualification on the meaning they at once suggest. "In the beginning God created the heavens and the earth." All I contend for is, that creation may be regarded from a certain point of view,—that is to say, from my point of view,—as an evolution. So far from having adopted the commonly-accepted Evolution theory, I think I have shown that theory to be untenable. I have said that, if we are to adopt it, we must begin by imagining a condition of matter which was perfectly homogeneous. We can only do that by picturing to ourselves homogeneous atoms, so distributed that there must have been a perfect reciprocity between their tendencies, or the forces by which they would be at one time or another actuated. That I take to be the only possible way in which we can present to our minds the ordinary doctrine of Evolution ; and that doctrine, as will be seen from my paper, I have not adopted : I have merely stated it in order to confute it. I have by no means committed myself to the theory that matter came into existence in a state of perfect homogeneity. It may, or it may not ; but, at any rate, we have no proof that it was so produced. Finally, I think, from what I have said, that it must be quite apparent that my views are in entire accord with what is commonly believed to be the teaching of the Bible on the subject of creation.

The meeting was then adjourned.

REMARKS UPON THE FOREGOING PAPER
 BY SIR J. WILLIAM DAWSON, K.C.M.G., F.R.S.

January 8, 1888.

The title of the paper is not a very attractive one to a person whose studies have led him to regard the modern doctrine of Evolution, as expounded by its more enthusiastic advocates, as savouring more of superstition than of either Revelation or Science. There is, however, much valuable thought and suggestion in the paper, and it tends to clearing up the fallacies which encompass the word "Evolution" as used to include the distinct ideas of causation and development, and to confound them in the popular mind.

When men shall see clearly that under this misused word they are including in a most uncritical manner the ideas of causation both primary and secondary, and of development both direct and indirect, we may hope for some rational philosophical views as to the origins of things and the changes they may undergo. Until this mental confusion shall be dispelled, we shall have little progress in the discussion of these great subjects.

FURTHER REPLY BY THE AUTHOR.

In his communication touching my paper, SURGEON-GENERAL GORDON has drawn attention to a profoundly interesting question, and one that ought not to be overlooked in a treatise on Evolution. But it does not arise within the scope of my argument; for the theory of physical evolution by no means involves the assumption that man, considered as an animal, must have been improving from the time of his first appearance on earth. His environment has doubtless been modified, partly by astronomical and geological changes, and partly also by the manifold effects of advancing culture and civilisation; but no historical evidences of retrogression, supposing them to be forthcoming, may reasonably be adduced in refutation of the theory in question, unless, on a comparison of the conflicting influences to which the various races of men have been thus exposed in their struggle for existence it can be proved that there is no adverse balance

to account for retrogression. It must be admitted to be conceivable that in the Cosmos as a whole, there may be a continuous advance in heterogeneity, yet such as, so far from being uniformly favourable to every species of development, necessitates, to some extent, organic deterioration. Nevertheless, in the human physique, even if it could be clearly shown to have improved, there is nothing whatever to countenance the notion that the interpretation of man's spiritual history should be sought in atomic tendencies to complex molecular arrangement.

The sort of philosophy which, having discovered these tendencies, finds itself at the limits of its field of investigation, and can distinguish nothing beyond, could not be expected to introduce into its nomenclature the term Evolution without misusing it, and—to adopt Sir William Dawson's words—including under it “in a most uncritical manner the ideas of causation both primary and secondary, and of development both direct and indirect.” For, although the conception of a cause may easily become entangled in metaphysical confusion with that of its operation or its effect, to banish it altogether from the elaboration of first principles in any system of philosophy is impossible. My endeavour has been to vindicate for the true philosophy its rightful claim to a much-abused word, and, by a legitimate application of that word, to bring into view the Fundamental Cause, to which, along with every other name, and with every indication of existence or of change, it is always pointing.

In my impromptu reply to the critical, but candid and friendly, remarks which the reading of my paper elicited, I have already given such explanations as will, I trust, satisfy Mr. Griffith and the speakers who followed him that my views virtually coincide with those they expressed on all the momentous questions that came under discussion. In order, however, to obviate all possible misapprehension of the drift of my argument, I beg leave to call attention to paragraph 4. Having undertaken to examine the fundamental hypothesis of the theory of Evolution as commonly propounded, I there commence my argument by supposing for the process of differentiation a point of departure; I start with what I thus conceive to be a necessary assumption respecting the origin of the Cosmos. But, as will be observed, the assumption is made in the way of temporary concession, and with a view to a *reductio ad absurdum*, my object being to expose the fallacy which I see lurking in the phrase “unstable equilibrium.”

As soon as I have so far accomplished my purpose, I go on to point out how, as I believe, it is possible to arrive, by a strictly scientific process of investigation, at a distinct conception of the real origin of things. I indicate what seems to me to be a demonstrably trustworthy clue to that by which all finite existence is accounted for. But what I assert to be thus discoverable is not an aggregate consisting, on the one hand, of conceptual abstractions, self-subsisting and possessed, of the power of self-evolution into concrete forms, and, on the other hand, of a suitable, but absolutely nondescript, vehicle for these forms, likewise self-subsisting, but conditioned as to its mode of existence by time and space; it is a personal Creator

APPENDIX A.

ON THE PAPER ON "KRISHNA."

As regards Non-Christian Religious Systems, vol. xviii. contains a paper, upon Buddhism, in which the talented author gives the results both of his own studies during a quarter of a century in India, and of the most careful researches yet made by others, into the history of the times when Buddhism took its rise; and the position taken up in that paper is supported by several whose studies enable them to claim a right to speak upon the subject.

The present volume contains a paper on Krishna, by the same author, followed by a discussion, in which some of the best known authorities upon the subject give their opinions.

As it adds to the completeness with which the subject has been brought before the Members, it seems not undesirable to add, as an appendix to this volume, the opinion of one of the leading authorities in England, upon the subject of the Sacred Books of the East.

REMARKS BY SIR MONIER MONIER-WILLIAMS, K.C.S.I.

(Boden Professor of Sanskrit at Oxford University).

"Unusual facilities for the study of non-Christian religious systems are now at our disposal; for the University of Oxford has this year, 1887, completed the publication of about thirty stately volumes of the so-called Sacred Books of the East, comprising the Veda, the Zend-Avesta of the Zoroastrians, the Confucian Texts, the Buddhist Tripitaka, and the Muhammadan Kuran,—all translated by well-known translators. Our missionaries are already convinced of the necessity of studying these works, and of making themselves conversant with the false creeds they have to fight. How could an army of invaders have any chance of success in an enemy's country without a knowledge of the position of its fortress, and without knowing how to turn the batteries they may capture against the foe? Instead of dwelling on so manifest a duty, I venture a few words of warning as to the subtle danger that lurks beneath the duty.

"In my youth I had been accustomed to hear all non-Christian

and Upholder of whatsoever is subject to these conditions—an original and fundamental Cause, whose effects are at once the revelation of a Mind and the operation of a Will.

My philosophy, therefore, is no development of the speculations of Plato, except in so far as they approximate to a worthy conception of that eternal essence of goodness and truth towards which his mental energy was assiduously directed, but which it had not been given him truly to apprehend. It is simply, as I believe, the Biblical philosophy, although in my exposition of it I may have been giving evidence of habits of mind determined in some measure by familiarity with thoughts which owe their stamp and currency to his deep and fertile intellect. A reference to paragraph 10 will make it apparent that I hold matter to be a *creation*; for, as will be seen, I contrast man, in respect to the subordination of his will and to his inability to originate in any sense—except in the use of material already provided for him—with that Being to whom I ascribe an *absolute* power and an *ideal* freedom of origination.

If the title I have given to my paper should seem to need a more explicit apology than will be found in the foregoing remarks, I would request attention to the meaning of the word "Evolution." To *evolve* is to *roll out* or *unfold*; and therefore, as it seems to me, the disclosure of an idea, plan, or purpose, may with strict propriety be termed an *evolution*. In choosing this word, I was determined by the consideration that the universe, regarded as a creation, should be conceived as not merely *emanating*, that is to say *flowing forth*, from the source of all finite existence, but opening out a scheme latent in the mind of Him with whom (James i. 17, R. V.) can be no variation, nor shadow that is cast by turning.

religions described as 'inventions of the devil.' And when I began investigating Hinduism and Buddhism, some well-meaning Christian friends expressed their surprise that I should waste my time by grubbing in the dirty gutters of heathendom. After a little examination I found many beautiful gems glittering there; nay, I met with bright coruscations of true light flashing here and there amid the surrounding darkness. Now, fairness in fighting one's opponents is ingrained in every Englishman's nature, and as I prosecuted my researches into these non-Christian systems I began to foster a fancy that they had been unjustly treated. I began to observe and trace out curious coincidences and comparisons with our own Sacred Book of the East. I began, in short, to be a believer in what is called the evolution and growth of religious thought. 'These imperfect systems,' I said to myself, 'are clearly steps in the development of man's religious instincts and aspirations,—interesting efforts of the human mind struggling up towards Christianity. Nay, it is probable that they were all intended to lead up to the one true religion, and that Christianity is, after all, merely the climax, the complement, the fulfilment of them all.'

"Now, there is unquestionably a delightful fascination about such a theory, and, what is more, there are really elements of truth in it. But I am glad of the opportunity of stating publicly that I am persuaded I was misled by its attractiveness, and that its main idea is quite erroneous. The charm and danger of it, I think, lie in its apparent liberality, breadth of view, and toleration. In the *Times* of October 14th, 1887, you will find recorded a remarkable conversation between a Lama priest and a Christian traveller, in the course of which the Lama says that 'Christians describe their religion as the best of all religions; whereas, among the nine rules of conduct for the Buddhist, there is one that directs him never either to think or to say that his own religion is the best, considering that sincere men of other religions are deeply attached to them.' Now, to express sympathy with this kind of liberality is sure to win applause among a certain class of thinkers in these days of universal toleration and religious free trade. We must not forget, too, that our Bible tells us that God has not left himself without witness, and that in every nation he that feareth God and worketh righteousness is accepted with him. Yet I contend, notwithstanding, that this flabby, jelly-fish kind of tolerance is utterly incompatible with the nerve, fibre, and backbone that ought to characterise a manly Christian. A Christian's character ought to

be exactly what the Christian's Bible intends it to be. Take that sacred book of ours; handle reverently the whole volume; search it through and through, from the first chapter to the last, and mark well the spirit that pervades the whole. You will find no limpness, no flabbiness about its utterances. Even sceptics who dispute its divinity are ready to admit that it is a thoroughly manly book. Vigour and manhood breathe in every page. It is downright and straightforward, bold and fearless, rigid and uncompromising. It tells you and me to be either hot or cold. If God be God, serve him. If Baal be God serve him. We cannot serve both. We cannot love both. Only one name is given among men whereby we may be saved. No other name, no other Saviour, more suited to India, to Persia, to China, to Arabia, is ever mentioned,—is ever hinted at.

“‘What!’ says the enthusiastic student of the science of religion, ‘do you seriously mean to sweep away as so much worthless waste paper all these thirty stately volumes of Sacred Books of the East just published by the University of Oxford?’

“No—not at all—nothing of the kind. On the contrary, we welcome these books. We ask every missionary to study their contents and thankfully lay hold of whatsoever things are true and of good report in them. But we warn him that there can be no greater mistake than to force these non-Christian Bibles into conformity with some scientific theory of development, and then point to the Christian's Holy Bible as the crowning product of religious evolution. So far from this, these non-Christian Bibles are all developments in the wrong direction. They all begin with some flashes of true light and end in utter darkness. Pile them, if you will, on the left side of your study table, but place your own Holy Bible on the right side—all by itself—all alone—and with a wide gap between.

“And now, I crave permission at least to give two good reasons for venturing to contravene, in so plain-spoken a manner, the favourite philosophy of the day. Listen to me, ye youthful students of the so-called Sacred Books of the East, search them through and through, and tell me, do they affirm of Vyasa, of Zoroaster, of Confucius, of Buddha, of Mohammed, what our Bible affirms of the Founder of Christianity—that *He, a sinless Man, was made Sin?* Not merely that He is the eradicator of sin, but that He, the sinless Son of man, was Himself made sin. Vyasa and the other founders of Hinduism enjoined severe penances, end-

less lustral washings, incessant purifications, infinite repetitions of prayer, painful pilgrimages, arduous ritual, and sacrificial observances, all with the one idea of getting rid of sin. All their books say so. But do they say that the very men who exhausted every invention for the eradication of sin were themselves *sinless men made sin*? Zoroaster, too, and Confucius, and Buddha, and Mohammed, one and all, bade men strain every nerve to get rid of sin, or at least of the misery of sin, but do their sacred books say that they themselves were *sinless men made sin*? I do not presume, as a layman, to interpret the apparently contradictory proposition put forth in our Bible that *a sinless Man was made Sin*. All I now contend for is that it stands alone; that it is wholly unparalleled; that it is not to be matched by the shade of a shadow of a similar declaration in any other book claiming to be the exponent of the doctrine of any other religion in the world.

“Once again, ye youthful students of the so-called Sacred Books of the East, search them through and through, and tell me, do they affirm of Vyasa, of Zoroaster, of Confucius, of Buddha, of Mohammed, what our Bible affirms of the Founder of Christianity—that He, a dead and buried Man, was made life?—not merely that He is the Giver of life, but that he, the dead and buried Man, *is* Life? ‘I *am* the Life.’ ‘When Christ, who *is* our Life, shall appear.’ ‘He that hath the Son, hath Life.’ Let me remind you, too, that the blood is the Life, and that our Sacred Book adds this matchless, this unparalleled, this astounding assertion: ‘Except ye eat the flesh of the Son of man and drink his blood, ye have no life in you.’ Again, I say, I am not now presuming to interpret so marvellous, so stupendous a statement. All I contend for is that it is absolutely unique; and I defy you to produce the shade of the shadow of a similar declaration in any other sacred book of the world. And bear in mind that these two matchless, these two unparalleled declarations, are closely, are intimately, are indissolubly connected with the great central facts and doctrines of our religion: the incarnation, the crucifixion, the resurrection, the ascension of Christ. Vyasa, Zoroaster, Confucius, Buddha, Mohammed, are all dead and buried; and mark this—their flesh is dissolved; their bones have crumbled into dust; their bodies are extinct. Even their followers admit this. Christianity alone commemorates the passing into the heavens of its divine Founder, not merely in the spirit, but in the body, and ‘with flesh, bones, and all things apper-

taining to the perfection of man's nature,' to be the eternal source of life and holiness to his people.

“The two unparalleled declarations quoted by me from our Holy Bible make a gulf between it and the so-called Sacred Books of the East which sever the one from the other utterly, hopelessly, and forever,—not a mere rift which may be easily closed up, not a mere rift across which the Christian and the non-Christian may shake hands and interchange similar ideas in regard to essential truths, but a veritable gulf which cannot be bridged over by any science of religious thought; yes, a bridgeless chasm which no theory of evolution can ever span. Go forth, then, ye missionaries, in your Master's name; go forth into all the world, and, after studying all its false religions and philosophies, go forth and fearlessly proclaim to suffering humanity the plain, the unchangeable, the eternal facts of the gospel,—nay, I might almost say, the stubborn, the unyielding, the inexorable facts of the gospel. Dare to be downright with all the uncompromising courage of your own Bible, while with it your watchwords are love, joy, peace, reconciliation. Be fair, be charitable, be Christ-like, but let there be no mistake. Let it be made absolutely clear that Christianity can not, must not, be watered down to suit the palate of either Hindu, Parsee, Confucianist, Buddhist, or Mohammedan, and that whosoever wishes to pass from the false religion to the true can never hope to do so by the rickety planks of compromise, or by the help of faltering hands held out by half-hearted Christians. He must leap the gulf in faith, and the living Christ will spread his everlasting arms beneath and land him safely on the Eternal Rock.”

APPENDIX B.

NOTES ON THE COMPARATIVE IMMUNITY OF THE JEWISH NATION FROM INFECTIOUS DISEASES.*

The interesting nature of this question, upon which conflicting opinions are being publicly expressed, will plead an excuse for the insertion of the following remarks, from the pen of one specially competent to deal therewith.

The Jews certainly do enjoy immunity from the ravages of cholera, fever, and small-pox in a remarkable degree. Their blood seems to be in different condition from that of other people.

The public papers reported that there was not one case of death among the Jews from cholera in Naples during the last visitation, though many thousands of the natives died. The *average* life of Jews is also of greater duration than that of most other classes,—this although they suffer much privation, and for the most part live in unwholesome localities, and are obliged to work at disagreeable and even injurious employment. They seem less receptive of disease caused by blood poisoning than others.

The Mosaic laws as to diet and cleanliness have been strictly observed by them during many hundred generations, and must have materially benefited their constitution.

As to diet,—the laws against offering in sacrifice any maimed or injured animal, or one out of condition, have led to abstinence from all animal food which is injured or diseased. Careful inspection of animals is practised by competent persons after slaughter, and this bars the possibility of contamination and transmission of disease through animal food. The prohibition to eat of blood has ever been most strictly obeyed. All trace of blood is cleansed out of (what has been officially passed as pure and wholesome) meat before cooking,—so that this source of disease is also stopped. Hence the Jewish constitution can and does *resist* infection. The sobriety and temperance of their habits also strengthen their resisting power.

* Contributed to the Journal.

The Jews also benefit, not only by the annual thorough *turning out* of their dwellings at Passover and by the whitewashing; but by the ceremonial bathing, especially on the eve of the weekly Sabbath, which is also practised, and conduces to cleanliness.

It is worthy of note that at a recent annual inspection of the Whitechapel Baths and Washhouses, the Inspector, Colonel —, reported that these institutions were mainly supported by Jews and Jewesses, who resort to them in thousands annually.

Ceremonial purification of the person, the clothing, and the dwellings among Jews does check the spread of disease, and help to strengthen the constitutional immunity created in past generations by obedience to the law of God as to diet and purification.

E. A. FINN,

Member of the Royal Asiatic Society.

APPENDIX C.

RECENT EGYPTIAN DISCOVERIES.

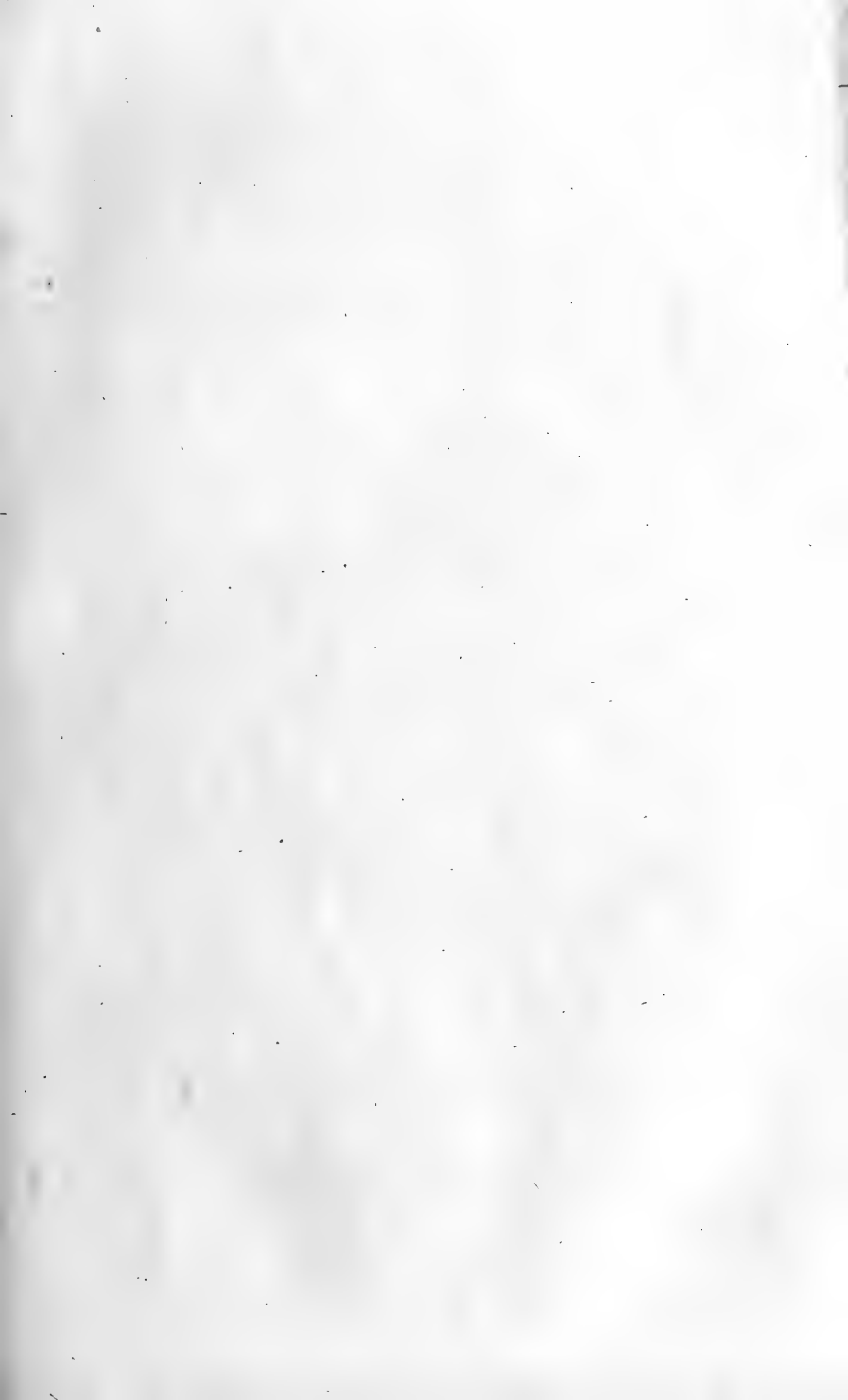
The work of excavating the ruins of the Great Temple of Bubastis, which were discovered last year by M. Naville, has lately been resumed with very interesting and important results.

Last year two great halls had been discovered—a grand hypostyle hall, strewn with fallen monolithic columns of the 12th dynasty workmanship, and a hall without columns, but lined with elaborate bas-relief sculptures, representing a great religious ceremony, and containing tens of thousands of minutely-executed hieroglyphic inscriptions. A third hall, dating from the reign of Osorkon I. has now been found between the hypostyle hall of Rameses II. and the festival hall of Osorkon II. The roof was supported by two large columns with palm capitals, and the walls were sculptured with bas-reliefs on a large scale, representing Orsokon I. in the act of worshipping Bast and the other deities of the city. Eastward,—that is to say, at the end by which the temple was entered,—two parallel trenches have revealed the site of a colonnade ; and here the base of a statue of Nectanebo I., has been found : thus showing that he made additions to both extremities of the structure. The western end, now in course of excavation, appears to be of great width ; but its length is as yet not ascertained. That it contains the sanctuary may be taken for granted, and the sanctuary is probably the work of Nectanebo.

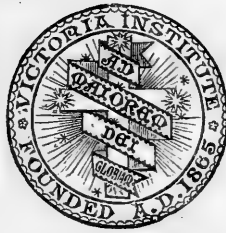
Within the hall a series of remarkable discoveries have been made, showing that Bubastis was the site of an important settlement. They consist of two black granite statues, of the unmistakable Hyksos types ; the lower half of a seated statue of an unknown King, also of Hyksos work ; and a fine red granite architrave engraved with the cartouche of Apepi, the most famous of the Hyksos rulers. The third of these, the statue broken off at the waist, is the most remarkable of them. M. Naville, writing in April this year, 1888, sends the following description :—

“Our most important discovery up to the present time was made yesterday morning. I had noticed on Friday the corner of a block of polished black granite which I thought might belong to some good monument, and I had it unearthed yesterday. It proved to be the lower half of a life-sized figure of very beautiful workmanship, with two columns of finely-cut hieroglyphs engraved down each side of the front of the throne to right and left of the legs of the statue. These inscriptions give the name and titles of an absolutely unknown King, who, judging from the work, must belong to the Hyksos period, or, at all events, to one of the obscure dynasties preceding the Hyksos invasion. I forward a copy of the inscriptions. One cartouche contains a sign which is quite new to me, and which I cannot therefore decipher. The other reads ‘I-an-Ra’ or ‘Ra-Ian,’—a name unlike any I have ever seen. He is described, most strangely, as the worshipper of his Ka (*i.e.* his ghost, or double). . . .” M. Naville then mentions that the Pharaoh of Joseph is called “Reiyân the son of El Walîd” in Arab literature, but attaches no weight to this fact, for the utter valuelessness of Egyptian history, when written with the reed pen of the Arab Chronicler, is only too well known. A writer in the *Times* adds: “In the meanwhile it must be conceded that the letter-for-letter identity of the two names is, to say the least of it, very extraordinary. We must not, however, forget that ‘Ra-ian,’ may with equal correctness be read ‘I-an-Ra,’ and ‘I-an-Ra’ is curiously like the name of the Hyksos ‘Iannas’ or ‘Janias,’ who, in a long quotation which professes to be given *verbatim* from Manetho by Josephus (answer to Apion, Book I., section 14), is said to have reigned for fifty years and one month, and to have been the successor of Apôphis, and the predecessor of Assis. It would be unreasonable to doubt that Iannas is as truly an historical personage as Apepi; and it is at least possible that Iannas and I-an-Ra may be one and the same. That Joseph served a Hyksos King has long been accepted by the majority of Egyptologists as a very probable hypothesis, both chronologically and from the internal evidence of the Biblical narrative.”

[As M. Naville is one of the members of this Institute, a paper giving the final results of the explorations may be expected.]







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- IX. Geological. By Dawson and others.
- X. On Physical Science.
- XI. Various.
- XII. Geological. By Dawson and others.
- XIII. Religious.
- XIV. Religious.
- XV. On Creeds.
- XVI. Materialism.
- XVII. Archæology.
- XVIII. Antiquity of Man.
- XIX. Christianity.
- XX. Religion and Modern Thought.
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- Philosophical Transactions. 10 vols. By Baddam.
- Philosophy, a Sketch of a. By J. G. McVicar, D.D.
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- Philosophy of the Seven Principles. By John Coutts.
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 Planters' Association of Ceylon, Proceedings of.
 Plants of New South Wales. By F. Von Mueller.
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 Pocket of Pebbles, A. By W. Philpott.
 Poems. By A. J. Hollingsworth.
 Polynesia, Nineteen Years in. By Rev. G. Turner, LL.D.
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 Positivism and Mr. Frederic Harrison. Rev. W. Arthur, M.A.
 Power of the Soul over the Body. By G. Moore, M.D.
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 Pre-Adamite Man.
 Presbyterian Council, Report of.
 Present Day Tracts. Vols. I. to IX.
 Principia. By Sir Isaac Newton.
 Printer, The.
 Prodromus. 20 vols. By A. de Candolle.
 Prophecy. By A. Keith, D.D.
 Prophecy Fulfilled. By Rev. B. W. Savile, M.A.
 Prophecy, Interpretation of. By J. W. Brooks.
 Prophetic Outlines. 2 vols. By J. Rees Mogg.
 Protestantism, History of. By J. A. Wylie, LL.D.
 Protoplasm. By Prof. Lionel Beale, F.R.S.
 Prussia, History of.
 Psychology, Comparative. By J. Bascom.
 Punjabis, Proper Names of. By Capt. Temple.

Q.

Quartz and Opal, Treatise on. G. W. Traill.

R.

- Radiation, Phenomena of. By G. Warington, F.C.S.
 Reasons for Renouncing Infidelity. By G. Sexton, LL.D.
 Recent Discoveries on the Temple Hill. Rev. J. King, M.A.
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 Records of the Past. Vols. I. to III.
 Recovery of Jerusalem. By Wilson and Warren.
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 Regeneration.
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 Religious Belief and its Difficulties. By J. Quarry, D.D.
 Religious Progress.
 Religious Subjects, Thoughts on.
 Responsibility in Mental Disease. By H. Maudsley, M.D.
 Review of Articles on Church of England. By W. Peters.
 Rolleston, Miss, Letters of. By C. Dent.
 Roman Creed, The. By A. Dallas.
 Rome. By Canon Trevor, M.A.
 Rule of the Road. By Thomas Gray.
 Ruling Mind, The.
 Russia, History of. 2 vols.

S.

- Sabbath, The. By Rev. G. Blencowe.
 Sabbath Question, The Bible on the. By C. Hill.
 Sacred and Profane Literature. By R. Gray, D.D.
 Samoa. By Rev. G. Turner, LL.D.
 Satan of Scripture, The.
 Satan, The Gospel according to. By S. Gray, M.A.
 Sceptical Fallacies Examined. By Rev. W. J. Hall, M.A.
 Sceptic's Creed, The. By Rev. N. Loraine.
 Science and the Bible : introductory Essays classified for lecturers
 by Captain F. Petrie, Hon. Sec. of the Institute.
 Science and Christian Thought. By Prof. Duns, D.D.
 Science and Religion. By A. Winchell, D.D.
 Science and Revelation.
 Science a Stronghold of Belief. By R. B. Painter, M.D.
 Science, Discoveries in. By Sir G. D. Gibb.

- Science Gossip. 10 vols.
 Science without God. By H. Didon.
 Scientific and Learned Societies, Official Year-Book of.
 Scientific Materialism. By G. Sexton, LL.D.
 Scientific Scepticism, Baseless Fabric of. By G. Sexton, LL.D.
 Scientists' Directory, International.
 Scripture and Nature.
 Scripture and Science. By J. E. Howard, F.L.S.
 Scripture and Science not at Variance. By Rev. J. H. Pratt,
 M.A. F.R.S.
 Scripture Biography and its Teachings. By J. Hassell, A.K.C.
 Select Plants. By Baron Sir F. Von Mueller, K.C.M.G.
 Sensualistic Philosophy of Nineteenth Century. By Prof.
 Dabney, D.D.
 Sermons. 2 vols. By Rev. Dr. Arnold.
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 Sermons in Stones. By D. McCausland, Q.C. LL.D.
 Sermons, Miscellaneous.
 Shaftesbury, The Earl of.
 Shinar. By D. McCausland, Q.C. LL.D.
 Sinai. By H. S. Palmer, M.A.
 Socialism and Communism. By Rev. M. Kauffmann, M.A.
 Socialism, French and German. By R. T. Ely, Ph.D.
 Societies, Journals, Transactions, and Reports of:—
 American Institute of Christian Philosophy.
 American Philosophical Society.
 Anthropological Society of Washington.
 Anuario del Observatorio Astronomico Nacional de Tacubayo.
 Arts, Society of.
 Biblical Archæology, Society of.
 Canadian Institute.
 Chronological Institute.
 Ethnology, Bureau of.
 Geographical Society, American.
 Geographical Society, Royal.
 Geological Society.
 Harrow Naturalists' Field Club.
 Michigan Board of Agriculture.
 National Association for the Promotion of Social Science,

Societies, Journals, Transactions, and Reports of—*continued*:—

- New Zealand Institute.
 Palestine Exploration Fund.
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 Royal Institution.
 Royal Society.
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 Science Department, Tokio.
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 Technical Education, New South Wales, Report on.
 United Service Institution.
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 Wagner Free Institute of Science.
 Warwickshire Natural History Society.
 Solar Fictions. By A. Freeman.
 Solar Light and Heat. By Z. Allen, LL.D.
 Solomon, The Proverbs of. By J. W. Brooks, M.A.
 Solution of the Pyramid Problem. By R. Ballard.
 Soul's Life, The. By E. Garbett, M.A.
 Sower, Parable of the. By R. Brown.
 Speaker's Commentary. See *Bible*.
 Species not Transmutable. By C. R. Bree, M.D.
 Spirit Scenes of the Bible. By A. R. Morgan, M.A.
 Spiritual Problems, Keys to.
 Stars, Science of the. By A. J. Pearce.
 Stars, Testimony of the. By F. Rolleston.
 Stonewall Jackson, Life of. By Prof. Dabney, D.D.
 Story of Creation. By Rev. T. S. Ackland, M.A.
 Story of the Rocks. By L. N. Vail.
 Studies on the Times of Abraham. By Rev. H. G. Tomkins.
 Sunday. By C. Hill.
 Sunday Labour, Continental. By C. Hill.
 Sunlight. By H. P. Malet.
 Supernatural in Nature. By Rev. J. W. Reynolds, M.A.
 Supernatural Revelation. By Rev. Prof. Birks.
 Surgeons of New York. By S. W. France.
 Swedenborg's Writings and Catholic Teaching. Clissold.

- Sydney Observatory. Results, 1871-81, and 1877-8.
 Syriac Miscellanies. By B. H. Cowper.
 Syro-Egyptian Society. Papers.

T.

- Tacitus. 2 vols. Bekker.
 Temple, The. By J. Elliott.
 Temptation of Jesus, The.
 Tempted to Unbelief. By E. F. Burr, D.D.
 Tenby. By P. H. Gosse, F.R.S.
 Testament, New R.V.
 Theology, Instruction in. Vols. II. and III. J. Boyle, D.D.
 Theology, Natural, Philosophy of. By W. Jackson, M.A.
 Theology, Natural. By A. Mahan, D.D.
 Theology, Natural. By W. Paley, D.D.
 Theology, System of. By Prof. Dabney, D.D.
 Theory of the Arts. 2 vols. By G. Harris.
 Theosophic Correspondence. By S. Martin.
 Thoughts on the Kingdom of God. By W. Niven, B.D.
 Tillotson, Miscellaneous Works of. 10 vols.
 Ti-Ping Revolution, History of. By Lin Le.
 Traditions of Eden. By H. Sheppard, M.A.
 Treasury of David. Vol. I. By Rev. C. H. Spurgeon.
 Trinitarian Doctrine, Philosophy of. By Rev. A. G. Pease.
 True Bread of Life, The. By J. Harrison, D.D.
 Truth Defended, The. Various Authors.
 Truth of the Bible, The. By Rev. B. W. Savile, M.A.
 Truths *versus* Shadows. By F. R. Waring.

U.

- United States Geological Survey (see Societies).
 Unity and Harmony of God's Word. By J. Coutts.
 Universal Beliefs. By E. F. Burr, D.D.
 Universe, Divine Order of the. By A. Clissold, M.A.
 Unseen Universe, The. By Stewart and Tait

V.

- Variation of Species. By T. V. Wollaston, M.A.
 Vatican, The, and St. James's. By J. Lord.
 Vegetable Kingdom, Lectures on the. By W. Woolls
 Vestiges of the Natural History of Creation.
 Victory over Death, The. By W. Niven, B.D.
 Victories and Defeats. By Major-General Anderson.
 Virgil. 3 vols. By T. Seymour Burt.
 Visible Origin of Language.
 Visit to the Isle of Wight. By John Bridge.
 Vital Force, Laws of. By E. Haughton.
 Vulgar Tongue. By Rev. T. Lysons, M.A.

W.

- Weather, The. By Observer.
 Weather Book, The. By Admiral Fitzroy.
 Wesleyan Methodist Conference, Minutes of.
 Western Palestine, Survey of. By Trelawney Saunders.
 Westminster Confession tested. By Rev. A. Stewart.
 What I believe. By L. Tolson.
 What is Matter? By an Inner Templar.
 Whitaker's Almanack.
 Who are We? By J. T. Harrison.
 Wide-awake Stories. By Steel and Temple.
 William III. of Prussia. By W. B. Kingston.
 Winds of Doctrine. By C. Elam, M.D.
 Witnesses from the Dust. By Rev. J. M. Fradenburgh, M.A.
 Wonders of Creation. By M. Josephs.
 Word, Work, and Will. By Archbishop Thomson.
 World-wide Crisis, The. By A. Duff, D.D.
 World Without End. By Rev. S. Garratt, M.A.

Y.

Year-Books of Various Societies.

Z.

Zoology, A Manual of. In Samoan.



OBJECTS, CONSTITUTION, AND BYE-LAWS
 OF
The Victoria Institute,
 OR
Philosophical Society of Great Britain.

Adopted at the First Annual General Meeting of the Members and Associates, May 27th, 1867, with Revisions of 1874-5.

§ I. *Objects.*

1. THE VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, is established for the purpose of promoting the following objects, viz.:—

First. To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture; with the view of reconciling any apparent discrepancies between Christianity and Science.

Second. To associate together men of Science and authors who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association; and, by bringing together the results of such labours, after full discussion, in the printed transactions of an Institution: to give greater force and influence to proofs and arguments which might be little known, or even disregarded, if put forward merely by individuals.

Third. To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which Science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote

the real advancement of true Science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, who, in His wisdom, created all things very good.

Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute.

Fifth. When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, and to publish such Lectures.

Sixth. To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real science, and generally in furtherance of the objects of this Society.

Seventh. To found a Library and Reading Rooms for the use of the Members and Associates of the Institute, combining the principal advantages of a Literary Club.

§ II. *Constitution.*

1. The Society shall consist of Members and Associates, who in future shall be elected as hereinafter set forth.

2. The government of the Society shall be vested in a Council, to which members only shall be eligible, consisting of a President, two or more (not exceeding seven) Vice-presidents, a Treasurer, one or more Honorary Secretaries, and twelve or more (not exceeding twenty-four) Ordinary Members of Council, who shall be elected at the Annual General Meeting of the Members and Associates of the Institute. But, in the interval between two annual meetings, vacancies in the Council may be filled up by the Council from among the Members of the Society; and the Members chosen as Trustees of the funds of the Institute shall be *ex officio* Members of Council.

3. Any person desirous of becoming a Member or Associate shall make application for admission by subscribing the Form A of the Appendix, which must be signed by two Members of the Institute, or by a Member of Council, recommending the candidate for admission as a Member; or by any one Member of the Institute, for admission as an Associate.

4. Upon such application being transmitted to one of the Secretaries, the candidate for admission may be elected by the Council, and enrolled as a Member or Associate of the Victoria Institute, in such manner as the Council may deem proper; having recourse to a ballot, if thought necessary, as regards the election of Members; in which case no person shall be considered as elected unless he have three-fourths of the votes in his favour.

5. Application for admission to join the Institute being thus made by subscribing Form A, as before prescribed, such application shall be considered as *ipso facto* pledging all who are thereupon admitted as Members or Associates to observe the Rules and Bye-Laws of the Society, and as indicative of their desire and intention to further its objects and interests; and it is also to be understood that only such as are professedly Christians are entitled to become *Members*.

6. Each Member shall pay an Entrance Fee of One Guinea and an Annual Contribution of Two Guineas. A Donation of Twenty Guineas shall constitute the donor a Life Member.

7. Each Associate shall pay an Annual Contribution of One Guinea. A donation of Ten Guineas shall constitute the donor a Life Associate.

8. The Annual Contributions shall be considered as due in advance on the 1st day of January in each year, and shall be paid within three months after that date; or, in the case of new admissions, within three months after election.

9. Any Member or Associate who contributes a donation in one sum of not less than Sixty Guineas to the funds of the Institute shall be enrolled as a Vice-Patron thereof, and will thus also become a Life Member or Life Associate, as the case may be.

10. Should any member of the Royal Family hereafter become the Patron, or a Vice-Patron, or Member of the Institute, the connexion shall be regarded as purely Honorary; and none of the Rules and Bye-Laws relating to donations, annual contributions, or obligations to serve in any office of the Society, shall be considered as applicable to such personages of Royal Blood.

11. Any Member or Associate may withdraw from the Society at

any time, by signifying a desire to do so by letter, addressed to one of the Secretaries ; but such shall be liable for the contribution of the current year, and shall continue liable for the annual contribution, until all sums due to the Society from such Member or Associate shall have been paid, and all books or other property borrowed from the Society shall have been returned or replaced.

12. Should there appear cause, in the opinion of the Council, for the exclusion from the Society of any Member or Associate, a private intimation may be made by direction of the Council, in order to give such Member or Associate an opportunity of withdrawing from the Society ; but, if deemed necessary by the Council, a Special General Meeting of Members shall be called for the purpose of considering the propriety of expelling any such person : whereat, if eleven or more Members shall ballot, and a majority of those balloting shall vote that such person be expelled, he shall be expelled accordingly. One month's notice, at least, shall be given to the Members of any such Special General Meeting.

13. Non-resident Members and Associates, or others desirous of promoting the objects and interests of the Institute, may be elected by the Council to act as Corresponding Members abroad, or as Honorary Local Secretaries, if within the United Kingdom, under such arrangements as the Council may deem advisable.

14. The whole property and effects of the Society shall be vested in two or more Trustees, who shall be chosen at a General Meeting of the Society.

14a.* Special donations to the endowment fund, whether from Members, Associates, or others desirous of promoting the objects and interests of the Institute, shall be invested in the names of the Trustees.

14b. The Trustees are empowered to invest the Endowment Fund in other securities than Three per Cent. Annuities, such other securities being the Bonds of the Corporation of London, or Guaranteed Indian Railway Debentures, or Debenture Stocks.

14c. All moneys received on account of the Institute shall be duly paid to its credit at the Bankers, and all cheques shall be drawn, under authority of the Council, and shall be signed by the Honorary Treasurer and Honorary Secretary.

15. The accounts shall be audited annually, by a Committee, consisting of two Members,—one of whom may be on the Council,—to be elected at an Ordinary Meeting of the Society preceding the Anniversary Meeting. This Committee shall make a written Report

to the Council at the first Meeting after such audit, and also to the Institute, upon the day of the Annual General Meeting,—stating the balance in the Treasurer's hands and the general state of the funds of the Institute.

16. Both Members and Associates shall have the right to be present to state their opinion, and to vote by show of hands at all General and Ordinary Meetings of the Society; but Members only shall be entitled to vote by ballot, when a ballot is taken in order to determine any question at a General Meeting.

§ III. *Bye-Laws* (Privileges).

1. A Member or Associate, when elected, shall be so informed by the Secretary in a printed copy of the letters, Form B, in the Appendix.

2. Members and Associates shall not be entitled to any privileges, or have the right to be present, or to vote at any of the Meetings of the Society, till they have paid the contributions due by them.

3. Annual subscriptions shall be considered as in arrear, if not paid on or before 31st March in each year, or within three months after election, as the case may be.

4. Should any annual subscription remain in arrear to the 30th June, or for six months after election, the Treasurer shall cause to be forwarded to the Member or Associate from whom the subscription is due, a letter, Form D, in the Appendix, unless such Member or Associate reside out of the United Kingdom; in which case the Form D shall not be sent unless the subscription continues unpaid till the 30th September.

5. If any arrears be not paid within twelve months, the Council shall use their discretion in erasing the name of the defaulter from the list of Members or Associates.

6. Members shall be entitled to introduce two Visitors at the Ordinary Meetings of the Society; and to have sent to them a copy of all the papers read before the Society, which may be printed in its Transactions* or otherwise, and of all other official documents which the Council may cause to be printed for the Society; they will also be entitled to a copy of all such translations of foreign works or other

* And the Transactions issued in the years during which they have not subscribed may be purchased at half price.

books as are published under the auspices of the Society in furtherance of Object 6 (§-I).

7. Associates may introduce one visitor at the Ordinary Meetings, and shall be entitled to all the minor publications of the Society, and to a copy of its Transactions during the period of their being Associates, but not to the translations of foreign works or other books above referred to.* It shall, however, be competent to the Council of the Society, when its funds will admit of it, to issue the other publications of the Society to Associates, being ministers of religion, either gratuitously or at as small a charge as the Council may deem proper.

8. When it shall be found necessary to send the letter, Form D, to any Member or Associate who may be in arrear, the printed papers and other publications of the Society shall cease to be sent to such Member or Associate till the arrears are paid; and, until then, he shall not be allowed to attend any Meeting of the Society, nor have access to any public rooms which may be in its occupation.

9. The Library† shall be under the management and direction of the Council, who are empowered to designate such works as shall not be allowed to circulate.

10. Each Member‡ shall be allowed to borrow books from the Library, and to have not more than three volumes in his possession at the same time; pamphlets and periodical publications not to be kept above fourteen days, nor any other book above three weeks.

11. Members who may borrow books from the Library shall be answerable for the full value of any work that is lost or injured.

12. Periodical publications shall remain on the table for a month, other books for a fortnight, after they are received.

13. When a book or pamphlet is wanted, and has been the stipulated time in the possession of any Member, the Secretary shall request its return, and a fine of threepence a day shall be incurred for every day it may be detained, which fine shall commence on the third day after the transmission of the notice in the case of town Members, and after the sixth day in the case of country Members; and until the return of such works, and the discharge of all fines incurred, no further issue of books shall be permitted to the Member applied to.

* These, as well as the Transactions issued in the years during which they have not subscribed, may be purchased at half price.

† For the use of the Members and Associates.—See 7th Object.

‡ Members only are allowed to take books away.

14. The books shall be ordered in for inspection at such times as the Council shall appoint, and a fine of half-a-crown shall be incurred for neglecting to send in books by the time required in the notice.

15. A Book shall lie on the Library table in which Members may insert, for the consideration of the Council, the titles of such works as they desire to be purchased for the Institute.

§ IV. *Bye-Laws* (General, Ordinary, and Intermediate Meetings).

1. A General Meeting of Members and Associates shall be held annually on May 24th (being Her Majesty's birthday, and the Society's anniversary), or on the Monday following, or on such other day as the Council may determine as most convenient, to receive the Report of the Council on the state of the Society, and to deliberate thereon; and to discuss and determine such matters as may be brought forward relative to the affairs of the Society; also, to elect the Council and Officers for the ensuing year.

2. The Council shall call a Special General Meeting of the Members and Associates, when it seems to them necessary, or when required to do so by requisition, signed by not less than ten Members and Associates, specifying the question intended to be submitted to such Meeting. Two weeks' notice must be given of any such Special General Meeting; and only the subjects of which notice has been given shall be discussed thereat.

3. The Ordinary Meetings of the Society shall usually be held on the first and the Intermediate Meetings on the third Monday evenings in each month, from November to June inclusive, or on such other evenings as the Council may determine to be convenient: and a printed card of the meetings for each Session shall be forwarded to each Member and Associate.

4. At the Ordinary and Intermediate Meetings the order of proceeding shall be as follows:—The President, or one of the Vice-Presidents, or a Member of the Council, shall take the chair at 8 o'clock precisely, the minutes of the last Ordinary or Intermediate Meeting shall be read aloud by one of the Secretaries, and, if found correct, shall be signed by the Chairman; the names of new Members and Associates shall be read; the presents made to the Society since their last Meeting shall be announced; and any other communications which the Council think desirable shall be made to the Meeting. After which, the Paper or Papers intended for the evening's discussion shall be announced and read, and the persons

present shall be invited by the Chairman to make any observations thereon which they may wish to offer.

The claims of Members and Associates to take part in a discussion are prior to those of Visitors. The latter, when desiring to speak upon any Paper, must first send their cards to the Chairman and ask permission (unless they have been specially invited by the Council "to attend, and join in considering the subject before the Meeting," or are called upon by the Chairman): 1875.

5. The Papers read before the Society, and the discussions thereon, fully reported, shall be printed by order of the Council; or, if not, the Council shall, if they see fit, state the grounds upon which this Rule has been departed from, in the printed Journal or Transactions of the Society.

6. The Council may at their discretion authorise Papers of a general kind to be read at any of the Ordinary or Intermediate Meetings, either as introductory lectures upon subjects proper to be afterwards discussed, or as the results of discussions which have taken place, in furtherance of the 5th Object of the Society (§ I.).

7. With respect to Intermediate Meetings, the Papers read at which are not necessarily printed nor the discussions reported,* the Council, at its discretion, may request any lecturer or author of a paper to be read thereat, previously to submit an outline of the proposed method of treating his subject.

8. At the Ordinary or Intermediate Meetings no question relating to the Rules or General Management of the affairs of the Society shall be introduced, discussed, or determined.

§ V. *Bye-Laws* (Council Meetings).

1. The Council shall meet at least once every month from November to June inclusive, or at any other time and on such days as they may deem expedient. The President, or any three Members of the Council, may at any time call a special Meeting, to which the whole Council shall be summoned.

2. At Council Meetings three shall be a quorum; the decision of the majority shall be considered as the decision of the Meeting, and the Chairman shall have a casting vote.

3. Minutes of the proceedings shall be taken by one of the Secretaries, or, in case of his absence, by some other Member present,

* So arranged when the "Intermediate Meetings" were commenced, 16th January, 1871.

whom the Chairman may appoint ; which Minutes shall afterwards be entered in a minute-book kept for that purpose, and read at the next Meeting of the Council, when, if found correct, they shall be signed by the Chairman.

§ VI. *Bye-Laws* (Papers).

1. Papers presented to be read before the Society shall, when read, be considered as the property of the Society, unless there shall have been any previous engagement with its author to the contrary ; and the Council may cause the same to be published in any way and at any time they may think proper after having been read. If a Paper be not read, it shall be returned to the author ; and, if a Paper be not published within a reasonable time after having been read, the author shall be entitled himself to publish it, and he may borrow it for that purpose.

2. When a Paper is sent to the Society for the purpose of being read, it shall be laid before the Council, who shall refer it to two of that body, or of the other Members or Associates of the Society whom they may select, for their opinions as to the character of the Paper and its fitness or otherwise for being read before the Society, which they shall state as briefly as may be, in writing, along with the grounds of their respective opinions. Should one of such opinions be adverse to the Paper and against its being read before the Society, then it shall be referred to some other referee, who is unaware of the opinion already pronounced upon the Paper, in order that he may state his opinion upon it in like manner. Should this opinion be adverse to the Paper, the Council shall then consult and decide whether the Paper shall be rejected or read ; and, if rejected, the Paper shall be returned to the author with an intimation of the purport of the adverse opinions which have been given with respect to it ; but the names of the referees are not to be communicated to him, unless with their consent or by order of the Council. All such references and communications are to be regarded as confidential, except in so far as the Council may please to direct otherwise.

3. The Council may authorise Papers to be read without such previous reference for an opinion thereon ; and when a Paper has been referred, and the opinion is in favour of its being read in whole or in part, the Council shall then cause it to be placed in the List of Papers to be so read accordingly, and the author shall receive due notice of the evening fixed for its reading.

4. The authors of Papers read before the Society shall, if they desire it, be presented with twenty-five separate copies of their Paper, with the discussion thereon, or with such other number as may be determined upon by the Council.

§ VII. *Bye-Laws* (General).

1. The government of the Society, and the management of its concerns are entrusted to the Council, subject to no other restrictions than are herein imposed, and to no other interference than may arise from the acts of Members in General Meeting assembled.

2. With respect to the duties of the President, Vice-Presidents, and other Officers and Members of Council, and any other matters not herein specially provided for, the Council may make such regulations and arrangements as they deem proper, and as shall appear to them most conducive to the good government and management of the Society, and the promotion of its objects. And the Council may hire apartments, and appoint persons not being Members of the Council, nor Members or Associates of the Institute, to be salaried officers, clerks, or servants, for carrying on the necessary business of the Society ; and may allow them respectively such salaries, gratuities, and privileges, as to them, the Council, may seem proper ; and they may suspend any such officer, clerk, or servant from his office and duties, whenever there shall seem to them occasion ; provided always, that every such appointment or suspension shall be reported by the Council to the next ensuing General Meeting of the Members, to be then confirmed or otherwise as such Meeting may think fit.

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[Date] _____ 188 .

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I hereby desire to be enrolled a *

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18 .

I have the pleasure to inform you, with reference to your application dated the _____, that you have duly been elected a _____ of the VICTORIA INSTITUTE, or PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

I have the honour to be, Sir,
Your faithful Servant,

To _____

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Your obedient Servant,

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18 .

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I have the honour to be, Sir,
Your faithful Servant,

To _____

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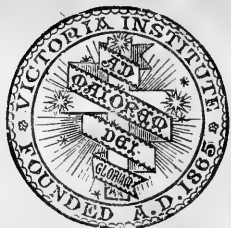
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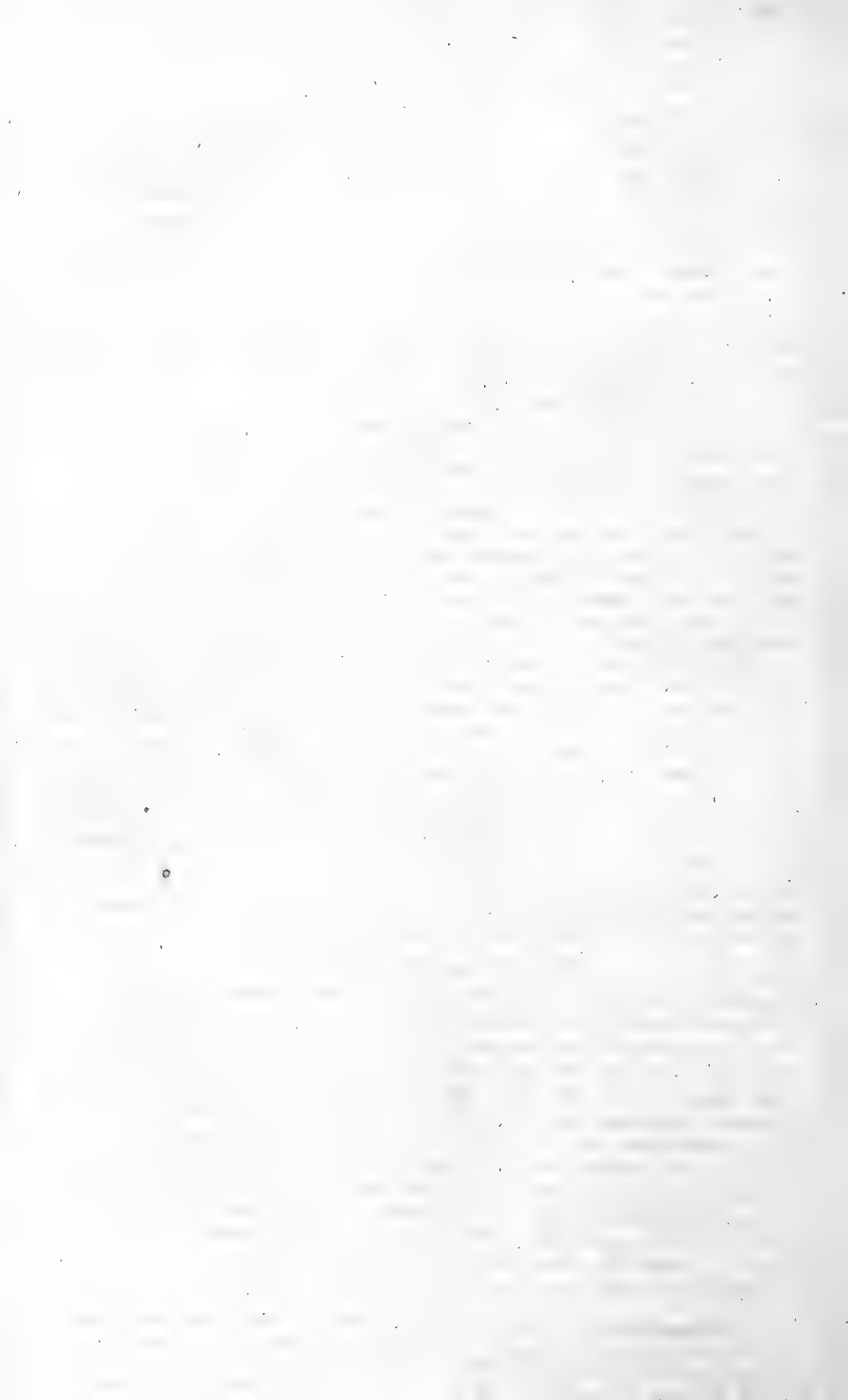
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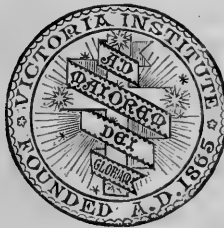
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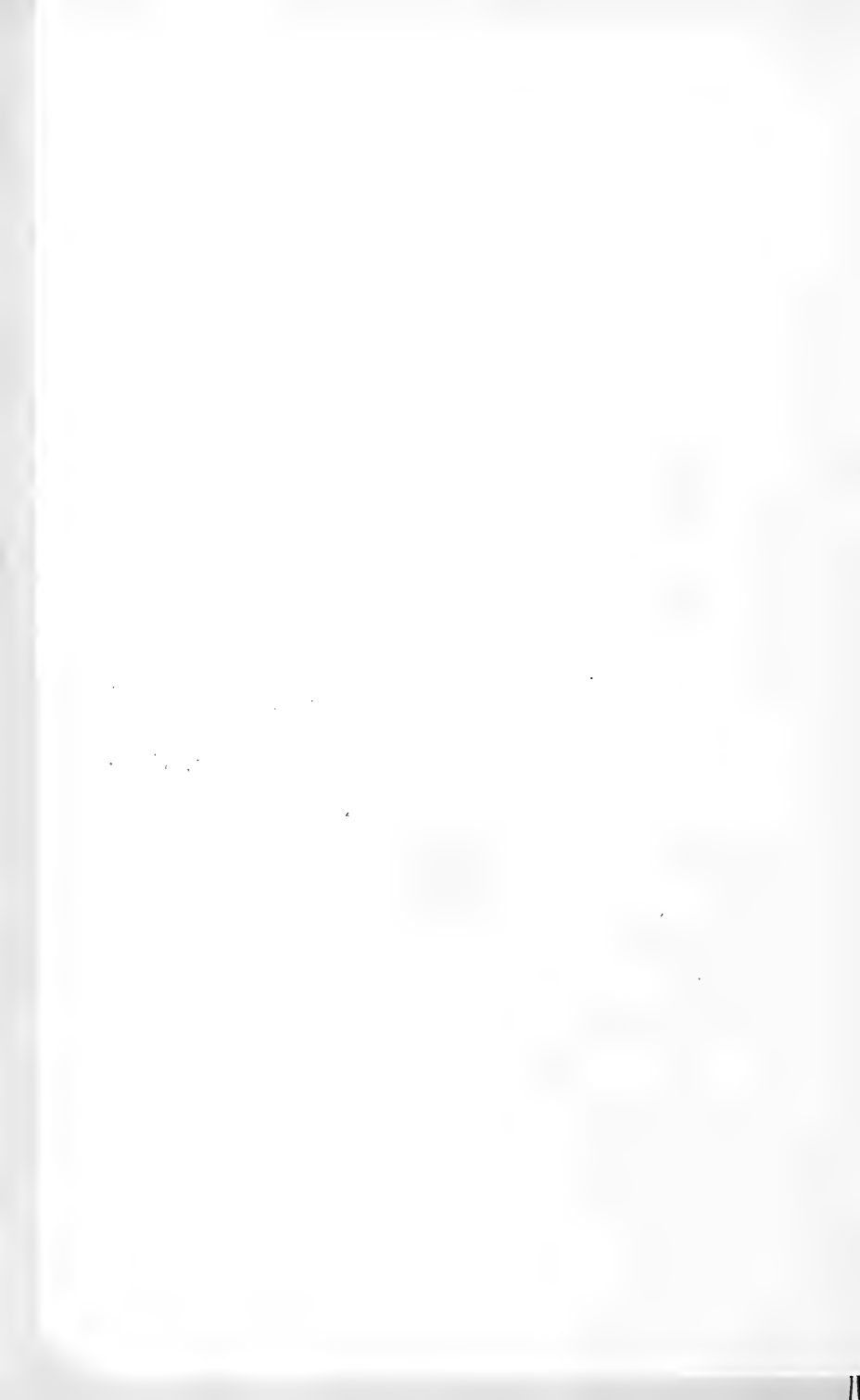
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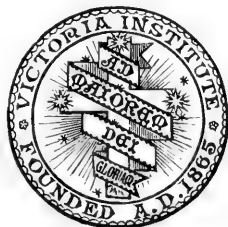


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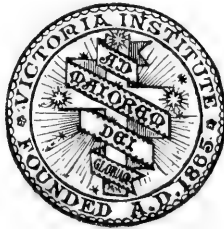
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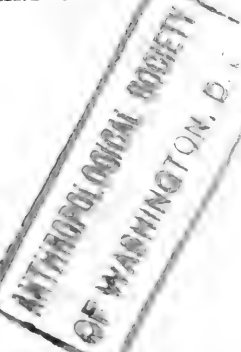
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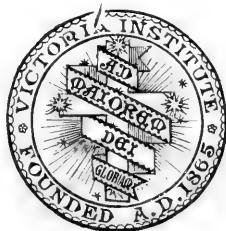
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